INDIAN INDUSTRIAL COMMISSION

MINUTES OF EVIDENCE

1916-17

VOLUME I

Delhi, United Provinces and Bihar and Orissa.



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CORRIGENDA.

On page 28, in lines 24, 25 and 26 *for* ' L. C. ' *read* ' H. P. '

„ 37, in line 44 *for* ' *co-operated* ' *read* ' *co-opted.* '

„ 38, in lines 33 and 35 *for* ' co-operated ' *read* ' co-opted.'

„ 56, in line 29 *for* ' Higginbottom ' *read* ' Higginbothom. '

„ 57 „ 32 *after* the last word ' Board ' insert the words ' of Industries. '

„ 270 „ 47 *for* ' 22 pie ' *read* ' 22 pie. '

„ „ „ 49 „ ' maund ' „ ' lb. '

„ 296 between lines 26 and 27 *insert* the words ' Oral Evidence, 13th November 1916. '

„ 316, in line 44, *for* ' Dhanbad ' *read* ' Dhanbaid. '

„ 318, „ 36, before ' small ' insert ' a. '

„ 327, „ 21, *for* ' yards ' *read* ' yarns. '

„ 375, in lines 2 and 3, *for* ' Provincial Banks finance ' *read* ' Provincial Bank finances. '

„ 385, in line 25, *for* ' supplies ' *read* ' supplies. '

„ 389, „ 53, *for* ' *piece* ' *read* ' *piece.* '

„ 437, „ 44, *for* ' connot ' *read* ' cannot. '

„ 445, „ 39, *for* ' freighte ' *read* ' freight. '

„ 475, „ 28, *for* ' McKenzie ' *read* ' Mackenzie. '

„ 481, after the written evidence of Mr. A. Howard insert ' *The oral evidence of Mr. Howard is confidential.* '

„ 508, in line 54, *for* ' municipal ' *read* ' municipal. '

„ 512, „ 27, *for* ' and their customers to carry ' *read* ' to their customers and carry. '

R. D. BELL,

Secretary, Indian Industrial Commission.

N.B.—Trivial errors which do not obscure the sense are not included in this slip.

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Introductory Notes.

In many cases witnesses before the Indian Industrial Commission have, in their written statements, made references to the Preliminary Note of the Commission and to the list of questions which was issued for the guidance of witnesses. For convenience of reference these are reproduced here.

The Preliminary Note was drawn up in July 1916 at a meeting of the members of the Commission then in India. The object in issuing this Note was to obtain, before the full Commission assembled, suggestions which might form suitable material for enquiry by the full Commission. It is reprinted in this place merely as a document for reference in connection with the evidence. The Note was as follows :—

Preliminary Note on the Scope of Enquiry by the Indian Industrial Commission.

I.—Introduction.

1. The scattered information already available regarding the resources of India in raw material, the suitability of the people for expert labour, and the probable financial resources of the country, is sufficient to show that there are room and opportunity for a very substantial development of manufacturing and other industries.

2. It will be the business of the Commission, after establishing this fundamental proposition by a critical analysis of the facts, to suggest the most profitable lines of action with the object—

(*a*) of drawing out capital now lying idle;

(*b*) of building up an artizan population;

(*c*) of carrying on the scientific and technical researches required to test the known raw materials and to design and improve processes of manufacture;

(*d*) of distributing the information obtained from researches and from the results of experience in other countries; and

(*e*) of developing the machinery for—

(1) financing industrial undertakings, and

(2) marketing products.

3. As the result of the examination of Government records and preliminary discussion with various authorities, the following suggestions have been made regarding problems likely to come before the Commission. These suggestions are now being distributed among the Local Governments with a view of obtaining further suggestions during the current monsoon tour.

4. The President will be grateful for any suggestions in addition to, or in modification of, those given below, in order that, at the end of the monsoon, it will be possible to sketch out a tour programme for the Commission, and to frame a list of questions for the assistance of witnesses.

II.—Collection of Preliminary Information.

5. The Commission will assemble during October next, and, as soon as possible afterwards, will proceed by touring through the provinces, to collect evidence through independent witnesses, representatives of local Committees and institutions, and by personal inspection of industrial enterprises.

6. In view of the limited time at the disposal of the Commission, it would be an advantage in each of those provinces not already provided with a Director of Industries or an Advisory Board, to organise at once a representative Committee assisted, if practicable, by an officer on special duty. Steps to this end have already been taken by some of the Local Governments.

7. These representative Provincial Committees would be responsible for giving precision to questions that are now being discussed vaguely in general terms, for example, by stating them for concrete cases. The Provincial Committees would compile lists of raw materials available locally and suitable for the establishment of new industries, and also lists of raw materials that might be imported as accessory material, or even as the principal raw material, with the same object. From this and other information at their disposal, they would form lists of industries,

already tried or new, that appear to be suitable for encouragement according to the special circumstances of each province, calling attention to enterprises that have been obviously successful or offer distinct promise of success. They might profitably make detailed and, when necessary, confidential studies of a few typical examples of recent failures, in order that the causes which have contributed to such failures may be brought to the notice of the Commission. They would also advise the Commission as to the names of suitable individual or representative witnesses.

8. It is suggested that, during the next cold weather tour, the time at the disposal of the Commission in each province might be divided as follows :—

(*a*) examination of individual witnesses, with, as convenient,

(*b*) visits to typical works or industrial centres, followed by

(*c*) a general conference between the Commission and the representative Provincial Committee.

9. The Commission will devote from a fortnight to three weeks to each of the larger provinces, and it will be an advantage to obtain from each Local Government, before the end of September, a programme indicating the most suitable centres for taking evidence and the most suitable places for visits to representative industries. It will be necessary to obtain, about the same time, a list of the individual witnesses nominated, in order that they may be supplied, about the middle of October, with a series of questions for the preparation of their preliminary written statements. It may be possible, in some cases, however, to nominate after this date additional witnesses on special subjects, but the Provincial Committees will doubtless take care, that, in giving such advice, the programme in each case is not overloaded.

III.—Development of Official Administration.

10. Under this heading arise problems connected with the establishment or development of Imperial and Provincial Departments which are concerned, in one way or another, with industrial enterprise. In some provinces, there are already at work Directors of Industries, assisted by technical experts and in some cases, advised by Boards of Industries, while in other provinces, proposals for a similar organisation are under consideration. It is obvious that, to effect improvements in the unorganised or cottage industries, such as, hand-loom weaving, and in any industry in which local circumstances completely supersede technical considerations, the establishment of provincial departments is likely to be advantageous; but for some of the larger industries, in which purely technical matters are paramount, it may be advisable to form Imperial departments.

11. It has been suggested that such central organisations might be formed for some of the following :—

(*a*) chemistry, including agricultural, metallurgical, tinctorial, and pharmaceutical chemistry;

(*b*) the leather and hide industries;

(*c*) glass-making;

(*d*) sugar and alcohol manufactures;

(*e*) paper making; and

(*f*) oil-seed industries.

12. Opinions might be obtained as to whether any Imperial departments of this description should be constituted, and, if so, for what subjects. The nature of their administration should also be considered, that is, whether their heads should be purely advisory, with inspecting powers, as in the Forest Department, or should have administrative and executive control as in the smaller and more specialised Geological Survey Department.

13. It will be important also to obtain evidence as to the organisation of Provincial Industrial Departments, and the advisability of instituting Provincial Boards of Industries, or Advisory Committees, to include non-official members. Evidence as to the constitution and functions of these Boards or Committees should be obtained.

14. Finally, it will be necessary to obtain opinions regarding the relationship of a Provincial Industries Department with an Imperial department of the kind mentioned in paragraph 11.

15. Evidence might also be obtained on the following points :—

(*a*) the suitability of the present system of collecting and distributing statistics and commercial intelligence, by the Director of Statistics and the Director-General of Commercial Intelligence, respectively;

(*b*) the advantages of establishing or assisting special journals for the chief industries and also general industrial and trade journals;

(*c*) any recognisable advantages which have followed the issue of special monographs and other Government publications such as those of the Forest and Geological Departments;

(*d*) the formation of commercial museums, and of sales agencies or of commercial emporia, in the principal towns of India and possibly abroad, for the display and sale of the products of unorganised cottage industries;

(*e*) the institution of periodical industrial exhibitions;

(*f*) the appointment of trade representatives in other provinces, and, for the whole of India, in Great Britain, the Colonies and foreign countries;

(*g*) the possibility of establishing some system of Government certificates regarding the quality of products, accompanied by the institution of testing laboratories;

(*h*) the regulations of trade marks and the working of the patent laws; and

(*i*) the suitability of the present law for the acquisition of land on behalf of industrial companies.

IV.—Government Aid to Industries.

16. Evidence might suitably be collected regarding the experience so far obtained of financial and technical assistance rendered to industrial enterprises, and opinions might be obtained as to the most suitable form in which Government aid can be given to existing or to new industries.

17. The following methods have been suggested, and some have been tried, at different times:—

(*a*) loans and money grants-in-aid;

(*b*) supply of machinery and plant by Government on the hire-purchase system;

(*c*) guaranteed dividends for a limited period, with or without subsequent refund to Government of the expenditure incurred in paying dividends at the guaranteed rate;

(*d*) guaranteed Government purchase of products for limited periods;

(*e*) concessions of land;

(*f*) special railway transport facilities and rates;

(*g*) bounties and subsidies;

(*h*) pioneering industries and handing them over to private companies;

(*i*) loan of services of Government employed experts.

18. With regard to any of these forms of direct Government assistance, it will be important to obtain opinions as to whether, and to what extent, they should be accompanied by Government control, as for instance, by the appointment of Government Directors for the period during which the direct assistance lasts. The information collected by officers placed on special duty will assist the Provincial Committees and the Commission in considering the extent to which Government aids to new enterprises will compete with those already existing and with established external trades.

V.—Technical and Scientific Work.

19 (*a*) What can be done to improve the labourers' efficiency and skill, generally or in particular industries? What advantages have followed from the establishment of industrial schools? What experience has been gained in training apprentices in factories or workshops?

(*b*) What steps are desirable for the improvement of supervisors of all grades and of skilled managers? Should assistance be given to these, or to technical experts of private firms, or to Government officials, to study conditions and methods in other countries? It is important to obtain some idea as to the benefits that have been gained by the deputation of officers abroad for special enquiries, or on ordinary study leave.

(*c*) What noticeable benefits have local industries received from researches conducted by Government Departments?

(*d*) What experience has been gained from demonstration factories? It would be interesting to obtain opinions as to where, and what kind of, factories should be instituted in each province.

(*e*) Problems have been referred at times to the Scientific and Technical Department of the Imperial Institute; it is important to obtain from those who have utilised the Institute, opinions as to the relative merits of conducting researches in India and in England.

(*f*) It is understood that the activities of the new Advisory Council for Research in the United Kingdom may extend to India and Colonies; it will be useful to have opinions from scientific and technical men as to ways in which this opportunity may be utilised.

(*g*) It is important to obtain opinions as to the most suitable way of developing technological research institutions, such as the Indian Institute of Science. Should these be general in their interests or be confined to limited groups of related subjects, and should they be Imperial in their interests, or be maintained as provincial institutions?

(*k*) Whether the time has come when measures should be adopted to prevent the unnecessary overlapping of research activities by Technical Departments, Special Technological Institutes, and University Colleges.

VI.—Miscellaneous Questions.

20. Evidence might be obtained regarding the following questions:—

(*a*) Facilities for the development of hydro-electric power and the positions of apparently suitable power sites in the various Provinces.

(*b*) The effect of railway freight rates on local industries. Are there any practicable changes that can be made with apparent advantage, or are there any railway extensions that are necessary to develop possible new industries, or to extend existing industries? What waterways can be improved with advantage?

(*c*) Have any local difficulties been noticed in the working of the new mining and prospecting rules issued in September, 1913? Are there any minerals that are essential for industries of Imperial importance that ought to be developed at public expense, for example, minerals of direct importance for the manufacture of munitions of war, or substances which are ordinarily obtained in commerce only from one country?

(*d*) Can the forest policy be modified so as to permit of reducing the cost of assembling raw forest products, as for example, by the concentration of special kinds of trees in limited areas, and by improved forest transport facilities?

(*e*) In view of the report of Sir Edward Maclagan's Committee, it is important to obtain opinions as to what extent, and in connection with what industries, co-operative societies can be encouraged.

(*f*) In connection with the points already noticed in paragraph 15, regarding the collection and distribution of information under Government agency, could the principal Government departments which use imported articles assist Indian industries by publishing lists of these articles, or by exhibiting the articles in commercial museums?

(*g*) The possibility of formulating a scheme for financing, by existing or new banking agencies, the marketing of indigenous products.

A list of questions for the guidance of witnesses was prepared and issued in September 1916 so that the first witnesses examined by the Commission might be able to prepare their written evidence in advance. This list was revised after the full Commission assembled in Delhi. In the revised list, which is printed below, a number of verbal alterations were made in the original questions and the following new questions were inserted:—

Questions 2(*a*), 5(8), 10(*a*), 12(*a*), 27(*a*), 27(*b*), 30(*a*), 43(*a*), 44(*a*), 61(*a*), 62(*b*), 62(*c*), 71(*a*), 81(*a*), 102(*a*), 112(*a*), 112(*b*), 112(*c*).

INSTRUCTIONS TO PERSONS INVITED TO GIVE EVIDENCE BEFORE THE COMMISSION.

It is not intended that individuals or bodies invited to give evidence should attempt to answer all the questions.

The Commission will naturally attach importance to the practical experience and special knowledge which witnesses have acquired of the matters regarding which they offer opinions.

1. The questions in the accompanying lists have been framed so as to cover, as far as practicable, the whole scope of the enquiry to be made by the Indian Industrial Commission.

2. Each witness will also be examined orally by the Commission. At the oral examination, he will probably be examined on his written evidence in order to make clear doubtful points, and otherwise to enable the Commission to estimate its value.

3. A Chamber of Commerce or similar body invited, as a Chamber or body, to give evidence, may either submit one set of answers to the questions, which it desires to answer, and select not more than three representatives to support its views in oral examination; or it

may nominate two or three individuals to give each his own views, in writing and afterwards orally. These individuals may be selected either as representing different interests, or as having knowledge and experience of different subjects, or as representing different views on one or more subjects.

Individuals who are members of Chambers of Commerce or similar bodies may give evidence, at their own request or by invitation, independently of these arrangements. The evidence of these witnesses will be taken as representing their individual views only.

4. In answering the printed list of questions, *witnesses need not restrict themselves to a series of answers to the questions* on which they desire to give evidence. The questions are intended merely as a guide to show witnesses the matters on which the Commission desires to gather information and opinions. *The Commission prefers that witnesses should submit their views in a connected statement for each subject*, and include in each such statement their answers to the various questions.

5. Witnesses who desire that any portions of their evidence should be treated as confidential are requested clearly to mark such portions. Oral evidence will also be treated as confidential when witnesses so desire. They will be given the opportunity of revising the proofs of their oral evidence.

QUESTIONS FOR THE ASSISTANCE OF WITNESSES.

I.—Financial aid to industrial enterprises.

Capital.

1. Please state if you have had any experience of the raising of capital for industrial enterprises?

If so, what difficulties have you found in doing so?

What suggestions have you to make for removing these difficulties?

2. What are the sources from which capital for industrial enterprises is principally drawn?

2(*a*). Can you suggest any new sources from which capital may be drawn?

3. Do you know of any kinds of industrial enterprises where more concerns have been started than can be maintained in full time employment?

If so, please describe the general conditions.

Government assistance.

4. What is your knowledge or experience of financial aid by Government to industrial enterprises?

5. What are your opinions on the following methods of giving Government aid to existing or new industries:—

(1) money grants-in-aid;

(2) bounties and subsidies;

(3) guaranteed dividends for a limited period, with or without subsequent refund to Government of the expenditure incurred in paying dividends at the guaranteed rate;

(4) loans, with or without interest;

(5) supply of machinery and plant on the hire-purchase system;

(6) provision of part of share capital of companies on the same basis as public subscriptions of capital;

(7) guaranteed or preferential Government purchase of products for limited periods; and

(8) exemption for a limited period of the profits of new undertakings from income-tax; and exemption from any tax on an industry, or on any article used in an industry?

6. In which methods of Government assistance should there be Government control or supervision?

What should be the form of such control or supervision? (*E.g.*, Government audit or appointment of Government directors with defined powers for the period during which direct assistance lasts.)

Pioneer factories.

7. What is your experience or opinion of Government pioneer factories?

[Note.—By pioneer factories are meant those established primarily to ascertain whether a new industry is commercially practicable?

By demonstration factories (see Questions 19 and 20) are meant those established primarily for giving demonstrations of, and instruction in, improved methods for industries which have been proved to be commercially practicable.]

8. In what ways and to what extent should Government pioneer industries?

At what stage should pioneer factories be either closed or handed over to private capitalists or companies?

What limits and restrictions, if any, should be imposed on the conversion of successful pioneering experiments into permanent Government enterprises?

Financing agencies.

9. In your experience what industries are hampered by the conditions under which they are financed as going concerns?

Please describe the method of financing and its effect on the industry in each case.

10. In what ways is it possible to give more assistance to industrial undertakings by existing or new banking agencies?

10(*a*). Do you think there is need of a banking law?

[See also question 39.]

Co-operative societies.

11. Do you know of any industries which have been developed or assisted by the formation of co-operative societies?

What were the exact means adopted and what were the results obtained?

12. In your experience what are the industries for which co-operative societies should be encouraged?

What should be the organisation and special objects of these Societies?

12(*a*). What suggestions have you to make for industrial development by means of Trade Guilds, such as exist in other countries?

How far should the State encourage the promotion of such Guilds?

Limits of Government assistance.

13. What principles should be followed in order to prevent Government aid competing with existing, or discouraging fresh, private enterprises.

14. Should there be any limitations on Government aid to a new enterprise if it competes with an established external trade?

II.—Technical aid to industries.

Technical aid in general.

15. What is your personal knowledge or experience of technical and scientific aid provided by Government to industrial enterprise?

16. What is your personal knowledge or experience of noticeable benefits received by local industries from researches conducted by Government departments?

17. On what conditions should the loan of Government experts be made to private firms or companies?

18. Under what restrictions and conditions would you allow publication of the results of researches made by a Government paid expert while attached to a private business?

Demonstration factories.

19. Can you suggest any industry for which Government demonstration factories should be adopted and on what lines? (See note below Question 7.)

20. Should any demonstration factories be instituted in your province?

Research abroad.

21. What has been your experience of the aid afforded by the Scientific and Technical Department of the Imperial Institute?

What are its advantages and disadvantages?

22. In addition to arrangements made for research in India, is it advantageous to have provision for research for special subjects in the United Kingdom?

If so, for what special purposes is it advantageous to conduct researches in England rather than in India?

23. In what ways can the Advisory Council for Research in the United Kingdom give assistance to Indian industries?

24. Can you suggest for this country any system, similar to that of the Advisory Council for Research in the United Kingdom, for referring research problems to Colleges and other appropriate institutions in India? (See Questions 75 and 76.)

Surveys for industrial purposes.

25. Does the existing knowledge of the available resources of the country—agricultural, forest, mineral, etc.—require to be supplemented by further surveys?

26. How should such a survey be organised?

What should be its precise objects?

27. How should its results be made most useful to industries?

27(*a*). What is your experience or opinion of the value of Consulting Engineers appointed by Government to aid industrial enterprise by technical advice and by the supply of plans and estimates?

(*b*) Should such Consulting Engineers be allowed to undertake the purchase of machinery and plant for private firms or individuals? If so, under what conditions?

[See Question 63 *et seq.*]

III.—Assistance in marketing products.

Commercial museums.

28. What is your experience or opinion of commercial museums, *e.g.*, that in Calcutta?

29. If you think commercial museums should be developed and increased in number, what suggestions have you to make regarding their situation, arrangement and working?

Sales agencies.

30. What is your experience or opinion of sales agencies or commercial emporia for the sale as well as the display of the products of minor and unorganised cottage industries.

How should they be developed?

Exhibitions.

30(*a*). Would travelling exhibitions of such industries be of advantage?

31. What is your opinion or experience of the value of industrial exhibitions?

32. Should Government take measures to hold or to encourage such exhibitions?

If so, what should be the Government policy?

33. What should be the nature of such exhibitions?

Should they be popular in character, or should they aim merely at bringing sellers and buyers into contact?

Trade representatives.

34. Should trade representatives be appointed to represent the whole of India, in Great Britain, the Colonies and Foreign Countries?

What should be the qualifications of these trade representatives?

How should their duties be defined?

35. In addition to these trade representatives would it be suitable in some cases also to have temporary Commissions for special enquiries?

36. Should provinces in India itself have trade representatives in other provinces?

How should such representation be arranged for?

Government patronage.

37. Should the principal Government departments which use imported articles publish lists of these articles, or exhibit them in commercial museums?

38 With reference to the encouragement of Indian industries, have you any criticisms to offer regarding the working of the present rules relating to the purchase of stores by Government departments?

Have you any changes to propose in the rules themselves?

Banking facilities.

39. In what way is it possible to assist in marketing indigenous products by more banking facilities, either through existing agencies (such as the Presidency, Exchange, Joint Stock and Co-operative Credit Bank) or through new agencies (such as Industrial and Hypothec Banks)? (See also Question 10.)

IV.—Other Forms of Government Aid to Industries.

Supply of raw materials.

40. What conditions should control the supply of Government owned raw materials (*e.g.*, forest products) on favourable terms?

Land policy.

41. Is there any check at present imposed on industrial development in your province by the land policy of Government?

If so, what remedies do you suggest?

(Note.—The expression "land policy" is intended to cover laws and regulations relating to settlements, the Government assessment, rents, tenant rights, permission to use land for industrial purposes, and generally all matters connected with the ownership and use of land.)

42. On what principles should Government give concessions of land for the establishment of new, or the development of existing, industries?

43. What criticisms have you to make regarding the working of the present law for the acquisition of land on behalf of industrial companies?

What modifications of the law do you recommend?

43(*a*). In what ways and on what terms can Government assist in the provision of subterranean or surplus surface water for industrial purposes.

V.—Training of labour and supervision.

General.

44. (*a*) Do you think that the lack of primary education hinders industrial development?

(*b*) What has been done in any industry of which you have had experience to improve the labourers' efficiency and skill?

45. What steps do you consider should be adopted to improve the labourers' efficiency and skill—

(*a*) generally, and

(*b*) in any industry of which you have had experience?

Apprenticeship system and industrial and other schools.

46. What special knowledge or experience have you of the training of apprentices in factories and workshops?

47. What advantages have you observed to follow from the establishment of industrial schools?

48. On what lines should these two systems of training (*i.e.*, apprenticeship system and industrial schools) be developed and co-ordinated?

49. What has been your experience of day schools for short-time employees, or of night schools?

How should these be developed?

50. Should industrial and technical schools and commercial colleges be under the control of the Department of Education or of a Department of Industries?

What measures should be adopted in order that these two departments should work in unison in controlling industrial schools?

Training of supervising and technical staff.

51. What measures are necessary for the training and improvement of supervisors of all grades and of skilled managers?

52. What assistance should be given to supervisors, managers and technical experts of private firms to study conditions and methods in other countries? (See Question 77.)

53. In what circumstances and under what conditions should industries assisted by Government be required to train technical experts?

Mechanical engineers.

54. Is there a want of uniformity in the standard of examinations for mechanical engineers held in the various provinces where engineers in charge of prime movers are required in certain cases to be certificated?

If so, should measures be adopted to make such tests uniform so that the Local Governments and Administrations may reciprocate by recognising each other's certificates?

55. If the law in your province does not require any qualifications in an engineer in charge of a prime mover, have you any criticisms or suggestions to make?

VI.—General official administration and organisation.

56. What provincial organisation exists in your province for the development of industries?

What criticism have you to make regarding its constitution and functions?

57. What organisations do you recommend, for the future development of industries in your province?

Should there be a Board of Industries?

If so, what should be the functions of such a Board?

Should it be merely advisory or should it have executive powers with budgetted funds?

58. If you recommend an Advisory Board, how should it be constituted?

59. If you recommend a Board with powers, what should be its constitution and how should its powers be defined?

60. Should there be a Director of Industries?

What should be his functions?

Should he be a business man, or a non-expert official, or a technical specialist?

What other qualifications should he possess?

61. If you recommend both the formation of a Board of Industries and the appointment of a Director of Industries, what should be the relations between the Board of Industries, the Director of Industries and the provincial Government or Administration?

62. What form of machinery do you propose in order to correlate the separate activities of the various provinces as regards industries?

Is it practicable to form an Imperial department under a single head?

If so, what should be the functions of such a department?

Cottage industries.

62(*a*). Should there be special measures taken or special sections of a Department of Industries organised for the assistance of cottage industries?

62(*b*). Please explain in detail what should be the Government policy as regards cottage industries and how it should be carried into effect? In this connection, see especially Questions 11, 30, 64 and 72.

62(*c*). What cottage industries do you recommend should be encouraged in this way?

VII.—Organisation of Technical and Scientific Departments of Government.

General.

63. Are there in your province any technical and scientific departments which are capable of giving assistance to industries?

If so, what criticisms have you to make regarding their organisation?

What changes do you recommend?

Imperial department.

64. In order to aid industrial development do you recommend the formation of any new Imperial Scientific and Technical Departments?

If so, for what subjects or natural groups of subjects?

65. How should such an Imperial department be constituted and recruited?

66. What should be the powers of the head of the department?

If he has executive control of the department, what should be his relationship to the Imperial Government?

67. What should be the relationship of an expert, whose services are loaned by the Imperial department to a Local Government, with the Local Government and the latter's Department of Industries?

Provincial departments.

68. For what subjects should Local Governments engage their own experts or organise their own technical and scientific departments?

69. Under what direct control should these experts and departments be placed?

70. On what terms should these experts be employed?

Technological institutions.

71. What is the most suitable way of developing technological research institutions, such as the Indian Institute of Science?

71(*a*). Should there be a Technological Institute for each province, and should such Institutes be allowed to develop as independent units or should they be fitted into a general development scheme for the whole of India, with a Central Research Institute?

72. As regards investigation and research should each Institute be general in its activities and interests, or should each deal with limited group of related subjects?

73. Should there be any Government control?

If so, should this control be Imperial or should it be purely provincial or local?

Co-ordination of research.

74. Is it desirable that measures should be taken to co-ordinate and prevent unnecessary overlapping of the research activities in Government Technical and Scientific Departments, special Technological Institutes and University Colleges?

If so, what are your suggestions?

75. What noticeable results have followed from the institution of the Indian Science Congress?

76. Can you suggest any ways in which the Congress might become more useful in assisting industrial development? (See Question 24.)

Study of foreign methods.

77. What encouragement should be given to Government technical and scientific experts to study conditions and methods in other countries? (See Question 52.)

Reference libraries.

78. What difficulties have you experienced in consulting teachnical and scientific works of reference?

79. Have you any suggestions to make regarding the establishment of libraries of such works?

Colleges of commerce.

80. Do you think that the establishment of a College of Commerce is necessary in your province?

If so, on what lines should it be organised?

81. In what ways do you expect such a college to assist industrial development?

81(*a*). In what ways can Municipalities and Local Boards assist in promoting industrial and commercial development?

VIII.—Government Organisation for the Collection and Distribution of Commercial Intelligence.

Statistics.

82. Have you any criticisms to offer on the present system of collecting and distributing statistics by the Director of Statistics?

What changes do you suggest?

Commercial intelligence.

83. Have you any criticism to offer on the present system of collecting and distributing commercial intelligence by the Director-General of Commercial Intelligence?

What modifications do you suggest?

Industrial and trade journals.

84. What advantages have you found in the issue of the "Indian Trade Journal"?

85. Should Government establish or assist industrial or trade journals, either general or for special industries, which would be of real use to persons actively engaged in industries?

86. What proposals do you make for the dissemination of information of this kind through the various vernaculars?

Other publications.

87. What advantages have you known to follow the issue of special monographs on industrial subjects or publications like those of the Forest and Geological Departments?

What measures do you advise in order to increase the usefulness of these publications?

88. Are there any other directions in which Government could collect and publish information of a kind likely to assist industries and trades?

IX.—Other Forms of Government Action and Organisation.

Certificates of quality.

89. Are there any products for which a system of Government certificates of quality should be established?

For what products should such certificates be compulsory, and for what products voluntary?

90. What should be the organisation for testing each class of products and granting certificates?

Prevention of adulteration.

91. Are there any classes of materials for manufacture or of manufactured articles for the adulteration of which penalties should be imposed?

92. For each such class of goods what organisation do you suggest for purposes of inspection and prosecution of offenders?

Misdescription.

93. Have you any other suggestions to make in regard to the prevention of misdescription of goods generally?

Trade marks and trade names.

94. What is your opinion on the present state of Indian law relating to marks and descriptions of proprietary and other articles of trade.

The patent laws.

95. Have you any criticisms or suggestions to make regarding the existing law and regulations relating to patents?

Registration of partnerships.

96. Is it desirable and practicable in the interests of trade, to introduce a system of registration or disclosure of partnerships?

Roads, railways and waterways.

97. To what extent does the lack of transport facilities by road, rail or water hinder industrial development in your province?

Have you any specific recommendations to make?

98. Have you any criticisms to offer regarding railway freights, the classification of goods, the apportionment of risk, and the regulation of rates?

What are your proposals?

99. Are there any railway extensions necessary in your province to develop new or to extend existing industries?

100. Similarly, are there any waterways which should be constructed, extended or improved?

Shipping freights.

101. Are you aware whether the external trade or internal industries of the country are handicapped by any difficulties or disadvantages as regards shipping freights?

Can you suggest any remedies?

Hydro-electric power surveys.

102. What has been done in your province towards ascertaining the possibilities of developing hydro-electric power?

Should further investigation be made in this matter?

102(*a*). Have you any criticisms to make regarding the effect of the Electricity Act on industrial enterprise?

Mining and prospecting rules.

103. What difficulties have been experienced in the working of the Mining and Prospecting Rules (1913)?

104. Are there any minerals that are essential for industries of imperial importance that ought to be developed at public expense? (*E.g.*, minerals of direct importance for the manufacture of munitions of war, or minerals ordinarily obtained in commerce from one country only.)

Forest Department.

105. From the point of view of industrial enterprise, have you any criticisms to make regarding the policy and working of the Forest Department?

What suggestions do you make?

106. What measures are practicable to reduce the cost of assembling raw forest products?

107. To what extent is it practicable to concentrate special kinds of trees in limited areas?

108. What noticeable deficiencies in forest transport are known to you?

What suggestions do you make for their removal?

Jail competition.

109. Have you any complaints to make regarding competition by jail industries?

X.—General.

110. What suggestions have you to make for the development of any industry in which you have been actively concerned or interested?

111. Does your experience suggest to you any new industry for which India seems peculiarly suited on account of its resources in raw materials, labour and market?

112. What supplies of raw materials are known to you of which the use in industry or trade is retarded by preventible causes?

What are these causes, and how should they be removed?

112(*a*). Have you any suggestions to make regarding the utilization of waste from raw materials?

112(*b*). Have you any suggestions to make regarding Government aid in the improvement of raw material, such as, cotton, silk, sugarcane, etc.?

112(*c*). What industries in the country are dependent on the importation of raw materials and partly manufactured articles from abroad?

113. Do you know of any supplies of raw materials for which there is a good case for investigation with a view to their development?

S. G. P. I.—145 S. I. I. C.—17-12-17—3324.

Evidence taken by the Indian Industrial Commission, 1916-17.

DELHI.

Witness No. 1.

The Hon'ble Mr. James Currie, *Messrs. James, Currie & Co., Delhi.*

Written Evidence.

Before I proceed to reply to the questions submitted I would like to say—

I am of opinion that there should be established an Imperial Research Institution, the laboratory of which should be equipped with the best brains that the Empire can produce. Its industrial side should be put in a position to give sound practical advice to private enterprise, and its trade experts should be able to analyse business propositions and determine their chances of success. There should also be attached to it an actuary and a staff of qualified auditors.

It is also necessary that there should be established a bank with an industrial side and a trade side supported by Government with branches all over the country, something stronger than the co-operative banking system, that is developing and assisting the agricultural community.

Financial aid to industrial enterprises.

Capital.

I have had experience in connection with the raising of the capital of the Lahore Electric Supply Co., Ltd., Lahore. Although the concern was a perfectly sound and promising one from the beginning and despite the fact that a competent canvasser was employed by the Company to place the position and facts before men of substance, it was not supported by the public until it demonstrated its value in its balance-sheets. The difficulty the Directors of this concern experienced illustrates the timidity of the investing public to put their money into industrial concerns.

Capital for industrial enterprises is principally drawn from surplus profits, in Calcutta and Bombay from bazaars, in the districts mainly from professional men.

I have no personal experience, but I have been informed that the history of cotton ginning factories and cotton pressing in the Punjab, if referred to, will disclose the fact that more concerns were started than could be maintained in full-time employment with the result that combinations and pools were established which artificially raised the cost of ginning and of pressing.

Government assistance.

I do not think it would be a wise policy for Government to give money grants-in-aid, or bounties, or subsidies, or to guarantee dividends.

It may be possible to develop a scheme of assistance by means of loans, or supply of machinery or plant, or provisions of part of share capital through the agency of an Industrial Banking Corporation receiving support from Government and acting on the advice of the Imperial Research Institution which I suggest should be founded.

Industrial concerns manufacturing articles suitable for Government purposes should certainly be encouraged by means of purchases by Government, everything being equal in the matter of rates and qualities.

I would not advise Government to attempt to undertake methods of assistance in the direct management of industrial concerns.

One of the great mistakes made with many of the industrial concerns of India has been the non-provision of sufficient working capital, with the result that they have had to borrow at heavy rates of interest in the bazaar and very often missed a purchasing opportunity for lack of funds. It may be possible to develop a scheme of assistance to industrial undertakings through the agency of an industrial banking corporation receiving support from Government acting on the advice of the Imperial Research Institution.

Co-operative Societies.

Co-operative societies may be made useful to cottage industries and to miscellaneous bazaar industries.

Immediately the competition of a Government demonstration concern begins to compete with private enterprise which is healthy and serving its purpose, the concern should be handed over to private enterprise.

Limits of Government assistance.

Unless there is promise of material benefit to the country, Government should refrain from associating itself directly or indirectly with new enterprises that compete with an established external trade.

Technical aid to industries.

Technical aid in general.

Private firms and companies should be permitted to ask for the loan of experts from the Imperial Research Institution, and if, after a preliminary report has been submitted, their services are required, they should be paid for.

If the services of Government experts are paid for, the result of their researches should be considered private.

Demonstration factories.

I cannot suggest any form of Government demonstration factory because I have not in my mind at the moment a suitable raw material that has not already been more or less exploited, but I can suggest the shape that a very useful Government demonstration shop could take that would be the training ground for very useful artisans. In every municipality there is a municipal workshop. I would suggest that municipalities with the assistance of Government should establish an up-to-date blacksmith's shop, a forge, a moulding shop, a turning shop, a carpentry shop, and, say, a wheelwright shop, all equipped with the best tools obtainable and supervised by an expert mechanic.

Research abroad.

Research in India should be placed on an absolutely independent footing. The interchange of experts with the sister institution (the Scientific and Technical department of the Imperial Institute) of the United Kingdom will no doubt be found to be advantageous to both sides.

I am of opinion that satisfactory results can only be obtained from an Imperial institution established on lines such as I have suggested. There must be a continuous and sustained effort and a full and continuous record of results for reference before anything really practical and valuable can be obtained.

Assistance in marketing products.

Commercial museums.

The commercial museum at Calcutta serves a purpose but it is only the first step; it is the permanent way without the rolling stock.

A commercial museum should be established in all distributing centres of importance. It should combine a sales agency and an exhibition of products. The museum should be able to put buyers in touch with producers. The Punjab Chamber of Commerce suggested a method to Government sometime ago suitable for Delhi which may contain a suggestion.

Trade representatives.

Results of any importance are not to be expected from the appointment of Indian trade representatives in Great Britain, the Colonies or foreign countries, until the industries of India have made substantial progress. The enterprise of our merchants may be relied on to push the articles the factories produce as industries develop.

The commercial museums will serve the purpose of trade representatives in India and in customer countries.

Government patronage.

The principal Government departments which use imported articles should publish lists of those articles and exhibit them in Commercial museums.

Banking facilities.

The trade side of the Bank I have suggested should be able to give great assistance in marketing indigenous products.

Other forms of Government aid to industries.

Government should place itself in a position to take up land for the establishment of factories or for the development of existing industries; the land can be transferred on reasonable terms.

Training of labour and supervision.

If there is a want of uniformity in the standard of examination of mechanical engineers in various parts of India, uniformity should be established.

I believe there are necessary qualifications required in an engineer put in charge of prime movers.

Organisation of technical and scientific departments of Government.

The Imperial Research Institution, which I have suggested, should be established under one head, subordinate to the Member for Commerce and Industry. The services of the members of its staff can always be at the disposal of the provincial Governments in the same way as they are at the disposal of the public and on the same terms.

Study of foreign methods.

The Imperial Research Institution I suggest would naturally keep abreast of the progress made in other countries by sending out its experts to investigate and report.

Other forms of Government action and organisation.

Certificates of quality.

Any Government action in the shape of testing and classing products and the granting of certificates would only hamper trade. The trader can very well protect himself as things stand.

Trade marks and trade names.

Uniformity in the law relating to Trade Marks, Trade Names and the Patent Laws should be brought about within the Empire.

Registration of partnerships.

It is desirable and, I think, practicable to introduce a system of disclosure of partnerships.

Roads, railways and waterways.

Railway freights on the products of industries, particularly of the industries established up-country, are, I think, capable of revision and adjustment and it goes without saying, of course, that the more railways are extended the better it will be for industries. Waterways will as a rule always give way to railways, and for that reason railways should command the greatest attention.

Shipping freights.

Government should firmly resist combinations and monopolies in shipping that restrain trade from obtaining the full benefits of all the facilities that offer.

General.

Possibilities in connection with the manufacture of chemicals and drugs in India should be investigated.

ORAL EVIDENCE, 28TH OCTOBER, 1916.

To President.—The Imperial Research Institution that I suggest should be a thorough research institution, intended purely for research and advice. I am aware that there are many forms of technology which are quite distinct from one another; for instance, there is very little connection between electrical engineering and drug manufacture, or between textiles and metallurgy, or between the chemistry of leather and mineralogy. I think that it is essential that you should have this research institution established, from which, as necessity arises, other research departments would branch off. I think it would be well to concentrate the results of each research so that any private enterprise desiring to follow up the pursuit of an industry would go to the headquarters and get the best advice that it is possible to obtain. I would concentrate the research works so that there would be one head responsible. Take, for instance, drugs. I would go to the laboratory side of the research institution and get the best advice from the chemists as to the products that can be manipulated and operated upon. I would then go to the industrial side of the research institution and find out where I can get the best retorts or the best distilling apparatus, and further I would go to the commercial side and see how they would advise me to distribute my product. I think there are a good many people who might make use of the Government facilities, but do not know exactly whom to go to; that is the trouble now. As regards the development of the different branches of research, I would leave it entirely to the staff of the research institution. I would concentrate. I think there is a great deal of waste at present in having institutions spread over the country. With regard to gathering the work of a natural group of subjects into one institution, I would leave it to the research department to arrange their own methods. I think it will be possible to bring all institutions and all research activities in. I think there is overlapping and waste at present. There is a certain amount of difficulty in appointing one man to be the head of a big research institution which includes numbers of subjects which have no relation to one another, and some of which he would hardly be expected to have more than a superficial knowledge. I would look upon him simply as the governor and he would have on his staff the finest chemists, the best industrial experts, and the best commercial experts. I think that the governor ought to be a good scientist; I would get the very best professor for that position. A scientific man who is a specialist cannot be an expert in all forms of science, but each of the departments would have its own experts. I would put in as governor a capable administrator. You can appoint a member of the Indian Civil Service as governor if you can get one sufficiently strong.

As regards the employment of Government experts by private firms, there should be nothing private so far as the research institution and its record are concerned. What I mean is that if the research is paid for, it should not be immediately available to the general public, it should not be published. The research should be put on the record of the institution but should not be freely available to the public. It would probably be useful in further research if another private enterprise followed the subject. I could not conceive of the research work of the institution lying idle. The research work of the institution would be continuous, and it might take up, and probably would take up, research in the particular line started on, but at the same time it is quite possible to conceive that the actual results of the research expert that was loaned to the private enterprise that call for research, the particular one might still be considered as private although the research laboratory resolved to pursue its research in that special direction. It is true that we want those results to benefit the country as quickly as possible. It would not be right to bottle up the research. At the same time, I think that if a firm asks for the services of an expert and pays for them, that expert and his work should be considered for the time being as the property of the firm.

Take for instance sandalwood oil. It used to be distilled from sandalwood, largely in Europe. When the war broke out, that trade was interfered with and

research operations were undertaken in the Indian Institute of Science with the result that a process was devised successfully for the manufacture of sandalwood oil which is now being practised in Bangalore on a large scale. Do you think it would be right to keep the results of that kind private ?—No. Certainly not.

You think that the company would be acting in its own best interests by allowing the publication of results in connection with the research work I have told you of just now?—I cannot express an opinion. I do not think it would be a popular course if it is once understood and believed that the research which is being paid for would be available to competitors.

Trade representatives would probably be useful in an undeveloped country like Africa where the products of the mills are sent. I doubt very much if we could for many years to come export anything except raw materials to Japan. I am in favour of sending as frequently as convenient experts to other countries to report. An expert from the commercial department of the research institution is the man to be sent, and manufacturers should send their own good man abroad to study the conditions.

As regards the establishment of sales agencies I, should not like to insist on the sale of the best qualities of articles only. Everything that an industry produces should be put on the table, and should be put in a position of being pushed by the agency of exhibitions, or museums, as the case may be. I do not think that it would be advisable for the officer in charge of the sales agency to refuse to sell articles that he thinks would bring a bad name to the manufacture. If there are defects in the articles produced the results of the sales will correct them.

I am not in favour of having any kind of Government standard. It would be an advantage if we had a Government testing institution to which anybody could go and obtain a certificate of quality ; the research laboratory might issue certificates exactly as, at present, the Alipur Testing Works give a certificate of quality. But I would not give standards to the sales agencies. If a manufacturer offers a poor quality and the help of the sales agencies is refused, perhaps that would discourage him. If his article brings in a poor result, he will probably find that he should improve the manufacture and produce a better quality.

When I say in my written evidence "Immediately the competition of a Government demonstration concern begins to compete with private enterprise which is healthy and serving its purpose, the concern should be handed over to private enterprise," I mean that the aid given by Government to demonstration and experimental factories should be withdrawn.

I cannot venture now to define the constitution and functions of a bank that will aid industry. I see that it is contemplated at home to establish some such bank and I have no doubt that the experts who are considering the matter will make suggestions. I would not allow the bank to receive short notice deposits : the home people, I see, think that it would be unwise. I do not know anything about the hypothec banks of Japan. I have not thought out a scheme for such a bank because it is being considered at home. I am of opinion that it is the only feasible method by which assistance can be given to industries.

To Hon'ble Sir Fazulbhoy Currimbhoy.—The Imperial Research Institution I am speaking of would also embrace Burma. One properly equipped institution will suffice for the whole of India. I cannot say that scientific problems are being solved by the Universities in the United States, but the American manufacturer certainly employs experts very much more than other people do.

About the raising on capital, I have no other experience than that relating to the Electric Supply Company, Lahore. In Bombay and Calcutta capital comes principally, I believe, from the bazars and from Native States. Many people up country subscribe capital in Bombay and Calcutta.

I think it would be very unwise on the part of the Government to give money grants-in-aid, or bounties or subsidies or to guarantee dividends. I know that considerable capital is raised in this country by Government guaranteeing interest on railways. In railways the Government have a substantial and vested interest. The people of the country benefit by it. It would be advantageous to the country if the Government were to guarantee interest on the preference shares if it is satisfied that a certain industry is good enough : still I do not think that it is the province of the Government. If the enterprise is good enough, then it should be good enough for the people.

I cannot conceive of any effective control that the Government could have over an industry. Even if the Government were to have their own director nominated in the firm that would not be an effective control of the everyday work of the industry.

The Japanese Government may guarantee interest on the concerns started in Japan. Japan is a very enterprising country. It is a young country. In special cases an

industry can very well be assisted through the agency of the industrial bank, I have suggested, but not directly by the Government. Government can assist an industry with good advice from the industrial expert. What I mean by saying that the Government should not associate itself directly with new enterprise is that it should *not* take an active part in the industry.

I cannot suggest any remedy for the prevention of combinations and pools in cotton ginning and cotton pressing. I cannot suggest any remedy that will restrain private enterprise from running "amok." If there is combination at one place and if the people in the interior establish their own ginning factories and presses and the combination may thereby be broken up, so much the better. Probably if there had been no combination, no presses would have been established up country and in the interior. There are a lot of combinations and pools and there is a great waste of capital in the meantime. I believe that the latest development in cotton ginning is speculation in kapas. In ginning and pressing I do not think they make more than five or six per cent. profit.

Commercial experts sent out from the Research Institution for the special purpose of reporting would succeed in obtaining information from foreign countries as to what can be done for Indian articles. I think the industry of India has hardly developed sufficiently to justify a permanent man being attached to foreign countries. China, Africa and Egypt and the Gulf are the great markets of the manufactured goods of India.

To Hon'ble Pandit M. M. Malaviya.—I am aware that in many European and American Universities research work and the work of teaching are going on together. Modern Universities aim at giving education in this form. I look upon their work as preparatory. I look upon them as preparatory to the research institution. I do not think it would be advantageous to the research staff to have a number of young men scholars engaged in research work under them at the institution. I think that the young men for the research institution should be put through a searching examination before they are admitted. After they have received that training, the moment they are fit enough to take up research work, I would have a number of them at the research institution. I recommend a central research institution for the whole country, and I think it would be an advantage if all research were centred there, because, for instance, if the Bangalore Institute takes up chemistry it is also taken up at Pusa, at the Forestry school at Dehra Dun and I believe at the Medical Stores department. I think it would be an advantage to the cause of research and to the cause of industries if the various branches of research work are centred in one place. It would also enable the institution to gather together more experts than could be brought together otherwise. By the research institution having an industrial side and a research side I mean, that private firms should be able to ask for advice and help from the research institution. The industrial side will be a department of the institution. I think it would be an advantage to have them all at one place. The Imperial institution I refer to would take up and supplement the work of the Board of Industry. There will be enough work for the industrial side of the institution to occupy it all the twelve months of the year for any number of years. The strength of the department can be regulated as experience dictates. The experts on the industrial side should be afforded the best opportunities of studying and understanding new appliances. When the industrial bank lends its support to an industry, the bank would naturally desire to receive the best advice and a reliable report on the industry, and unless it has an actuary and qualified expert accountant to go into and examine the position of any particular concern, the bank would be working pretty much in the dark. The advice that the experts could give with regard to an industry that is going to be started would be available to the manager of the bank. A staff of auditors is required because it is hoped that results would follow and industries would develop. I would not have this research institution placed under a board consisting of the Member for Education and the Member for Commerce and Industry. I do not believe in divided responsibility. It should be under the direction of the Member for Commerce and Industry, because it is more particularly within his province. I have never given serious thought as to whom I should place in the position of governor. I would select a strong man who is capable of looking after and conducting the affairs of the institution as a whole, because each department will in itself, have a head who will be an expert. I do not think it will be a special advantage to have one as governor who is strong in one of the subjects which the Institution deals with rather than one who is endowed with common sense. I would give power to Government to decide whether the results of a research should be made public or not, but I would expect the Government to show some consideration to the originator of the idea who called in the expert. A mere repayment of what the firm paid to the expert will not be sufficient. Something more should be done.

With regard to trade representatives, it will be enough if men are sent out from time to time for special objects.

To some extent, Indian capital does not come forward owing to the general want of commercial education and knowledge among the people of the country.

I have no personal experience of the ginning factory business. I cannot say what amount of cotton is produced in the Punjab, nor the number of ginning factories and presses. I cannot give any facts and figures as to these.

I think the accounts of an industrial concern should be audited by Government experts, if the concern is receiving support from the Government or from the bank.

I think that when Government requires an article it ought to get the best article obtainable at the cheapest price, and if Indian industry can produce it, it should have preference. I do not think that preference to an Indian industry should be shown if the rates were not quite equal. You want to raise the standard of quality and efficiency, and if Government were to begin to take something inferior, then you would always get the inferior article. If the rates and the qualities are not quite *equal*, preference should not be shown to Indian industry simply because they are Indian. I think all that the Indian industries should expect is preference for an equal article at the same price. What I mean by saying that the Government should refrain from associating itself directly with new enterprises that compete with an established external trade, is that it should not make a money subsidy or partake in the management of the enterprise.

If, for instance, the Government purchased articles made by a factory, would not that, according to your statement, be indirect association with the enterprise by the Government?—Yes. In that case, I cancel 'indirectly' in that written answer. I would not wish that Government should not encourage the manufacture of cotton goods, simply because it would conflict with foreign trade in cotton with India. Demonstrations of apparatus would be helpful to industries. It will be an advantage to have an industrial bank at every industrial centre.

Waterways can be utilised with great advantage for the transport of goods and produce where railways do not exist. I believe that the experience of the past proves that the railways will always kill water transport, if it is running parallel or nearly so. In England they had been worked together with this result. I am not antagonistic to waterways in any way, but I am a great believer in railways. If you have this additional means of transport, it is doubtful if it would cheapen rates and increase the facilities for transport.

To Hon'ble Sir F. H. Stewart.—I am President of the Punjab Chamber of Commerce, but the views I am now giving are my personal views. Between the research institution and the bank there would naturally be a close connection. The research institution would be a Government institution entirely. The bank would not be a Government bank but would receive support from the Government. The relations between the two would naturally be very close. The research institution would be under the control of the Commerce and Industry Member. The bank manager would consult the commercial side of the research institution. The responsibility of the research institution and the superintendence of the bank may, to a certain extent, add to the work of the Commerce and Industry Member. The bank would be put on a proper footing with a proper staff. There might be Government directors or something else so long as there was Government support. I would put in a permanent man as a governor of the research institution and I would give him such a salary that he would not be anxious to go elsewhere. I do not contemplate his having a seat in the Imperial Executive Council, and that is why I put him under the Member for Commerce and Industry. He should be at least on a footing similar to that of the President of the Railway Board. The actuaries and auditors would be associated with the commercial side of the research institution. I would have no objection to the results of researches being available in the records of the department. They should not be placed at the disposal of any person who chooses to go and ask for them with a view to competing.

The workshops in the municipalities that I suggest should be demonstration shops and I contemplate apprentices being bound to them for a number of years. If necessary, the Government should give the municipalities assistance, but there is no reason why in a few years these shops should not be self-supporting. The idea is to get really efficient artisans turned out. They are very much wanted now.

Trade representation is a thing that would develop. In the meantime I think that experts should be sent out from the commercial side of the research institution to report, and on their report and through experience it may be seen whether or not permanent men will be necessary. I have no personal experience of complaints regarding Indian goods by customers in foreign countries, but I would expect a certain percentage of complaints.

Granting of certificates is a big question, and I think it is better to leave the trade to its own methods. I can conceive of instances where certificates and the practical outturn of articles would clash and therefore I would be afraid to grant certificates. I do not see how certificates are going to establish trade. I am not aware of certificates of quality being issued in some countries. Perhaps Japan and France may issue such certificates. I am in favour of uniformity in the law relating to trade marks and trade names within the Empire. I would also bring India within the scope of the International Convention.

I think it would be quite possible to establish some simple declaration of partnerships. Difficulties have been brought forward in connection with this suggestion, such as that of the joint Hindu family; but beyond that I do not see any specific reason why a declaration of partnership should not be made. I think it is practicable and reasonable.

I regard waterways as being weaker than railways, and therefore railways should be given more attention. I would not say that in a country in the position of India to-day the greatest good would be obtained from the development side by side of both railways and waterways. The development ought to go on of both, but I think there is no benefit to be derived in trying to establish competition so far as transit facilities are concerned, and certainly there is nothing to be gained by trying to bring in and utilise the irrigation canals of the country for that purpose.

To Sir D. J. Tata.—I look upon the research institution as being something far beyond a school or college or even university. The young men who would enter the departments of research would naturally develop their knowledge and be available to be sent out or to be taken up by private enterprise into industrial concerns. I would bring in trained chemists from Europe and have them as experts first of all; but I would utilise the material in this country as far as possible. I can conceive the acute brain of Bengal and Madras and the Deccan being extremely useful in the laboratory. The research institution is a developing, training ground. I would recruit the best of the men from the universities and college that exist. Experts cannot be imported every time from Europe; and we must train up our young men as well to do the work and the research institution should, as I have already said, be a great training ground. I do not think it would be an advantage to have subordinate technological institutes in every province suitable to its wants: I am dead against overlapping energies. I think that the central institution would be able to gather all the information and concentrate it far better than scattered institutions all over the country. The central institution would send out deputations to the various places in connection with research. The scientific man would not be the business man; the business man would be the business expert of his department. The commercial side of the research institution would operate when private enterprise came for advice, and for that purpose I would have business men and not scientific men attached to it. I still call it a research institution because the business men would continue to look into and record their experience of what was going on the country in commerce. I do not think it is necessary to send a canvasser round like a commercial traveller to the big centres to place the position of an enterprise before the public; but it may be useful in the backward parts of the country. The canvasser of the Lahore Electric Supply Company was supplied with the last balance sheet and a report on the company which gave a true statement of the position of the company, and with the two combined, we thought it would be sufficient to convince anyone who had money to invest that it was an absolutely sound concern. This was shortly after the company was established. As a matter of fact, the soundness of the company has been proved beyond a doubt since then and the shares have all been taken up.

The statements in my written evidence that capital is very shy in India and that ginning and cotton-pressing factories have been multiplied unnecessarily in the Punjab may appear to be contradictory; but the multiplication came on after the results of the first ginning factories and pressing factories were declared. I am not aware that some ginning factories recouped all their capital in the first two years, but I would not be surprised if it was the case.

I think that the rules relating to the Government purchase of stores may be made simpler than they are at present. The articles manufactured in this country should always get the preference from the Government, everything being equal. I doubt if suitable prices would be paid by Government for an article manufactured in this country which is superior to the imported article. I doubt if that would be operative. The machinery at the disposal of the store keepers would hardly admit of that.

There is an advantage in travelling exhibitions, but still I think there is greater advantage to be derived from exhibitions in the distributing centres of the country. Travelling exhibitions are educative, but would not have the same practical results as permanent museums or exhibitions at the distributing centres where trade goes on.

I think the time will come when trade representatives will be useful. I think it is too early now. When I say that the enterprise of the British merchant may be relied on to push the article the factories produce, I refer to India and articles manufactured in India. By the term "British merchant" I mean the Indian merchant as well.

The common law protects both the trader and the public now, if an inferior article is foisted on a customer. I think the idea of certificates is altogether too big a question for Government to take up. It would probably clash with trade interests.

Having got Government advice and having established a business, the firm should employ its own experts to carry on its busi ess. I can picture the research institution

supplying experts to industries. If an industrial firm wanted an expert, the best source from which to get one would be the research institution. The firm should take him over and employ him altogether. The results of his enquiry, if the expert went back to the institution, should be put on the record of the institution. I contemplate the position of an industry taking an expert away altogether to itself, and employing him continually. I want the Government to place itself in a position to give the very best advice to private firms when they want it. If a person has taken the advice of the institution regarding a certain problem and another person, probably a rival, comes and asks for advice on the same subject, the governor of the institution would be justified in repeating his advice. Researches ought not to be bottled up. It is the country that is maintaining the research institution.

Hon'ble Sir R. N. Mookerjee.—You are opposed to Government financial aid in any form to develop even a most promising and sound industry?—If you ask Government to come to the aid of every concern directly, you open up a very big question. Is it to give its aid to every one that comes and asks for it?

Q.—How can a bank assist in floating a company?—I have suggested the industrial bank as the source from which support can be obtained, the bank being supported by Government. What I believe is this: Government can wisely support the bank and by the Government support money will no doubt come into it. The time will come when the bank will be more or less self-supporting and then the bank and industries will operate independently of Government.

You are opposed to Government guarantee. Do you not think that if you had some guarantee from Government you would have been successful in floating the Lahore Electric Supply Company?—If Government had given a guarantee of interest, we would have had the capital for the Lahore Electric Supply Company very easily. I do think that, if the Government can give its support through the bank, it is far better that the bank should operate in connection with the industry than that Government should attempt to help with direct aid. The bank would investigate the proposal of a concern and if it was satisfactory the bank would advance money. I am aware that all the banks, European and Indian, are very careful to see that they have security before they make any advance. I do not know that they discriminate very much between a European concern and an Indian concern; still they require security. Government has not got the machinery to supervise if it gives a guarantee regarding a concern. A Government guarantee is of course the highest guarantee. When I say in my written evidence that it may be possible to develop a scheme of assistance by means of loans, I mean, by means of loans from the bank. Manipulation of raw material would be a material benefit to the country. Coal-tar would be of material benefit to the country if it can be extracted economically. If one wants to make coal-tar which is of material benefit to the country, Government may give its aid through the agency of the bank. I have no objection to Government giving assistance through the bank if an industry is of material benefit to the country. Though I have not stated "through the bank" in my written evidence, it is to be inferred.

You said in your written statement that, unless there is a promise of material benefit to the country, Government should refrain from associating itself directly or indirectly with new enterprises that compete with an established trade. Do you mean trade with England, or with the whole world outside India?—I would disturb things as little as possible unless the effort that is being made or is proposed to be made has shown that it will bring some material benefit to the country.

Including Germany?—I refer to trade with the Empire, our Allies, and friendly neutrals.

Is there any industry in India except cottage industry, which can be developed without interfering with the established trade of the whole world?—There will be interference certainly to some extent with an established external trade, if an industry in India is to be developed; but if it benefits India I would not mind interference with external trade.

To Dr. E. Hopkinson.—I have not felt the want of a research institution personally or in connection with any enterprise with which I have been associated. It would have been most valuable if the prospectus and the position of the Lahore Electric Supply Company had been referred to, and enquired into, by the commercial side of the research institution. The private enterprise would take the report of the research institution to the bank and the bank guided by that report would determine whether it could advance money or not.

At present every municipality of any standing has got a workshop. All the things that I mentioned in my written evidence, and one or two others, for instance, moulding, are necessary to the proper working of a municipality in any case. The workshop in the municipalities should be brought up to date and well-equipped, and utilised for training young men to follow their particular trade.

To Mr. A. Chatterton—The Government or the authorities of the central institution would not be responsible for the results of the advice which they tender to applicants. The information and advice would be given for what they are worth. I would not expect any practical result from having a number of experts retained by Government with permission to undertake private consulting work, instead of a full-time staff. Consulting engineers and consulting chemists, etc., might establish themselves: that would be their own enterprise. Certainly I would not discourage a class of professional men. I would not say that it would be desirable to encourage a professional class for the purpose of research to take the place of an Imperial institution. The research institution that I propose is to be for all time the method of dealing with the industries of the country, and I would not try to initiate any movement in private enterprise that would interfere with it; the necessary sustaining effort, I am afraid, would be wanting. I am not in favour of Government actively intervening in industrial matters. I would not advocate that Government should pioneer industries, except in very exceptional cases and only as demonstrations. I think that the factories that Government have established in connection with the resources of the Forest department have justified Government action and if they can be thereby developed, I would support the development. I can conceive of cases where it may be reasonable for Government to follow up the suggestions of the research institution. I think that if some valuable industrial information is obtained by the research institution at the instance of certain person, some consideration should be given to the person who originated the idea. If he did it with the object of starting an industry he ought to be given a reasonable period within which to start his industry, just as Government gives concessions for certain periods in certain cases. So far as the particular research work is concerned, I would give him a certain monopoly of the information for the time being, but I would not debar another from instituting research in the same line.

Witness No. 2.

Mr. F. C. Waller, *Messrs. F. C. Waller, & Co., Delhi.*

Written Evidence.

Mr. F. C. Waller.

My personal experience has been chiefly given to the importation of Manchester and Continental goods. In my opinion the prosperity of India depends almost entirely on agriculture and minerals,—given good crops every one is happy and prosperous. I do not think that Government can do too much in the way of extending railways, canals, the establishment of model farms showing the use of all the latest agricultural implements, the best and quickest means of raising and distributing water, the use of manure. The value of manure is not, in my opinion, fully understood by the natives of India. If some cheap fuel could be found to take the place of the large amount of manure which is daily burnt, it would, I think, be a benefit to the country.

I am not attempting to answer any particular question put by the Indian Industrial Commission, but just giving my own general opinion.

As regards Government attempting to finance or nurse any individual enterprise I think it is a mistake. Unless and until the natives of this country are equal to standing on their own feet, no amount of nursing will make a business a success.

Some years ago I was a director in a local cotton mill under European management with more or less a Native Board of Directors. As soon as the European element was removed the mill got into difficulties, shareholders losing everything.

The leather trade is an industry which Government might give its attention to Skins are very badly stripped and very badly cured. The match trade might also well be taken in hand.

In the aluminium trade there is also room for extension.

There is also the lamp trade. This, I believe, could be increased very largely under financial and expert advice.

Trunks, cheap locks, cheap paper, glassware, hosiery are all trades that might be encouraged.

I would very strongly deprecate the Government nursing any trade or industry that would injure the home trade, but would support the greatest assistance being given to any trade that formerly was in the hands of Germany and Austria.

As regards the management of Railways, I do not think anything better can be suggested than what is embodied in the address made by Major Hepper at the Railway Conference in Simla, on 16th October, 1916.

(Mr. Waller did not give oral evidence.)

Witness No. 3.

Rai Bahadur Sultan Singh, *Banke, Delhi.*

Written Evidence.

I am a banker and am connected with manufacturing and mercantile concerns. I am a director of the Delhi Biscuit Company, Limited, and of the Delhi Cloth and General Mills Company, Limited, and am a managing agent of the Delhi Flour Mills Company, Limited. I have been for many years a member of the committee of the Hindu College, and am the secretary of the Hindu Girls' school. I was for fourteen years a member of the Education Committee of the Delhi Municipality. I was also a Member of the Punjab Legislative Council from 1910—1913. For the last twenty years I have taken a keen interest in education. I have visited England and other European countries several times and visited a number of educational and industrial institutions there.

As the Commission have said in the questions sent to me that I need not answer all the questions nor answer them in the order in which they have been printed, but that the Commission would prefer that "witnesses should submit their views in a connected statement for each subject, and include in each such statement their answers to the various questions," I will state my views in the order that I think best.

India is rich in the three elements essential to industrial development and prosperity *i.e.* (1) resources in raw materials, (2) cheap and plentiful labour, and (3) an extensive market. Our aim should be to reduce the export of raw material and to increase the export of manufactured goods and articles. We should endeavour as far as possible to utilize for manufactures an ever-increasing proportion of those raw materials. Mr. James MacKenna, I.C.S., pointed out last year, on page 32 of his pamphlet on "Agriculture in India' that our cotton crop of 1913-14 was estimated at about 5 million bales. Of this, 3 million bales were exported. Japan took more Indian cotton than Germany, Belgium, Italy, Austria-Hungary, France, and the United Kingdom combined. Japan takes nearly twelve times as much as the United Kingdom and of the crop of 1913-14 absorbed 1,348,000 bales. The *Economist* also pointed out in a recent article that of the 2·5 million bales exported from Bombay in the season which closed just before the war, Germany and Austria secured over 500,000 bales, Belgium over 2,000,000 bales, a great deal being in transit through Antwerp to Germany; France and Italy nearly as much, and Japan 1¼ million, *i.e.*, 50 per cent. of the whole. Last season Italy was the only large European buyer, Japan securing 80 per cent. of the shipments. We should not allow such a large quantity of our cotton to be exported to Japan and other countries. If Japan can, after importing cotton from a distant country like ours, find it possible to manufacture it and export it after paying double carriage, we should certainly be able to manufacture and consume it in our own land with at least equal profit and thereby reduce the enormous quantity of cotton manufactures which we import and which cost us over sixty crores of rupees annually. This should not be at all difficult to do if the Government will help and encourage indigenous enterprise.

All these raw materials may be turned into manufactured articles in India in larger quantities for consumption both at home and abroad. The same may be said with regard to jute, hides, oil-seeds, etc. The existing factories are far too few and may be substantially increased in number, if financial aid and expert advice from Government are forthcoming.

Labour.

I believe that my countrymen are not inferior to any people in natural aptitude for skill in arts and handicrafts. The fine shawls of Kashmir, the silk and muslins of Murshidabad and Dacca, and the kinkobs of Benares fully prove this. But industrial conditions have greatly changed in the last century. The use of steam, electricity, and modern machinery for the manufacture of goods on a large scale now dominate the situation, and unless Indians can compete with the manufactures of the people of the West and those of Japan, who are industrially far more efficient than Indians, we cannot achieve or maintain our industrial prosperity. But if Indians are ever again to become fit to compete with the peoples of the West, the first requisite is that they should receive similar education and training. Elementary education should be made compulsory as it has been made in Japan and all the advanced countries of the West in order to raise the general intelligence of the people necessary for maintaining our position in the modern industrial conditions of life. The late Mr. Gokhale, quoting an eminent German Professor, well pointed out that "No real economic or social development of a people is possible without the education of the masses. Such education is the foundation and necessary antecedent of increased economic activity in all branches of national production in agriculture, small industries, manufactures, and commerce; it leads to a more equal distribution of the proceeds of labour; and it ensures a higher level of intelligence and a larger capacity for achieving social advance among the people. It is impossible to over-estimate the importance of this question in the present state of India." One of the fundamental reasons why the Japanese are beating us, Indians, and flooding our markets with their cheap goods is that 97 per cent. of their boys and girls are educated, while 93 per cent. of our boys and girls are illiterate. But elementary

education alone will not do. If Indians are to be made industrially as efficient at least as the people of Japan, institutions for technical and commercial education should be established throughout India on as liberal a scale as has been done in Japan. Unless Indians are so educated and equipped they have little chance in the economic warfare which is going on at present and which it is certain will continue with increasing fierceness in the years to come.

Markets.

India needs no foreign markets to stimulate or absorb its manufactures. Except the Chinese, no other people in the world have such an extensive home market to supply. But here again in order that Indians should learn to serve and utilise the market to the fullest extent, it is necessary that Indian youths should receive a most up-to-date commercial education in higher commercial schools and colleges.

Financial aid.

Next to education the thing that is most needed for the economic progress of the country is a well-organized system of banking. There ought to be a great industrial bank in every province which should receive full support from the Government and should have its operations supervised by experts appointed by the Government. They should report both to the Government and to those directly responsible for the management of the bank. This bank should have a branch in every district in each province. Among other matters it should be the business of this bank to advance loans on the security of industrial plant and on stocks and shares. Such industrial banks are necessary to give that financial help to industrial undertakings the want of which has been the cause of the ruin of many of them. The number and scope of co-operative credit banks should also be increased. In my opinion there should be one in every district. Local capital will be drawn out to feed both the industrial and the co-operative credit banks if they are so constituted that they secure the confidence and co-operation of business men of reputation in the district. The Government of the provinces should co-operate with the people in maintaining the banks at the right standard by depositing a portion of the public money in them and by a system of Government audit of accounts. In my opinion Government should help new business enterprises of an approved kind by guaranteeing dividends for a limited period with or without subsequent refund to Government of the expenditure incurred in paying dividends at the guaranteed rates, as each particular case may require. Assuming that such banks are established, Government need not itself directly advance loans to business enterprises with or without interest.

In parts of the country where the agricultural population is very poor and where therefore the co-operative credit system may not be suitable to meet the requirements of the situation, money grants-in-aid and the supply of machinery and plant on the hire-purchase system may be made to encourage cottage industries. The Government might well provide part of the share capital of business enterprises on the same basis as the public subscribe to the capital. But in all cases in which the Government decide to extend help to any enterprise, it should be a necessary condition that at least half the share capital of the company be reserved for Indians. If this is not done, I fear that foreign companies like the American Tobacco Company will come to exploit the country and to take Indian business more and more into their hands. The lending of services of experts to private companies by Government should be made on the condition that the Government should have the power to decide as to whether the publication of the results reached by the Government expert will go against the interest of the business concerned.

Commercial museums.

In my opinion a commercial museum should be established at the headquarters of every district for the purposes of bringing manufacturers and merchants into contact with one another. The encouragement of cottage and other industries of the district should also be a particular object of these museums.

Exhibitions.

Industrial exhibitions should be encouraged at the headquarters of each district or at suitable centres, and should be a permanent institution, *i.e.*, held annually.

Demonstration factories.

Demonstration factories should also be attached to museums where demonstration should be made of such processes and of the working of such improved apparatus as may likely lead to improvement of any local industry. It would be advantageous if all these museums, factories, and industrial schools be established close to each other.

Trade representatives.

Unless we develop our manufacturing trade there is no need of appointing trade representatives in foreign countries.

Government patronage.

The principal Government departments which use imported articles should publish a list of those articles and exhibit them in commercial museums.

Training of labour.

Nothing worth speaking has been done to improve the labourer's efficiency and skill in any industry of which I have any knowledge. As to how the labourers should be trained I have dealt above.

Apprenticeship system.

After students have received the necessary preliminary training in elementary, general, and technical schools, they should, be encouraged to work in some workshop in the district; and in cases where there are no workshops in the district, Government should

provide facilities to such students to proceed to other districts where workshops exist. Night schools should certainly be opened for short-time workers as they increase the efficiency of the workmen if they can receive technical and scientific instruction.

Technical and scientific departments.

It is essential for the industrial and commercial development of the country that an Imperial scientific and technical institute be established to promote the study of, and research in, subjects in which the entire country or several provinces of the country are interested. Subjects in which only one particular province is interested should be left to each provincial institute which also should be established.

Colleges of commerce.

I have already spoken of the need of commercial education. The establishment of a first class college of commerce is essential for the development of our trade and industry in every province. The advantages of such a college are manifest. Professor Lee Smith said a few years ago at the Industrial Conference held in Madras:—"The leaders of commerce and business need to be scientifically trained just as a doctor or a barrister or professional man is . . . Modern experience shows us that business requires administrative capacity of the very highest type. It needs not merely technical knowledge, but it needs the power of dealing with new situations, of going forward at the right moment and of controlling labour. These are just the qualities which Universities have always claimed as being their special business to foster; and we, therefore, say that if you are going to fulfil any of the hopes which were held out yesterday by your President, if you are going to take into your own hands the control of the commerce of this nation, then you must produce wide-minded, enterprising men of initiative—men who are likely to be produced by the University Faculties of Commerce. The University Faculty of Commerce is intended, of course, to train the judgment and to mould the minds of men. It is claimed that although, it must give primarily a liberal education, it is possible to give that education which has a direct practical bearing on business life. That kind of man (a man so trained) has immense possibilities in the world of commerce; he is the kind of man on whom you must depend to lead you in the industrial march in the future."

Commercial publications.

I strongly recommend the publication of commercial information in the principal vernaculars of the country as that would help the industries and commerce (1) by educating the public, most of whom do not know English, and (2) by stimulating industrial progress.

General.

I now come to deal with the practical side of the whole situation. We have to compete with many foreign countries that have attained various stages of industrial development and are far advanced than India. The industries cannot, under the circumstances, flourish until Government affords that help which is necessary for the development of a country like India. I will give a few instances.

The securing of capital is very difficult; only a few rich people are now carrying on different kinds of business with varying degrees of success. Expansion of business enterprise is exceedingly slow, among other things, on account of lack of capital. Men who make small savings fear to make their investments in enterprises which will have an uncertain existence, being exposed to competition of foreign countries. If the Government will either guarantee interest or help in any of the ways enumerated above, capital will be forthcoming easily.

Another equally important factor is the patronage of nascent industries. Here I am taking an illustration from the Delhi Biscuit Company, which is only a small concern.

The company was started in 1898 and did good business till 1908. They were selling biscuits at a price 25 to 30 per cent. less than that of the imported article. The foreign companies on finding that we were progressing fairly reduced their rates. We thus lost a great deal of our business and were ousted from the ports. Now since the war broke out shipping rates and insurance charges have gone up and foreign biscuits thus became expensive. This gave us an advantage. Army orders for the supply of biscuits were placed with us, and this is the cause of the prosperity of our business.

The Kandla and Gota industry in Delhi, which comprises gold and silver thread-making and lace-weaving has considerably suffered from the competition of cheap German and French Lamettas. The demand for these articles is still great and is partly met from indigenous make and mostly from imported articles. Even now nearly 3,000 to 4,000 persons depend on this industry. If Government support is granted by some kind of financial aid and expert technical advice to starting a factory with modern machinery and on a large scale for the manufacture of Lamettas, all the industries dependent thereon in this part of the country will flourish and give occupation to a still larger number of people including women and children.

With regard to the flour milling industry in Delhi in which I am actively concerned, I have to remark that we have to import considerable quantity of wheat from the various markets in the Punjab; we find railway freights for bringing wheat to Delhi a handicap in profitable working; we ought to have concession rates for the carriage of wheat from the Punjab and also for the carriage of flour to ports. Railway freights may be adjusted to encourage nascent industries.

ORAL EVIDENCE, 30th October, 1916.

To President—By technical education I mean scientific research and by industrial education training of labour, training of operatives for mechanical and other forms of industry. There are really two classes—industrial education and technical education which also includes technological. By commercial education I mean commercial organization, controlling of labour, marketing of produce and organizing business concerns.

When I say that industrial banks should be established in every district I do not mean that they should be in the other smaller places. I mean at the headquarters of the larger provinces they might have branches. If there is one central bank it will have branches and the activities of the branches will be limited to their respective provinces.

When you say that the business of this bank is to advance loans on the security of industrial plant and on stocks and shares, do you contemplate that the bank will have some staff of a technical kind that will enable it to judge of the value of the industrial plant, etc., and of the business undertaking generally?—There might be a Government department that will co-operate with the bank in giving expert advice as to what particular industries could be approved, the necessary advances being made by the bank. The expert would see whether the particular locality is suitable for any particular form of industry. There will be a technical and scientific department that will co-operate and co-ordinate giving advice to the bank whether a certain application deserves encouragement. The bank manager might refer to the Government expert and get a report whether the particular industry suffers from want of funds and then on the basis of that report will make the advance.

Have you formed any ideas as to what this would mean in the way of staff of experts available for every different form of industry to examine and report on every proposal of the kind for an advance of money from a district bank?—It is supposed that Government is going to maintain some department to make researches and enquiries on various industries and there will be sufficient data on record in the Government department in each province that will be available for the service of the bank. The industrial survey of the country is supposed to have been made already and how best capital could be utilised already known.

When the industrial concerns go for financial aid to the bank the latter makes enquiries anyhow, and I do not think it will be difficult for the Government to devise means to get reliable information. The bank will make advances only to industrial concerns. The banks are established for a specific purpose, that is to helping the industries of the country, and there will be no difficulty in finding out what industry deserves support.

The stocks of a company are visible to everybody. What we contemplate is something more than that. We should advance on prospects. Who is to estimate those prospects? What is the difficulty of our supporting an industrial bank?—Suppose a syndicate is formed and they have raised part of the capital. On the basis of this as capital a particular sum might be advanced as working capital. If many experts were wanted for the development of industries their services should be availed of.

Many industrial concerns suffer from lack of funds. This need should be removed. I want to differentiate this industrial bank from ordinary banks. This bank will not receive any deposits because in those banks which receive deposits their security is not liquid. When they make advances to industrial concerns and depositors withdraw the money the industrial bank will be in difficulty, and in their turn the bank will demand money from the industrial concerns. I expect that a portion of the money that at present goes to the presidency banks should go to the industrial bank. I have not worked out any detailed scheme, but I am just giving a general idea. For example, municipal money is lying idle. Part of it might be deposited in the industrial bank. The establishment of these banks would be a means of providing capital. There may be some industries which may bring quick returns. In that case Government could very well claim a refund. In some cases where big returns are not got quickly Government should give some concession. As a rule the company which has a guaranteed dividend should refund to Government the expenditure incurred in paying dividends, but Government may have the power to make exceptions.

I have seen some sales agencies in the Punjab for agricultural produce on a small scale where the purchasers bring all their products there. I have no experience of commercial museums, except that I have seen the one in Calcutta. The system of marking up-to-date prices on the articles in the museum is very desirable. The necessary cost involved could be met by levying small fees from the exhibitors and they will find it to their interest to do so. The museum will not take any responsibility. Government will simply help. In every German town I visited, when I was in Germany, I saw a lot of exhibitions with prices attached. If it is found impracticable to establish commercial museums in every district headquarters they might be established in big trade

centres where there is a good deal of manufacture to exhibit. If the people do not take the initiative then Government will step in and help in the establishment either of stores or museums. I would leave stores to private enterprise and leave Government to establish some sort of museum. I do not know the emporium at Cawnpore. I take it that the museum is simply meant to exhibit the things and the emporium is to sell them. Then the buyer would know whether a particular thing is made locally in the country or not, and then he could make an enquiry himself regarding the price. It is not necessary that Government should establish a commercial museum at the headquarters of every district. They might be established in the chief presidency towns and in other big industrial centres.

Demonstration factories can be both on a large and small scale according to the needs of the country. The villagers cannot go to long distances. There are various cottage industries which want improved methods. There should be a convenient centre. We want people who are seriously minded about the matter and not mere casual visitors. Each demonstration factory would not have all the industries. It is understood that the activities of any one particular demonstration factory would be limited to the particular industry of the locality.

Commercial museums might be either big or small according to the needs of the country. Government should inform all the purchasing departments what particular things can be had in India as well. The object of the publication of the list of articles is two-fold —to let the manufacturers know what the requirements of Government are and the second object is that consumers and the Government officers should know that these are articles which they consume and that they are manufactured in India. Big things which cannot be exhibited at each museum are not necessary, but simpler things, such as pencils and stationery, can be exhibited. I have no objection to my written evidence being modified to that extent. Scholarships might be given to apprentices. Stipends might be fixed to get practical training for them.

Can you mention some subjects which are limited to one particular province?—Textile industry. It must be established in Bombay. There are certain raw products that are in abundance in one particular province, for example, petroleum in Burma, gold mines in Mysore, etc. There are many raw products that grow more in one province than in another.

Do yow know of any business man in Europe who has been produced by the University Faculties of Commerce?—I do not know of any particular man, but I rely on the words of Mr. LeeSmith. I think this country is lacking in business organization and control. I think Colleges of Commerce are the one need of the country. They might be established in every province. One has been established in Bombay.

The Delhi Biscuit industry is not very much in need of financial help. We are thinking of extending it if we could get a market. But we fear that after the war our markets would be taken away, because imported biscuits would become cheaper and it would be difficult for us to compete with the foreign made biscuits. We cannot get any machinery now.

Do you think that Government should help a company which has got its capital twice over.—One particular concern does not help the prosperity or the trade of the whole country generally. But for the war we would not be in such a prosperous condition, and we intend to extend. For the last two years we have been occupied in supplying Army orders and our local sales are decreased even now.

Q.—Can't you use these profits to establish more agencies and could you not use a part of it for improving the method of manufacture?—This is what we intend. We want to double the factory if the machinery is available. We cannot do this during the war.

To Hon'ble Sir Fazulbhoy Currimbhoy.—There are two or three cotton mills in Delhi which are not working properly owing to lack of capital. They were started as a joint stock company and they were financed by some local banks at high rates of interest. There is not much technical knowledge and expert advice. Consequently the cost of production increases and we cannot compete with foreign manufactures. As regards the shape the supervision by experts should take there might be a director appointed by Government and a system of audit. This would infuse more confidence in those who invest money in the bank. The initiative should be in the hands of the people under Government, guidance and supervision. The bank should co-operate with the merchants and the manufacturers.

I do not know of any manufacturers that want pushing in foreign countries except cotton yarn. I think that we should export the surplus after consumption. I know the history of the textile industry in this country.

I have seen the college of commerce in Bombay. I suggest that more colleges be established in the various provinces on the same lines. I have not studied the curriculum of the college minutely, but I believe there is provision for all that is necessary.

Foreign companies working in India should offer to India 50 per cent. of the subscribed capital. The benefit of Indian labour should not go out of the country without being properly rewarded.

To Hon'ble Pandit M. M. Malaviya.—We export much cotton to foreign countries. It could be utilised locally provided there was sufficient capital and good management.

We had an agency of the Delhi Biscuit Company in Bombay and that agency has to be closed, because owing to the railway freight our biscuits could not compete with imported biscuits there.

Government should make deposits in the proposed industrial bank as they do in the presidency bank. This would inspire public confidence in the bank.

I do not want commercial museums for every district. Whether a district should have a commercial museum will depend upon the industries of the district. There may be several districts which might have one common commercial museum. But in every commercial centre there should be a museum. Demonstration factories will go better with an industrial school. I do not mean that factories and schools should be established as part of the museums. The museum is meant simply to let the people know that a particular article is made in a particular district and the price of it is a particular sum at a particular date. It would bring manufacturers and buyers together and would facilitate sales.

Commercial colleges are needed. There must be some source of turning out men competent to control business organizations. Commercial colleges will include instruction in banking. That is a very important subject. The recent failures of the Indian banks were due to ignorance of many of the banking problems.

To President.—Advances from the industrial bank should be made only to approved industries. The price of the plant, etc., will be considered by the bank manager with the advice of the expert before any advance is made. At first the originator of the scheme will bring in his scheme and prospectus and that should be gone through by the manager and expert advice taken. Of course a certain amount of risk is involved in taking the initiative in any industry. Even private individuals have to depend on expert advice. A certain amount of risk will of course be taken by Government as by any private individual. I think that in every country that has made progress in developing industries a large number of experts has been forthcoming, either at Government's expense or private expense later on as the industries grow.

To Sir D. J. Tata.—Regarding the increase of freight the Biscuit factoy has made a representation to the Railway Board and they have not yet replied. So far as I am concerned I should be very glad to receive men as apprentices.

Is there any difficulty in getting these people to work in factories?—I do not know about the Government and railway factories, but the private factories will be very glad to receive them. If they are not willing they ought to be persuaded.

To Hon'ble Sir F. H. Stewart.—A very large amount of capital would be required for the industrial bank. With Government support and advice considerable money would be forthcoming from private sources. Government help would be very much needed, but quite independently of Government help, the bank might be made a success. There is a lot of capital in the country that might be drawn to this bank if sufficient safety could be guaranteed. Government might not make advance to industries directly; they might advance through the agency of the bank. Government might guarantee dividends but the bank will be a separate concern by itself, of course under Government control and guidance which is wanted to inspire public confidence. That would be met by the appointment of a Government director and auditor. If the Government does not find that the capital is forthcoming in sufficient quantity then it may subscribe.

In Delhi there is still great demand for gold and silver embroidery work. There was a system of hall marking of goods, and I would recommend its resuscitation provided it does not make any extra cost in production. I am in favour of a certificate of quality.

Regarding the carriage of wheat from the Punjab the rate of carriage of wheat from Jullunder to Karachi has been raised from Re. 0-10-3 to Re. 0-10-6, while the rate for flour from Karachi to Delhi has been raised from Re. 0-7-9 to Re. 0-9-5, that is, it has been raised nearly by 2 annas. There are more facilities for sending wheat for export to ports than for bringing wheat from the wheat districts to the milling centres.

To Dr. E. Hopkinson.—I think most of the capital for the industrial bank will come from public sources and Government might supplement it. I think the bank should not receive deposits; because if it receives deposits then the deposits should be invested in liquid securities. The bank might share in the profits of the concern and build up a reserve. The Government expert is the man to ascertain whether any particular enterprise is a sound one. If the enterprise is favourably reported upon the bank should then give aid. Government might lend the services of experts to help in new undertakings. Discretion as to payment

for such services should be left to Government. If the industry is in an infant stage and wants support then there should be no payment If the results of the industry are such that the company or business concerned makes large profits, then the Government would be justified in imposing some condition of payment. It should be left to Government to find out if the business concern will suffer from the publication of the results of researches. In such case Government might withhold publication for a limited period. The point ought to be left to the discretion of Government.

To Mr. A. Chatterton.—The Delhi Biscuit Factory was started in 1898. We had a European baker. He left us three years ago. We wanted to keep him but he wanted to go back. The demand for biscuits fell off before he left and due chiefly to the fact that Lipton's opened a branch in Calcutta and they sold their biscuits at a price with which we could not compete. The importation of cheap biscuit from Europe is one of the causes of the failures of the locally made biscuit. The biscuit-makers in England use better flour which is not available here. We can get about 54 per cent. of domestic flour and 28 per cent. of atta from wheat. From the wheat grown here it is not possible to get flour of the very best quality. It is certainly inferior to the American wheat.

I do not know of any system of indentureship for apprentices. There is no law here to check the apprentices from running away.

Industrial concerns which are financed by Government should have Government directors. Government directors of private factories might be non-officials nominated by Government. They need not be officials. I have got no experience of commercial museums. The one I have seen is in Calcutta There is no other except that in Calcutta I think commercial museums can be utilised with great advantage. If more museums were established people would learn to use them.

As regards the industrial bank, when there is a supply of capital, the demand for it will come. Industries are at present not being started owing to lack of capital and the lack of necessary technical knowledge. When both will be forthcoming there will be a great deal of expansion. When the people get more confidence more capital will be forthcoming. I would have an elastic capital increasing from year to year. It would help if such a bank could issue against accepted security certificates to industrial concerns guaranteeing the demand of interest and then allow the industrial concerns to dispose of these in the open market. The certificates will be a sort of negotiable instrument. They will help the bank and the industries and would be a feasible way of dealing with the question of the gradual expansion of the capital of a bank.

Witness No. 4.

Mr. D. C. Churchill.

Mr. D. C. Churchill, B.Sc., M. E., *American Deccan Institute, Ahmednagar.*

Written Evidence.

A new handloom for weavers.

I have been engaged for a number of years in developing hand weaving machinery, especially a loom, in the American Marathi Mission, Ahmednagar, in connection with industrial educational work there.

The principle which is guiding us is distinctly different from that underlying any of the other attempts in handloom improvement in India of which I am aware.

We have found that by using mechanical ideas, peculiarly modern and western, a loom may be produced suited to Indian requirements, as regards, individual operation, in so far as we can judge without a widespread demonstration, and comparable to the power loom, rather than to the indigenous handloom, in outturn.

We have found no way in which this loom or a similar loom can be worked commercially, unless it is "manufactured" on a considerable scale in a well-equipped central factory which shall make use of equipment, processes, organization and distribution such as are found economical and necessary in a British or American or other factory engaged in making "popular" machinery (*i e*, machinery for the populace.)

Thus far I have had no experience in raising capital. I have, in anticipation of requirements for the completion of this work, *enquired into* possible sources of capital only, and have been satisfied that they exist and will be available on certain definite conditions. I have spent my time, and Government and Mission money thus far, chiefly, in trying to satisfy those conditions.

First.—The first condition for raising capital is, in this case, to insure a demand for the product by securing unquestionably workable machinery, *i.e.*, that which shall be commercially profitable under the conditions obtaining; these latter being that we must first secure:—

(*a*) A machine sound from an engineering point of view, complete for its purpose and designed for rapid and low cost manufacture, in duplicate parts, as are the bicycle, the sewing machine, the cash register, the motor car, etc.

(*b*) A machine possessing at the same time point of design and adaptability definitely demonstrated to be what the Indian can take kindly to under operating conditions.

Experience in America where the sale of "popular" machinery of a multitude of kinds is probably many fold that of any other country, has led me to put the above conditions for encouraging capital, first.

Second.—(*a*) Enquiry in India from time to time, of capitalists themselves, has made it seem probable that no large amount of capital for such a factory as is contemplated can be coaxed out without some considerable data leading to a fair indication of the probable demand for looms, granted that we secure a good one. (I use the word loom to represent all necessary hand machinery for making cloth from yarn).

(*b*) On the other hand, I was encouraged to believe that, given a large sized demonstration of a few hundred looms operating here and there successfully, sufficient data would be obtainable, within a reasonable time, to draw out the necessary capital for a factory to produce them.

(*c*) The Bombay Government has now under consideration the question of providing the means for making such a large sized demonstration.

Altogether such enquiries as have been made have brought out the following possible sources of capital.

1. Capitalists, large and small, who may be sought and persuaded.

2. Local Banks, for example, loans through a local "holding society" which would secure loans from banks on the personal property or reputation of members.

3. Loans from a philanthropic business organization like the Indian Missions Industries Co., London, which supplied Rs. 50,000 to Rs. 75,000 about 1900, for a rug factory in Ahmednagar. They supplied also the capital for a similar factory at Mhow.

Closely allied to the subject of raising capital for investment in a loom factory is the possibility of the growth of our experimental plant by comparatively small additions of capital or no additions at all except the earnings of the plant itself. This will be possible when it shall be big enough (by Government grant or otherwise) to make sufficient looms for the "fair sized" demonstration contemplated.

If, at that time, a good demand for the looms is demonstrated, there will of course be no difficulty in securing capital. If, on the other hand, demand is too slow to encourage capital immediately, the experimental plant which will already have produced several hundred looms will be able, without much additional capital, to supply a relatively slow demand during a period of gradual growth.

The present plant where our experimental work has been done and where all our various looms have been made has gradually "collected" in this slow and steady way.

We do not therefore anticipate much difficulty in providing the necessary plant for manufacturing looms, from the point of view of capital, if and when we can show, in the sense indicated above, commercially profitable weaving machinery.

The demand for our looms even while they have been in such an incomplete state of development that we could not recommend them, has been such as to indicate a sufficient immediate demand, when they shall be put on the market, to pay the running expenses of a small factory to produce them.

The encouragements of experienced Government officers and citizens like Mr. Alfred Chatterton, Mr. P. N. Mehta and Rao Bahadur P. Theagaraja Chetty have confirmed the belief that the demand will be amply sufficient to warrant any reasonable initial expense which shall secure the first condition abovementioned, for raising capital, *i.e.*, that the article manufactured and offered for sale is a good "commercial proposition."

Oral Evidence, 1st November, 1916.

President.—At the Madras competition your loom turned out twice as much as the next most efficient loom. How long did the test last and did the man working at the loom keep up his speed for the whole day?—That is a most important and fundamental thing. The very variable results in various competitions in the past were due to the fact that one test was for an hour, another for a day, and so on. In this case the test was to run for two weeks and my loom was not worked at that time for two weeks for the reason that it was so evident in the first two or three days that the loom was going to maintain itself straight through that they wanted me to stop and try the loom on fine cloths peculiar to Madras It was rather a failure on the finer cloths but the judges were of opinion at that time that there was no difficulty about the loom maintaining its speed straight along. Our experience during the last six years has borne this out amply. There has been no difficulty about maintaining the speed month after month.

Did the same man work the loom?—There was only one man. He worked about seven hours a day. The average day is only eight hours.

Did each competitor's loom work at that rate?—They all began and finished about the same time. My loom stopped only to try a particular kind of cloth and then went straight on.

Hon'ble Sir Fazulbhoy Currimbhoy.—Is your experience entirely limited to the hand-loom industry? You have not answered any other questions which have been sent to you. You have dilated entirely on the hand-loom in your written evidence.—I am interested in a number of other questions besides the hand-loom but I supposed that that was all that was wanted of me at this time.

You have no personal experience of raising capital?—No more than what has been stated in my written evidence, that is, only in so far as we wanted to go a head with our experimental work.

You say that so far you have spent chiefly Government and Mission money?—Yes. The money that has been spent has been mostly Government money.

With any condition of repayment?—Nothing at all.

Did you get any expert aid from Government?—I have made use of Government experts in so far as it seemed necessary and wise.

Can you give some idea of the plant you have got?—It consists of what a manufacturing establishment might call its experimental department, such as I have understood this in America, where certain processes or a certain kind of machine is needed in a large organisation. We have tried to organise it within the limits of the funds we have for this work. We had an analysis of such machinery as is available and anything which it seemed necessary to supply and satisfy those conditions which we thought necessary to make a hand-loom which would be suitable for the public. We have thus a factory not specially for making a lot of looms, but for experimenting to get one which would be suitable for India. It is not ready to manufacture now.

According to your scheme you will have a big workshop to prepare this?—That is the expectation eventually.

You want to run it on philanthropic lines?—Business lines entirely.

Have you shown your scheme to the Bombay Indigenous Industries Committee?—I do not know how completely it has been given to them. I answered such questions as were put to me at that time.

And later on you submitted your scheme to them?—I was asked certain things by the Committee of that time appointed by Lord Willingdon and the questions included a good many in addition to those concerning the hand-loom.

How much money to start with do you want to produce these looms?—It is very hard to answer that in a sentence. I made a proposition to the Bombay Government nearly two years ago in which I proposed to do some more experiments for two or three years. I asked for a lakh of rupees a year for five years. I asked for a sum of money for a policy which would extend over a period of years. I have been informed that that is next to impossible for Government to do. At present the proposition which has been sent to them has been for a lakh of rupees for the coming year for producing about 70 looms. This is their proposition rather than mine but I have agreed to it as a working proposition and to working the looms through one of the criminal tribes. It is not an ideal scheme by any means but one which I am willing to accept. There is nothing in it which will frustrate my main idea.

Do you expect that these looms will be taken by the villagers?—That is a very open question in my mind. If any loom will be taken up, we have made that loom. We have watched carefully such attempts as have been made in the past to introduce hand-looms where the underlying principle has been that the loom should be simple and capable of manufacture and repair in the villages. We have seen those things meet with failure and do no good to the people. Therefore we have taken to this new loom and it is hoped that it will go into the hands of the villagers. Whether they will use it to good advantage or not is purely a problematical matter.

What will be the cost?—I have said Rs. 150. That must be taken with much elasticity. I think it can be made within Rs. 150.

Do you think that a working weaver will be able to take this loom under the conditions of indebtedness in which weavers usually live in India?—I have not thought it necessary to decide that point. Like the sewing machine, if the loom is worth its price, then money will be forthcoming, even though the poor weaver will have to rent it.

What is the cost of the looms which are at present in working operation?—Roughly the 20 looms which have been running for six years past cost Rs. 1,000 to make, probably Rs. 1,200, without counting my time as worth anything at all.

How many looms have you got?—Twenty looms altogether, I think. We have several types.

What do they cost to the villagers who work the looms?—Till now we have not sold even one.

Do you know what the price of the looms now used by the villegers is?—I believe from Rs. 10 to 15.

Have you had these looms examined by experts in this country?—The Bombay Government has had them examined. I do not think that those who examined the looms can be called experts. I cannot say that the looms have been examined by expert machinists. Mr. Chatterton is the most expert machinist who has examined the loom.

Hon'ble Pandit M. M. Malaviya.—You have been giving your time to this invention as a business matter?—I have approached it from the educational point of view. I came to India for industrial education. I have believed from the very start, sometimes at variance with some of my colleagues but entirely in sympathy with others, that the way to be of most use educationally was to produce on the industrial side a "commercial proposition." It is my idea. You may call it philanthropic or educational.

You have not worked at it from the point of view of gaining an advantage for yourself?—Not the slightest advantage. It is hoped that later on a factory will be produced which would be engaged in making these looms. If there is any profit in the factory, it would be used in enlarging the scope of the educational institution of which it would be a part. That is all.

You do not wish that this invention should be the property of the Mission alone?—No; there has been a good deal of difference on the point. Some are in favour of getting a patent, others not.

How long ago did you begin to work at this loom?—In 1902.

Have you arrived at the conclusion that your machine is the right sort of machine that you wanted?—I cannot say that I am quite satisfied.

Do you think that the machine is complete enough to be put before the public?—Yes.

Have you any objection to having the machine subjected to examination by a committee of experts?—None at all. In fact I have been asking for that for some years.

You will be willing to disclose the construction of the loom?—Yes; everything.

If such a committee is appointed and if it reports that the loom is one which the Government should help, then you will have done with it. Will you then leave the Government free to deal with the machine as they think best?—Yes, as far as I am concerned. But I do not know whether my Mission will take the same view.

Can you give a rough idea of the amount spent in working up this particular invention?—Leaving out the value of my time, pretty close to a lakh of rupees during the last 15 years.

Can you give us any idea of how much Government has contributed towards this amount?—Perhaps three-fourths of it.

Do you not think it is a rather large sum to be spent on finding out what kind of loom would suit the people?—I do not think it is.

You have seen the Salvation Army handloom. Have you compared the result of the working of your loom with the result of the working of the Salvation Army loom? It has been compared as regards the outturn of the cloth.

Please give us a rough idea of the result.—The outturn was nearly double that of the nearest competitor.

Was that the Salvation Army loom?—That was a type of English shuttle loom which, I believe, was manufactured in Madras.

Can you tell us the cost of the loom which was the nearest competitor?—There were two kinds of looms; the pit loom and the frame loom. The frame loom cost about Rs. 75, and the other Rs. 25.

The outturn of both was about half?—Yes.

In what respects then is your loom superior to those looms?—That may be answered in two ways, mechanically and personally. After the competition in Madras, it was Rao Bahadur P. Theagaraja Chettiar, perhaps the most prominent Madrassi working handlooms

at the time, who ordered 200 of these looms immediately, even though they were in an imperfect and incomplete condition. Soon after the Bombay Government sent an expert to examine it. Mr. P. N. Mehta came and he made a verbal remark that he would sell 10,000 of these looms as fast as we could finish them. Other small manufacturers here and there have been sending in orders to the number of nearly 600. We have never advertised at all. The only advertisement we had was the results of the Madras competition.

Was this invention of yours completed last year?—The loom that was completed last year was only a new form in which were re-arranged some of the details of the loom of which I have been speaking and which has got its position since 1908. My experimenting is not an invention as is commonly supposed. It is a continued experiment to find out whether it is possible to produce a loom at all which can be worked by an individual Indian weaver who is not physically as strong as those who use similar looms in England.

In that case it is possible that next year you will be satisfied that your present loom has been made much better?—It is not my proposition to make a different one next year.

Do you mean then that you have arrived at a completed machine?—I think we have arrived at a place where we can make it commercially profitable.

From the time that you received an award in Madras, how many machines have you sold, roughly?—We have not sold any.

Can you tell us the reason?—It has been our policy not to sell any of those looms.

Why? What has stood in the way of your doing so?—I was satisfied, and have been satisfied up to last year, that, if it had been put into the hands of the public, it would have been a failure.

Can you put it now into the hands of anybody who wants to make it? Are you willing to explain the process?—I should do that willingly. This is, however, my own opinion. I can't say to what extent my Mission will back me up. But I think they will.

Why do you want Government to give you a lakh of rupees now?—I think the loom would be a failure in its present condition.

If anybody took it up as a commercial proposition he is likely to fail?—I think he would, with the loom in its present condition.

Are you not inconsistent when you say this and when you also say that the loom has been almost perfected?—I have brought it to a condition where it can be taken up by the public. I intended to say that we can now manufacture a commercially profitable machine. I do not think that anyone else could. Some others could, but I think that it would be a difficult thing.

You have said something about the popular machine supply companies in America. What is the system? Does the Government help the company to make cheap machinery for use by the people?—I have not heard of any Government subsidies of that sort. It is almost entirely private enterprise.

Sir D. J. Tata.—Can you give us some idea of the loom?—It compares more with a plain power loom than anything else, in appearance.

How is it worked?—The Indians have given it a very characteristic name. It is called the cycle loom. The man sits on a saddle made of wood like that of a cycle and works a pair of pedals like those of the bicycle. He has a position similar to that of a bicyclist. I adopted that because it seemed to me that, of all foot-propelled machines, the bicycle gives that position of the operator, in which he gets the best results with the east exertion. He takes up a position which comes to him most naturally.

Within the last 15 years have you spent nearly a lakh of rupees in carrying out your experiments?—Yes, if you consider everything altogether,—what the donors have given and so forth.

That money has been spent in trying to perfect a machine that will ultimately serve all conditions?—No, as many conditions as I have been able to get into them.

Eight years ago it was imperfect. Still it was able to produce twice as much as the next best loom that competed?—Yes.

For eight years you have been trying to improve upon it?—Since 1909, I have had no money to spend until 1915.

The lakh of rupees spent was presumably before 1908?—During the whole time, so far as it has been necessary to keep the plant together, while I hoped for more grants.

I cannot understand why if you spent a lakh of rupees during the last 16 years, you now want a lakh of rupees a year for the next five years. Why all that amount? Your experiments have already been prolonged over a long period and in answer to another

member you replied that the result arrived at last year now makes you think that it is possible to put the loom on the market?—In the first place I have given my own time and not charged for it and in the coming time I propose to charge for my own time. That is a considerable item. In the second place I do not consider that the loom has yet reached a stage when it can be put on the market. The question of making this loom of real avail to the Indian must of necessity involve a supply to him of good warp and the warping problem has not been taken up except very incidentally.

Have you found any difficulty in getting a supply of good warp?—Thus far this has been the great difficulty in all experiments in hand-weaving. There has been great difficulty in getting a warp which will be suitable for the loom. Suppose we get the very best loom. We will not be in a position to put it into the hands of the Indian until we have spent money and time in devising some warping system.

I do not see why any experiment is necessary. All you have got to do is to go to the mill which produces the necessary warp and give it to the weaver.—That is particularly the reason why I am to-day willing to take a lakh of rupees for one year instead of a lakh of rupees per year for five years, because we have come to a point where we can produce commercial looms provided we had a committee of experts whose opinion could be obtained and who could apply the results of the experiments.

Is not the weaver the best judge as to the kind of warp to purchase?—That seems so to me also. But in my experience thus far he does not seem to know that.

How do you propose to utilise the lakh of rupees in the coming year? Do you want the money for the production of a certain number of looms?—I have carried out all that is necessary. What we want to do with this money is to give a large enough demonstration, so that in case the capitalist's money is needed to manufacture, he would have the necessary data for advancing money. I believe demonstration is necessary. There is demand. The experiment consists of two main divisions: one is from the engineering point of view, to see whether the loom is mechanically good and whether it can be used in a popular way like the sewing machine and maintained in commercial condition. In another way we must have a demonstration of how kindly the Indian is going to take to it. I have felt that it is necessary first to make a demonstration which would satisfy not myself but those members of the Government who furnish the necessary funds for it. The object of the demonstration is to find out whether the loom is going to be suitable to the Indian.

Hon'ble Sir F. H. Stewart.—I understand that you have perfected a loom which will answer and you have actually made some?—I would not dare say that I have perfected it.

You have brought the loom so near perfection that it is commercially saleable?—The loom which I would manufacture to-morrow does not exist to-day. The loom of which I have been speaking was the first loom, of which I am aware, on which an Indian could and did turn out cloth day after day at high speed. It had a defect. We have now eliminated that defect. We are willing, under pressure of Government, instead of experimenting further, to turn out some 70 or 100 commercial looms. I have not actually manufactured any.

With regard to capital, have you tried?—I have enquired a great deal in my own country to find out what the possible sources might be.

Have you definitely been to any one?—I have tried to raise capital only for experimental work. I have asked for money from Government.

You have been engaged so far on experimental work?—In so far as I have spent my time on this work, that is true.

Have you had many demands?—The loom was advertised in the Madras competition. We have received considerable demands. Mr. Theagaraja Chettiar in Madras has several looms going.

You cannot estimate the cost of manufacturing?—I think Rs. 100 would be the price of the plain loom. The figure Rs. 150 has always been in my mind; it is lowering rather than going up, by careful designing. The price is elastic. If we had an immense demand the cost would be reduced very much.

Hon'ble Sir R. N. Mookerjee.—Who has invented this loom—your Mission or some outsider?—I have been the one principally gathering the points which are embodied in the loom to-day. If that is called inventing, then I have invented it. I have taken no precautions in the matter of patenting thus far. The advice from those interested in Government control, like the Collector of Ahmednagar, has been varied on the point. Some said "you must not do that because Government has put money in it." Others have said, "you must get it patented because that is business. Some one may steal it and then neither Government nor you will get any benefit."

If I took it up myself, will you have any objection?—I shall be very glad. Personally I have no objection. I have offered the whole thing to Government.

Are you confident that it will be commercially successful?—I would not have worked at it if I had not confidence in it.

If you bring this to perfection will there be no want of capital?—That has been the principle on which I have worked.

All that you want now is to perfect the machine and you want Government help?—I have asked Government for a lakh of rupees. It is not mechanical perfection alone that I have in my mind, but also the determination of all the points necessary for the Indian taking to it kindly and making use of it.

Dr. E. Hopkinson.—Are you a mechanical engineer by profession?—Yes.

Are the looms you refer to exactly the kind of looms that were exhibited at the Madras competition?—Not exactly. The new loom has been re-designed for more rapid manufacture. Otherwise it does not vary from it.

How long ago was it made?—In 1909; they have been running ever since.

Have you made further improvements since 1909?—I have spent a good deal of time in trying to work up a dobby. If money is given I intend to spend it on a dobby.

Since 1909, you have been working on paper?—During 1915, I had Rs. 24,000 and I have used that to embody the experience of the last few years into what I believe to be a commercial workable loom. I do not think it is yet in an absolutely perfect condition, but I believe that we have passed all necessary experiments and can now, and I would be willing to, build 100 or so looms which I would consider commercially valuable.

Has that particular loom made last year been in operation?—We never put warp on it. I have not been able to weave on the loom. If I had two months more I would have woven. But I had not the money. It ran out last February and my shop has had to become self-supporting. It is purely for financial reasons that I cannot report on that at this moment.

You have not been able to work that loom and you have not been able to embody further improvements?—Yes. The model loom stands to-day ready to run and it will run. But it has no warp on it. It does not weave.

If you obtain Government assistance the first thing to do is to set that loom to work?—There are two plans on paper. I should prefer to do exactly what you have suggested to put the loom to work and then to build other looms embodying the improvement. I think in the end we will get the best possible results if we do that. The plan proposed by the Bombay Government is not that exactly.

I understand you had considerable sums of money from sources other than Government and that those sources are now unwilling to find anything more?—Yes. The offer has come from the Bombay Presidency, not officially, but it depends on the finding of this Commission.

Mr. A. Chatterton.—Is this loom which you have been perfecting suited for the individual weaver?—That is a matter which can only be determined by trying it on the weaver. But what has been in my mind is to make a loom which the Indian can use. Whether he will use it or not is a matter of opinion which, of course, men like yourself can best judge.

Would it not be practicable to build ten of these looms and set up a demonstration factory in your school?—I think it would, but it would be a very problematical affair and for my part I would not take personal responsibility for it. It is not that I have not got sufficient confidence in the mechanics of the thing. But I think that is necessary, before wasting more time and money, to have a number of qualified men make an examination. I want information on it as much as any one else; I am ready to make one, ten, or any number of looms; but, if I do that, those who provide the money would still be unconvinced until they have a demonstration of 100 or 200 looms. It is for this reason that I am pressing for a large demonstration. I would take some six months to get the workshop ready to make, say, 70 looms and then we might turn out 15 per month until we had a sufficient number.

How many pickings does a good weaver make?—An ordinary workman could make about 80 to 85 pickings a minute. If he works a nine-hour day, three of the hours are actually spent in plying the shuttle, and the rest of the time is spent in mending warp threads and in pottering about the loom. When he turns out six yards a day he is turning out about two yards an hour.

Do you think that improvement in the loom in the rate of picking is not a very important matter?—I do not think it is so important as some other things. It is not so important as improvements in the method of making warps.

Does it need an expert to run the loom?—Our loom was the one that got the prize and the loom was considered as having great prospects, because it did not require an expert weaver to run it. The man who used it was a low-caste man. I believe that is a rather important point.

What is the average rate of picking?—It is slightly higher than the published results of the Madras Exhibition. It is 153 per minute for the entire day. The workers produce from 50 to 60 yards of cloth every day. Their day is less than 7¾ hours a day.

The President.—How do you propose to utilise the lakh of rupees you have asked from the Government of Bombay? You are going away on leave? When I say next year I mean the next year of work. There was no expectation of having anything done until January, 1918.

When do you think we might have a committee of experts?—At the end of 1918.

Could you suggest any names for that committee?—I am not sufficiently acquainted with any of the professional engineers in this country to enable me to suggest names.

BAREILLY.

WITNESS NO. 5.

MR. H. E. KINNS, *Principal, Government Carpentry School, Bareilly.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprise.

Capital.

From my experience of raising capital for the establishment of small wood-working businesses for students of this school, the main difficulty has been the prohibitive rate of interest asked on loans. Even when raised on land, or house property, the rates asked were prohibitive to any attempt at starting a business.

Government or the Board of Industries might materially *assist such small concerns* by granting loans *at a reasonable* rate of interest. In the first attempt, in which Government financial aid was asked to assist school, trained men to open up a superior furniture business at Bareilly, the small loan asked for was refused.

Government assistance.

Government might aid the attempt being made to improve and extend the Indian wood-working trades by granting loans at a nominal rate of interest, in the case of concerns started for the improvement of existing industries, or by granting loans without interest repayable on easy terms, to new wood-working industries.

The supply of machinery by Government on the hire-purchase system, to men trained in recognized establishments, would be an incentive to manufacturers to take up new methods or to improve their obsolete methods of working, and would assist the expansion of technical education by creating employment for suitably trained men. This is specially applicable to the present limitations of the Bareilly furniture trade. Orders for fittings and furniture for Government offices and buildings, if given to firms granted such loans or machinery, would effect the establishments of suitable workshops run under proper supervision to the advantage of both Government and the manufacturer.

The pre-war yearly value of the imports into India of manufactured wood-work, averaging Rs. 20,95,000, warrants an attempt being made to exploit the timber wealth of the country by the establishment of the wood-working industries.

Pioneer factories.

In the machine wood-working trades, which are in their infancy in this province, it is desirable that pioneer factories should be established by Government for the opening up and testing of the commercial practicability of the various branches of the work possible. Most of the factories or wood-working concerns opening up, have, to my knowledge, either failed or been severely handicapped by the lack of the highly skilled labour necessary, and the consequent low output and high cost of running and repairs. Since there are no such established factories in this province in which mechanics can get a suitable training in the work, a pioneer section, well equipped for specialized training, should be attached to the Bareilly school.

In the case of pioneer factories such as would be necessary for the opening of the bobbin-making industry, it would be necessary to instal special plant and to train the workmen to run it under skilled European supervision. After such training, varying from six months to two years, depending on the class of work, skilled labour would be available to enable private enterprise to open up such a business with ensured success. In some cases the plant and labour complete might be taken over by private enterprise as soon as its success had been established.

II.—Technical aid to industries.

Technical aid in general.

In the *furniture business* the establishment of the Bareilly Carpentry School has assisted the local manufacturers by giving advice and aid in the making of classes of goods which they were formerly unable to undertake, owing to the untrained condition of their labour.

Demonstration factories.

A machine wood-working demonstration factory attached to the Bareilly Carpentry School is necessary for the training of wood-working machinists in the various branches. Selected students, on completion of their preliminary and instructional courses, by undergoing a further two years' training in the demonstration section, under actual workshop conditions, would be qualified for posts of skilled mechanics, supervisors, or managers in similar workshops.

Survey for industrial purposes.

In the matter of timber supply, it is advisable that surveys should be made to ascertain the quantity of various timbers available or produceable in selected districts. Thus given any timber specially suitable for any purpose, it would be possible for that industry to be taken up in proximity to the supply of raw material. The results of such surveys should be published, particulars being given of supplies of timber available, also of the possibilities of power being taken from waterfalls, and of rail, and road communications.

Thus the water power available on the Bhabar canals near Haldwani, situated in the Terai and Bhabar forests, offer excellent facilities for the development of the small wood-working industries, and is capable of considerable development,—*vide answers to question 102.*

From enquiries made as to the supply of Haldu-timber for bobbin-making, no estimate could be given by the Forest department as to the probable quantity available.

III.—Assistance in marketing produce.

Commercial museums.

These are desirable in each province to advertise Indian-made goods, and enable buyers to ascertain the best markets for their respective requirements.

Sales agencies.

These are very desirable in the main trade centres to enable the small manufacturers to exploit and advertise his manufactures.

Exhibitions.

In the furniture business considerable trade has followed on the exhibition of sample furniture at the industrial exhibitions. These should be encouraged by Government by the award of suitable prizes and by being advertised more largely. Most of these exhibitions appear to be unknown outside of the district in which they are held.

Trade representative.

Trade representatives might with advantage be appointed to represent India in Great Britain and the Colonies. From such representatives suitable lines of Indian manufactures might be introduced to a larger extent. They could also give valuable unbiased opinion and advice as to the suitability or extension of manufactures for which there is a demand. Such representatives should preferably have a knowledge of Indian labour conditions, in addition to business experience and ability. These representatives might be in the form of selected business agencies or of private appointments.

Government patronage.

The principal Government departments should, in my opinion, publish lists of the articles imported and also exhibit such, as much as possible, in commercial museums. Many such articles are imported which could be made up in India, if requirements were made known. Lists might be supplied to all technical institutions with a view to their assisting in the training of special labour where necessary for the manufacture of articles required, or with the idea of each central technical school becoming acquainted with such requirements, and thus acting as a minor information bureau in its own special line.

V.—Training of labour and supervision.

General.

The establishment of the Bareilly school will eventually improve the labourer's efficiency and skill, but a more comprehensive scheme is necessary to effect a satisfactory improvement. I would suggest the following scheme for its improvement.

The lack of skilled labour in India is largely due to the unsatisfactory system of recruitment to industrial work. No regard is paid by the parents or the school to the selection of suitable boys for the respective labours to which they are put. Generally speaking a boy who is regarded a failure at school is put to manual work, irrespective of his capabilities. Little indication can be had from his school training, since no work of a practical nature is made compulsory in the school.

From my own experience, fully 60 per cent. of students admitted to this school, even after selection, turn out failures. This is disastrous to any attempt to train skilled labour apart from the expense involved in the training.

Reforms in this system can best be effected through the medium of—

(a) Elementary technical schools attached to each central technical school.

(b) The introduction of educational handwork as a compulsory subject in all schools.

(a) In this school the students should be admitted from the age of 10 years upwards. The curriculum should include only those subjects which are of practical use to the worker, such as Elementary Technical English, Practical Arithmetic, Elementary Practical Science, Drawing and Educational Handwork. The latter is of the greatest importance and should be the basis on which all the other subjects are taught. By this subject the power of observation, imagination and ability to tackle practical problems is developed. Such powers are essential in the successful mechanic.

As an alternative to the preliminary technical school, if educational handwork were made compulsory in the schools it would effect a vast improvement in the Indian artizan class generally in all industries. From this subject more than any other the capabilities of each student can be gauged. By the award of scholarships by Government or by public bodies, successful students could be encouraged to take up manual work. This system would ensure successful recruitment in the first instance.

Given successful recruitment to industrial work it is desirable that the course of instruction should be made as practical as possible and deal only directly with the work in

question. Much of the instruction given in technical schools overlaps the elementary school education. In skilled trades more specialized work should be taught. From my experience of applicants for posts and of technically trained skilled workers, I find that they are men of all trades and masters of none. The scope of the technical schools should be to provide superior skilled labour in specific trades or branches of trades in which there is or is likely to be a demand.

In the case of the Bareilly furniture trade, prior to the establishment of this school, the trade consisted only of a domestic furniture class of goods of inferior design. The school by assisting local manufacturers has enabled them to undertake other better paying classes of woodwork, which formerly were manufactured in large centres only or imported. By the opening of evening classes, the manufacturers are able to attend and receive instruction in the design of better classes of goods, thereby extending their markets. Labour, capable of turning out better classes of work, is being trained in the school, which will eventually be of great assistance to local manufacturers who have to depend for their labour upon the bazar-trained workmen.

Any improvement in the Bareilly furniture business can only be effected through the Bareilly school, since there are no firms in Bareilly at present who have a staff capable of improving the labour under their charge. Hence in wood-working industries the training of apprentices in factories, apart from the railway carriage building shops, is impracticable.

Since an attempt to modernize industries must be run on European lines, it is essential that the instructional staff of the Central Technical Schools should have had a European training. This applies specially to all branches of work that are in their infancy in India. Attempts to teach any practical branch of technical work in this school by Indian instructors has proved an absolute failure, due to the Indians' lack of appreciation of time and output. Considering the facilities India holds, which are at present entirely closed, and likely to remain so, owing to lack of skilled labour, it is essential that any new branch of work taken up should be under the charge of an experienced European trained man.

In central technical institutions a demonstration section is desirable. In this section only work of a nature in which pupils are to be employed would be carried out, the conditions of such sections approximating closely to actual well-organized workshop conditions both as regards time and output. The students should have at least two years' course in this section as part of the course. This is specially desirable in the wood-working trade, since there is no such factory at present in the United Provinces. This training would either fit them for earning their livelihood as skilled mechanics or for the posts of supervisors or managers in any such concern. When the actual value of the training has been shown in a demonstration section, successful factories on similar lines would grow up, and the respective industry would have a chance of expanding.

Since the function of the industrial school in India should be to train a superior class of specialized mechanic, such schools should be under the control of the Department of Industries. Preliminary technical schools giving a more general education might be under the supervision of the Department of Education. Thus the recruitment to the preliminary technical schools might be more satisfactorily carried out.

Training of supervising and technical staff.

This can only be effected by selections being made from the more literate trained workmen. For these posts a technical school training followed by a further workshop training is necessary. The solely workshop trained man lacks the knowledge of the scientific principle underlying the practices. Hence his scope is limited.

VI.—General official administration and organization.

For the future development of industries, in my opinion, a Director of Industries, and technical experts would be most satisfactory. Such organization, from budgetted funds, could, on the advice of the Director of Industries, give financial aid to minor industries, such advances being granted on the respective merits of proposals. This organization would materially assist the small manufacturer, having the requisite skill, but lacking capital.

The technical experts in charge of institutions could better undertake the training of suitable skilled labour necessary, and might, by specializing in selected branches, make the instruction of their respective institutions more effective, by conforming more to the actual requirements of industrial concerns.

A Director of Industries is desirable for the investigation of, and assistance to, industries.

He should preferably be a business expert, capable of advising the various industrial concerns coming under his jurisdiction. He should have a first-hand knowledge of factory conditions, and the labour conditions of the country.

VII.—Organization of technical and scientific departments of Government.

The present organization in this province consists of technical schools under the control of the Director of Public Instruction. In my opinion these schools are too limited in scope and number to effect the necessary improvement in industries, especially from the skilled labour point of view, which is the most vital.

In the Bareilly wood-working industry in particular, the Carpentry school is the only place in which any improvement can be effected in the skilled wood-working labour problem. Considering the possible and probable development in these industries, the size and scope of this school with its limited trained staff is hopelessly inadequate to the needs of the industry, and can at present do little more than aid the local furniture industry. Special sections, adequately equipped and staffed by European experts for the teaching of the respective branches in which there is a demand, are essential, and should be provided at a very early date, if the anticipated success is to be realized.

The establishment of a commercial demonstration section is absolutely necessary to improve the wood-working trades. This section should be quite separate from the preliminary instructional section advocated, its aim being to finish off the training, and prepare men as actual skilled mechanics, by enabling them to specialize in any branch and become skilled in specific operations in which they would be of most use in industrial concerns.

In my opinion, to effect the most far-reaching results the establishment of a provincial Technical Education Department, under the control of the Director of Industries, is desirable for the expansion of technical education, and the resulting aid to industrial development. The establishment of central technical schools, well equipped for the teaching of specific subjects, and of minor technical schools in smaller centres, would give the best results, as far as the training of an industrial class is concerned. In all the central technical schools, each of the staff in charge of any section or branch of the work should have had a European training on modern lines. Indian teachers trained directly under European supervision would be capable of carrying on the instruction with better results. The staff of the minor schools could be recruited from the central schools.

From my experience of Indian teachers of technical subjects generally, I am convinced that little progress is possible in India in the training of skilled labour or management under Indian instruction. Such teachers lack initiative and appreciation of the factors which are vital to industrial progress. In technical education generally, the education given should, in my opinion, be more specialized and concentrated, not aiming at an attractive curriculum embracing an impossible number of subjects under one head, but at producing specialists in each branch of work in which there is a demand.

Provincial departments.

Technical experts engaged by the Local Government should be under the control of the Director of Industries. They should be recruited by the Imperial Government on terms likely to prove satisfactory to both Government and the expert concerned, and their emoluments be made consistent with their work and position in India. The recruiting of under-paid experts cannot be considered conducive to the enlistment of their fullest efforts, when they realize the conditions under which they have to work and live in India.

Study of foreign methods.

Government technical experts who are engaged to teach the most up-to-date methods should be granted facilities to enable them to study foreign methods, and to keep up-to-date in their work. The teaching of obsolete methods cannot be calculated to satisfactorily train men in industries, coming into direct competition with those of other countries. At least three months' leave should be granted to technical experts after every three years of service, on pay adequate to the conditions of such study leave. This would enable the technical experts to keep in close touch with modern improvements, and would considerably increase the efficiency of the service.

Reference libraries.

A library of reference books dealing with the subjects taught should be supplied for the use of each central technical school to enable the staff to keep up-to-date and improve their own knowledge of the work in which they are engaged. The supply of technical periodicals is also very valuable from this point of view.

VIII.—Government organization for the collection and distribution of commercial intelligence.

Commercial intelligence.

The Director-General of Commercial Intelligence might be asked to publish or supply more detailed information regarding the importation of commodities. Thus in the case of imported woodwork, if the value of such were given under more detailed heads, such as domestic furniture, shop and office fittings, bobbins, toys, etc., the technical schools would have a better guide of the requirements of the training necessary for labour, and the manufacturer a better idea of possibilities. If these particulars were issued to the central technical schools, such schools could serve the purpose of local information bureaus in their respective branches of work. This, in my opinion, would prove of value.

Industrial and trade journal.

The *Indian Trade Journal* has proved useful in this respect, but its utility might be further increased as noted in the preceding paragraph.

Other publications.

In my opinion the issue of journals by Government dealing with special industries, giving particulars of experiments made, and developments introduced, would be of great assistance to the manufacturer and purchaser. The Forest publications have proved extremely useful to the wood-working industries by introducing timber resources which would otherwise have remained unknown, so far as their commercial uses and possibilities are concerned.

IX.—Other forms of Government action and organization.

Hydro-electric power surveys.

The possibilities of developing hydro-electric schemes in this province have not been exploited to the extent possible. The existing Dehra Dun-Mussoorie scheme might, I suggest, be further exploited by the establishment of saw mills and wood-working factories at Hardwar. This place, situated in rich timber-producing tracts, served by the Oudh and Rohilkhand Railway and having a cheap source of power from the hydro-electric scheme, offers exceptional facilities for such development. Suitable timber is available locally for match splints, pencils, boxes, bobbins, and general furniture, and timber for constructional purposes. The establishment of minor hydro-electric schemes is feasible on the falls of the Bhabar canals near Haldwani and at Ramnagar. Both of these are situated in the timber producing area of the Terai and Bhabar, and are served by the Rohilkhand and Kumaun Railway: road communications are good, hence the cost of collection of raw material would be reduced to a minimum. The existing low falls are used in one or two cases only to provide power by means of a wooden turbine, of a very inefficient design, for driving flour mills. On the existing Bhabar canal system the falls would give an average net power, available in the working season, of 141 L. C., distributed over seven falls varying from 7 to 36 L. C. and a net power on the minimum discharge in the dryest season of 100 L. C. Additional falls could be improvised at a comparative small cost by regrading the steeper lengths of the canals and interpolating falls. By compounding the height of the falls and power could be increased. These sites would be suitable for turning factories for the supply of toys, bobbins, and general turnery, suitable wood for these purposes being available near the sites. These sources of power are all within two miles of the railway.

A similar canal scheme at Ramnagar offers equal facilities for the exploitation of hydro-electric power for wood-working industries.

This existing power on the Bhabar irrigation canals would be sufficient for the outturn of turnery to the value of approximately Rs. 2,40,000 yearly, provided seasoned timber and skilled labour were available.

Forest department

Judging from the receipts of the Forest department from timber sales the present system of disposal, in my opinion, needs considerable revision and re-organization. The system of selling in standing coupes, and cutting and clearing by contractors is both wasteful and uneconomical.

If it were possible for cutting and clearing to be carried out by contractors under forest supervision, and for saw mills and timber-seasoning plants to be established at selected centres in the various forest circles, the full market value of each species of timber would be realized. Such mills might be controlled by the Forest department or by private agencies. In proximity to these centres, wood-working concerns could be started by private enterprises for the manufacture of whatever commodities the timber was best suited for. The success of these concerns would be ensured by the supply of seasoned timber available, which is the most essential item in any wood-working concern.

The natural process of seasoning is, in my opinion, the least satisfactory in India owing to the extremes of climate. From the forest timber-conversion and seasoning dépôts seasoned timber in scantlings would be available for supply to timber dépôts, run by managing agents, in selected centres, from whence users could obtain satisfactory supplies as required. The saving in freight on bulk would also be considerable.

Many existing industries are severely handicapped by this lack of seasoned timber and manufacturers are forced to import seasoned timber for purposes for which Indian timber is equally well suited if available in a similar condition. In the case of the Bareilly furniture trade its markets are limited by the supply of seasoned timber being unobtainable.

The establishment of a commercial forestry section in the Forest department is essential for dealing with these matters. The increased revenue which would accrue from this system of disposal, and the industrial development made possible warrants its establishment at an early date.

In the sub-Himalayan tracts steam tramways for the collection of timber at the main conversion-dépôts are practicable, and would considerably facilitate the collection of material.

The concentration of special kinds of trees is both practicable and necessary for the ultimate success of any special wood-working industry. Thus in the Bhabar tracts the afforesting of Haldu timber referred to demands special attention. This timber will, in my opinion, eventually be in great demand for turnery work, for which purpose it is eminently suited. By such concentration, the supply of raw material within workable limits would be ensured.

X.—General.

In the wood-working industries the only chance for any development is by the direct conversion and preparation of the raw material in the forest as advocated above.

Until the supply of raw material of a standard quality is ensured, there is little chance of development in any branch.

Nearly all wood-working industries offer facilities in India owing to the wealth of raw material in the forests, the relatively cheap labour, and the demands of the country. Their development is undoubtedly retarded by preventible causes, already enumerated in section V and IX.

Taking as an example the manufacture of bobbins, made entirely of wood, required by Indian jute mills, the Bengal jute mills alone require bobbins to the value of Rs.16,15,000 yearly. For this work approximately 320,000 cubic feet of timber are required representing a demand of one cubic foot for each 8·4 acres of forest in the Eastern and Western Circles of the United Provinces forests. Considering that suitable timbers are available and that branches of over 15″ girth can conveniently be used in the manufacture, the demand for raw material does not appear prohibitive to the success of this industry.

Similarly bobbins to the value of Rs. 15,00,000 annually are required for the cotton, silk, and woollen mills of India.

The value of raw timber required by the local Bareilly furniture industry amounts to Rs. 2,00,000 yearly, the limitations of this industry being caused by the lack of seasoned material, which is practically unprocurable at present.

Not only would the establishment of these industries in the Indian forests create an economic demand for forest timbers and thereby increase the revenue of the Government, but it would provide a lucrative investment for capital, and create an enormous demand for skilled Indian labour, thereby turning the expenditure on technical education, into a national investment.

ORAL EVIDENCE, 3RD NOVEMBER, 1916.

President.—How long have you been in this country?—For the last five years.

Can you give us shortly your experience before you came out to this country?—From my seventeenth year I was an apprentice with a firm of builders. Then I intended to go into business with relations, but owing to depression in the building trade I later took up lecturing in building construction and its allied subjects. Finally I took up manual training and building construction specialising in woodwork. Then I decided to go abroad. I was appointed by the Secretary of State in September, 1911. I have experience in the manufacture of furniture, general woodwork, turnery, and the development of minor hydro-electric schemes and power. I was sent to take charge as Principal of this school.

You are working under the Director of Industries?—Yes.

I notice that you have given us opinions on the duties of the Director-General of Commercial Intelligence and you have given us an account of what the function of the Trade Journal should be and what the other publications of the Government ought to be like, what the policy of the Forest department should be. But do you not think it would have been better if you had left these remarks out because most of them, I find, are quite general in character, and have no details that will help us to go any further than the general opinions we have ourselves. For instance, take this paragraph:—"Technical experts engaged by the Local Government should be under the control of the Director of Industries. They should be recruited by the Imperial Government on terms likely to prove satisfactory to both Government and the expert concerned and their emoluments be made consistent with their work and position in India." There is no particular experience of yours that helps you to give that statement as one of authority?—Generally no. Personally. We never thought that it had any particular and personal application. In the case of my assistant, too, who has been working here now, this school is practically provincial, and we are doing experiments here for other provinces as well. But only a small salary is given. That applies equally to all the Europeans that come out in technical work.

The Director of Industries can put before the Government or before us any matters of that sort?—Yes.

It would not be necessary for you to give an opinion as to how the department, as a whole, is to be treated seeing that you have been in it for only five years?—No.

Again, as regards this statement:—"Judging from the receipts of the Forest department from timber sales the present system of disposal, in my opinion, needs considerable revision and reorganisation". I do not know what experience you have had of the Forest department. I am unable to obtain supplies for any woodworking industry.

In what way do you apply for supplies?—At present we indent on the Forest department to supply departmentally through the contractors to us, but that is an indent for small quantities.

Do you apply for these things yourself or through the Director of Industries?—Myself. The Director knows what we want.

Do you think it is wise to leave everybody to purchase on his own account in a department in this way?—We have to submit a statement to the Director of Industries of the expenditure monthly. They are submitted after the expenditure is incurred.

How much timber do you buy in a year? About 6,000 or 7,000 cubic feet, that is about 7,000 or 8,000 rupees. We are limited by our budget. We get this timber from the local Forest department.

After doing that for four or five years, do you think it is sufficient to give an opinion on the policy of the Forest department?—I am in touch with all the trade. I know the difficulty of all the manufacturers in woodwork in getting seasoned timber. We get very good timbers but cannot get them seasoned. If we have the timber conversion scheme and seasoning plant, in the forests a lot of Indian timber, now burnt, can be made to yield a good source of revenue. I went through the scheme with the Forest Engineer and he approved of it.

Will you tell us in a little more detail what work is done in this school, what your curriculum is, what kind of student is taken in, etc.?—We try to attract students educated up to the 8th Anglo-vernacular class, but we have not been able to enforce that standard, because we cannot get sufficient students of that standard of education to take up this kind of work. We do not get students with sufficient education to take advantage of the instruction given. They are insufficiently educated for that. If we get better educated people, they can take books from the library and study them, and also take advantage of the English periodicals which we get, and keep in touch with modern improvements and methods, and at the same time it will lead to a uniform standard for admission to the classes. Students who have read up to the eighth or ninth class would be more efficient students. Those who have read up to that class who would be able to read elementary English. Educational hand work, as I have stated in my evidence, or the preliminary technical school, is the real solution to the question. The brain has to be trained, and educational hand-work does it. The cure would be to give them this preliminary technical education, and draft them into the specific work, such as furniture making, or any other branch of wood work, or technical work of a skilled nature.

You mean to say that the course of six years that you are now carrying on is practically useless?—No. This is a vast improvement on what has been, but it can be very much improved by getting hold of better raw material to start with as students.

Is it worthwhile giving the kind of instruction you are giving here, for six years if you are not getting the right kind of students? I think it is.

Would it not be better if you had your school in two distinct types, an elementary school at which a vernacular boy would read up to the fourth vernacular class and learn the work required of a good village carpenter so as to improve the village carpenters, not by the tens or twenties, but by the thousands, and a few more who might have education enough and are otherwise intelligent enough to become master carpenters, and ultimately to become possibly foremen of factories? You are apparently running the whole of your students right through the six years' course?—It is divided into two sections, junior and senior, and the senior is optional. It is only those students who have higher ambitions that go from the junior to the senior. The other boys are quite able to earn their living.

Can you give us an idea as to the number who continued up to the end of the third year and did not go on to the senior?—About 40 per cent. or nearly one-half go away.

Have you traced them?—They are working in the trade. One is working at Lahore: two are working at Bareilly. There were only eight students left at the end of last year in the junior third year. There were alterations in the curriculum, and inter caste troubles. Out of these eight, three left last year, and five are in the senior class.

These boys were not always, as far as I understand, the sons of carpenters?—No. The reason for that is that the hereditary carpenters have a short-sighted policy. If their

sons are capable of earning anything and helping the family, they are kept at home. Those of his sons who are not sufficiently intelligent the carpenter wants to put into the class. If you run an artisan's class you get hold of the rubbish as it were, attracted by the stipends offered.

Has anything been done to get hold of the sons of the village carpenters?—Nothing is done. At present we have district boards in this province who have been asked to nominate scholarship holders from their districts and they endeavour to get the sons of artisans, so that these men can get a training in the school and eventually go back to their own districts and improve their methods.

These boys sent by the district boards go through the six year's course?—At present they are admitted into the junior class, which is for three years, after which they can leave if they like, or go on to the senior class.

Will they be allowed to operate the machine tools?—That is a specialised line. It is not part of the six years' course, although in those six years' we teach them to use the most useful machinery—one or two machines which will do for small industries. We have not done anything to give a general machine training.

What is the origin and exact significance of that specialized course?—What kind of men come to it, in what way are they distinguished—the machine tool class? There are no educational qualifications required of them. They should know blacksmithing, or woodworking, but that is not imposed as a rule. This class has been established only from last August, and I cannot give any opinion on it. The idea is to train a woodworking mechanic such as you cannot get in India at the present time.

I have seen hundreds of these men working much more complicated machinery at the Jubbulpore Gun Carriage Factory, without any training but that given in the factory itself?—Yes. If we compare the output with that of an European shop, you will find probably it is only about ten per cent. of a European shop output.

Have you been to Jubbulpore?—Yes.

Have you seen them making gun carriage wheels?—Yes. They are quite good, but they have European supervision.

But you never get anything until you train a better class of men?—We endeavour to train these men If the forest scheme comes in, saw mill-hands would be required, and unless skilled labour is available they would be hopeless.

By the saw mills that may be erected by the Forest department?—The people here are anxious to get machinery so that they can develope a larger trade.

It is hopeless to attempt to run machinery without a mechanic to keep it in order.

You have been only five years and the course is six years, so you cannot tell us what the effect would be of this experiment?—I can only tell you from the students who had been through the training and are now working. They demand more wages and are getting them.

What does the school cost here?—About Rs. 37,000 yearly.

Is that the net cost or total expenditure?—Total expenditure.

Any receipts against that?—I do not remember the exact amount. I can give you the figures if you like. The net cost would be about Rs. 30,000. This is for 71 students.

No doubt, you will have to make your representation with regard to your own pay and your assistant's pay through your own department, through the Director of Industries.—We cannot undertake to give an opinion on that matter as a special case. We are only using these inspections and points of evidence for the purpose of getting samples sufficient to give us an idea of what the general policy may be of the Government. As to a particular case we could not possibly express an opinion, because a lot of things, personal and local, which we cannot enter into might have to be considered.

Hon'ble Sir Fazulbhoy Currimbhoy.—You complain of prohibitive rates of interest on the loans you attempted to raise for small woodworking businesses for students of the school. From whom did you attempt to raise these loans?—Through the local Bank. That was in the case of students who had undergone the junior course and wished to start business. One of them wanted to start a business, and attempted to raise a loan, but the bank said they would charge 10 per cent. interest.

What security did you offer—land or property?—The student's property—land.

Will you please tell us why the Government refused aid to open a superior furniture business?—I cannot. Government said that this was not an original industry but an industry well developed in Bareilly. Government did not appreciate that the whole of Bareilly trade was rather second class, and people who wanted good stuff were not going to Bareilly.

Consequently we wanted a superior class of trade here. We have very many more orders than we can possibly deal with. We must have some superior development capable of taking on these orders.

Can you outline a definite scheme of Government assistance?—A workable scheme has already been sent through the Director of Industries. It does answer a definite scheme of assistance to these people.

Why do you debar private furniture business from the scope of the supply of machinery of Government on the hire-purchase system?—I do not. You saw in this morning's visit to Messrs. Yakub Khan's shop three machines lying idle. They could not use them because they have not got the mechanics. The existing firms have every facility for coming here or sending their relatives.

The private furniture maker produces the same kind of furniture as you make here? No.

Suppose he makes the same kind of furniture, will you debar him?—No, if he has sufficient training.

You want the people who work here only to be assisted by the Government?—People ought to be trained, and should take the trouble of being trained before they are assisted. Those who have working capital have not the skill, and a man who is skilled has not generally got the working capital.

The man who makes the same furniture, you do not debar?—Government might buy from them too.

You say that the boys you get here are not good material. You want boys who have been educated up to the 8th standard?—Yes.

And then come up here for six years?—Yes. With better education, we might possibly reduce it. But six years is a ridiculously short course for cabinet making.

Do you think you can get these boys without having feeder schools?—We might do if assistance in education is offered. In elementary education if you have as optional subjects—practical science, drawing, or manual training, you find the students take Sanskrit. I want that the students should be moulded for this course.

You want elementary feeders for these schools?—Yes.

Why do not the sons of carpenters come up here?—Woodwork is an hereditary trade in Bareilly. When they are little boys they go into the business with their fathers.

I was going to ask you a question on that point, whether or not the six years' course deters them from coming here?—No. We have a special two years' artisans course. It is a course specially for artisans. We started this two years' course assuming that the artisan was partly trained, and that probably he might come here to improve his knowledge. We only get men who are useless in their father's shops.

Still he gets 12 to 14 annas in the ordinary way?—Yes.

Hon'ble Pandit M. M. Malaviya.—You have spoken of the necessity for a higher standard of general education among students who should be admitted into your school. Would it not be an advantage if in the elementary course manual training and drawing were taught as a part of the general system?—Your six years' course might then be reduced to three years?—That would be much better. If he had manual training in the schools that would practically do away (assuming he has begun from the kindergarten study) with two years.

You have advocated elementary technical schools. In case the primary schools are supplemented, by what are called supplemental technical schools, where instruction in drawing and manual work forms an essential part of the course, then your course can be got through in three years?—Four years—the whole course. The student's brain will have been moulded. If educational handwork is taught it will mould the brain to deal with practical problems and tackle them quickly.

In that case you can divide your course into two sections, higher and lower. The lower course can turn out good carpenters who can do the ordinary work that is done in the country, and the higher course can turn out master carpenters?—Yes. The junior course serves that purpose. Students go through the junior course where they have a grounding in all the principles. From there he can turn to any branch: he can go to his village as carpenter or anything else. He has got a sufficient grounding to apply the principles to any special use. A senior course man does more specialised work he is able to undertake office furniture, shop fittings, higher class furniture, etc.

In that case these higher students would serve as teachers in the elementary schools?—Yes. Eventually they might serve. Our main object is to turn out good workmen. The greatest demand is for workmen.

You have advocated a general system of technical and general education. For that purpose you require men who had been trained to take up manual work. Those students can serve as teachers also?—They could do. They will have to be specialised. Selected ones will turn out as teachers.

You have found it an advantage to maintain relations between your school and the local industry?—Yes. We have, and they have found advantage.

Do you have any occasional meetings to discuss what work you are doing in order to improve their work?—Every manufacturer can come here as often as he likes and when he likes and ask us questions. He can have demonstrations given on any point. I go and inspect the work for them. It is a lot of work for me. I supply the working drawing and explain it and get them to see the scientific principles on which the thing is constructed.

They are willing to utilise your advice?—They are very keen. One or two of the older firms think we are a kind of Government concern setting up in opposition to them, but that is not the case with all and the prejudice has practically died out. They come here very freely, and I spend a good deal of time with them and I can see the influence of it in the things they are making.

You have advocated that Government might aid industries in initial stages. But suppose you had industrial banks which would be willing to advance loans to new industries on easy terms, would you even in that case advocate Government rendering direct aid to industries?—No. If Government is behind them they have an incentive to fall back. If a district bank is financing them they will put more energy into the concern.

If you have co-operative credit banks to assist industries, similar to those which assist agriculture, at low rates of interest, then you think your object will be served so far as small industries are concerned?—We only want to get it established. We have the demand. No doubt about that. We simply refuse orders. Orders are coming in and we cannot comply. We are attempting to give instruction to the local manufactures personally as regards the orders that come in but it is a difficult matter to get them done satisfactorily with such a limited staff as we have here.

Hon'ble Sir R. N. Mookerjee.—Your assertion here that you could not get capital is based upon the exceptional case of one man?—Yes.

People giving money, apart from Government, must have some confidence in the man whether he is capable of managing the industry?—Yes.

It is not the intention of the school that every man turned out from this school should have a separate industry of his own?—No.

If they are qualified they may be employed by bigger firms?—Yes. But in one or two cases, for instance in the development of superior trade, we have got to establish some concern on distinct lines.

It is said in the questions sheet that the answers required of a witness should be from his practical experience or knowledge. Most of your answers are, however, your own views. You only tried to raise capital for one of your students and, for some reason or other, you failed. You cannot say that you have had experience in raising capital?—No.

You have been to Calcutta, Bombay, and Sibpur?—I have seen Sibpur Technical Works.

They have two different classes: one upper subordinate class and another artisans class. The artisan class get paid for the work they do?—Yes.

Do you do such a thing?—Yes.

Do you think that will encourage poor fathers to send their boys to the school?—Yes. I have sent a scheme to the Government through the Director of Industries to encourage students after they have finished the elementary course, to go into the senior class. The scheme is that, for all work they do of a practical and useful nature, they should be paid 50 per cent. of the value of that work, as we train them on modern lines, some provision should be made to give them a start when they leave the school with modern appliances, and 25 per cent. of the value of the labour is retained by the school, from which the students will eventually be supplied with tools and appliances. It is not yet sanctioned by Government.

With reference to your complaint that you cannot get seasoned timber from the Forest department, are you aware that large cabinet-makers get wood and season it themselves without asking the Forest department to season it?—The Forest department has control of the timber-supply.

As a rule, cabinet-makers and builders get teakwood from Burma and they season their timber. They cannot expect the Burma Forest department to season timber for them. Some wood wants five, six or seven years' seasoning. The Forest department cannot season wood which would satisfy you?—No.

All that you can expect them to do is to supply wood?—No. Decidedly not. By the time you get it from the Forest department the loss is 25 per cent. If there is a scientifically-constructed drying kiln, it will dry the wood in ten days instead of three years. It would be better if we have wood dried in seven or ten days and put on the market in a seasoned state in sawn scantlings ready for manufactures.

You were an apprentice in a building firm in England. Did they not season their own wood?—You had not any wood seasoned by the supplier?—Timber merchants season it.

Not the Government department?—No. I have seen the wood-working shops in the United Provinces.

You have not been to Calcutta, and you have not seen any private wood-working shops?—I was confining my attention to this province. For instance several of the small firms I had been to in the United Provinces were using their machinery for making boxes and packing cases. I am not criticising the work of these people. In the case of the Calcutta wood-working businesses they are able to obtain timber in sawn scantlings partly or wholly seasoned.

Sir D. J. Tata.—With regard to loans do you suggest that there should be Government control? Are you prepared to accept Government control for such loans?—Government control if the works are financed by Government, or under Government supervision.

In your evidence you use the words "demonstration section" attached to "central technical institutions." I want to know exactly what you mean. Is the Bareilly Carpentry School, for instance, to be considered a central school or a pioneer school?—Eventually it will be a central school, but it is not yet. The district schools will be affiliated to this and have a course of two years only. These I would call minor technical schools.

Where would the demonstration section be?—Take for instance bent-wood. No bent-wood furniture is made in India to any large extent other than with bamboo. We have the Austrian and Canadian bent-wood furniture—that would be a pioneer section for experimental work and training of people for doing that work.

So that a pioneer and demonstration section are practically the same?—Yes. The pioneer section would be as regard new industries. In the demonstration section, the time would be devoted to learning everything that is possible on a machine or group of machines so as to make him capable of operating and getting a full outturn from such machinery.

What you would practically propose is the introduction of educational handwork as a compulsory subject in all elementary schools in every district?—Yes.

Then we have the central school and there is a further course?—Yes. Educational handwork simply aims at a general, all-round development of knowledge. The central school is for specific training. Educational handwork is an extension of the Sloyd system. The Sloyd system is rather limited in its scope, being one of the earlier forms of educational handwork.

You suggest technical libraries attached to central schools. Would it prove an advantage to have public technical libraries anywhere?—For specialisation in certain branches. We do not want libraries here for any subjects other than those taught in this school or directly concerned with this work.

With regard to the supply of wood, do you think railway freights hamper the supply of wood?—They severely hamper the trade of the country.

Mr. A. Chatterton.—Did you get any definite instructions as to the policy you should pursue in the school?—No. The development of this scheme was left in my hands.

You were given a certain amount of money and you submitted your proposals from time to time and got the sanction of the department?—Yes. Proposals were sent up to Government for the allotment of funds.

And there has been no definite policy, or have you had a perfectly clear and definite policy which you are working up to?—I have a very definite policy—that of developing the woodworking industries.

The school was originally established in Bareilly to help the local people?—Yes.

You said in answer to one question that the school has not been a local school but a provincial school, and even that it deals with questions outside the province?—That is in the matter of experimenting on timbers and giving advice.

Is it the intention to keep the school at Bareilly auxiliary for the teaching of furniture-making, or has there been any discussion regarding the manufacture of other woodwork?—As a matter of fact you are doing it in one case because you are considering the question of making bobbins, toys, etc.?—Yes.

The question of making agricultural implements has never come up?—Yes, it has.

The manufacture of country carts?—That has also been discussed?

If you had to develop on these lines you would want a blacksmith's shop?—We have a blacksmith's shop. We should need European supervision. It is impossible to develop the wood-working business without that.

Do you consider that Bareilly is a suitable centre for the development of the manufacture of first class cabinet-work?—We have the wood here. We have labour, skilled or semi-skilled, which can be made capable of doing high class work. We have good supplies of raw material and cheap labour for the development of trade.

You say it would be better to have students trained in a manual training school first. But is it a practical suggestion that you should have elementary manual training classes all over the country?—Yes. It may be attached to this school.

What would be the cost of equipment of a manual training school?—I could not tell you offhand. The whole plans and details for a model centre in Bareilly were sent up to Government but owing to financial stringency it was held over.

What is the cost of the equipment of such manual training schools proposals as have been sent up to Government?—About Rs. 4,000.

Do you want two or three elementary manual training schools in Bareilly to serve as feeders, or should they be scattered all over the country?—They should be scattered over the country. This will be a model centre. The equipment of the small primary school would cost about Rs. 120. That would be sufficient for the feeder school for district schools. It would give the student a certain amount of practical training.

Would you reduce the course of instruction to four years?—Yes. Provided students had undergone a preliminary technical course or a full course in educational handwork.

What is the ordinary period of apprenticeship in England for carpentry or cabinet-making?—Now it is now often reduced to five years. It was generally seven years before.

You have drawn attention to the fact that carpentry is in great difficulties on account of want of seasoned wood?—Most of Bareilly trade is carried on with unseasoned wood—practically green stuff. Of course the material sells, but after some time is useless. It condemns the trade.

Is there any satisfactory method of seasoning wood which may be suitably adapted for timber here?—Yes.

Have you proposed to establish it here?—No experimental work has been done as yet; but at Dehra Dun the Forest Economist is getting an experimental modern plant. I am trying one of my own design. In America the Forest departments have these drying plants. They are universally used. It has been suggested that it is desirable that the Forest department should undertake to provide better seasoned timber? It is absolutely necessary. The saving in freight would be very considerable.

It would be a great advantage, not only to be able to secure seasoned timber, but to have it converted into scantlings?—Yes.

And establish timber yards in places like Bareilly where scantlings should be supplied?—Yes.

How much money has been spent on this school, (1) capital, (2) annual charges?—I cannot tell offhand. I shall be glad to supply the information to the Commission afterwards. (Witness subsequently sent a statement showing capital outlay on buildings and plant at the Carpentry School, Bareilly, as follows:—)

	Rs.
Buildings	73,095
Plant, including tools and machinery	41,945

You say that the approximate net yearly expenditure would be Rs. 30,000?—Yes.

Dr. E. Hopkinson.

From what area do you draw your students locally?—From a much wider area. It is representative of the province now, since the District Boards send students here.

It does not go outside the province?—No.

What class do they come from?—Are the students themselves interested in carpentry? They come from several classes not particularly from the carpentry class.

You are the Principal and you are under the Director of Industries?—Yes.

And there is no local advisory body?—We have a local advisory committee. They are advisory, and can condemn a proposal which they do not think fit, before it goes to Government, or otherwise express their opinion on it. They are non-technical men. I submit the resolution with my reasons for it, and the committee consider it and pass or condemn the resolution which is sent up to the Government through the Director of Industries, who makes his remarks on the resolution.

Who is the Chairman?—The Commissioner is ex-officio.

Do you find that your recommendations are often modified by the advisory committee?—No. Up to the present they have not been. But it depends largely on whether the Commissioner is favourable to it. The Director of Industries is a member of the committee and expresses his opinion at the meeting. If there is a difference of opinion, generally the Director's opinion carries more weight, because of his superior technical knowledge.

You make a report annually?—Yes.

To the advisory committee?—No. To the Government through the Director of Industries.

Is that submitted to the advisory committee?—No.

You say that fully 60 per cent. of your students have been failures. You do not explain what you mean by failures?—They are unfit. A man must have a certain amount of ability to become an artisan. We weed them out at the end of one month or three months. We do not get the student who is best suited to take up this sort of work.

When you say that the failures have been 60 per cent., do you include those who are weeded out in that way?—They would be included. But we do not weed out the whole of that 60 per cent.; about 40 per cent. of that number remain on, but they can never be considered likely to be very successful workmen. Of those who take up the junior course ten per cent. would be successful. Some of them drop off. If attention is paid to the selection of candidates for industrial work, we should not have so much trouble or so many relative failures. We had 81 applications this year for 15 seats, and we held a simple examination in elementary arithmetic and elementary drawing to fill up the seats.

Can you gauge the success of the school by other students of the same districts being drawn to it?—One student brings in his brother or his relative. That was the case in this year's admissions. We have four brothers of former students in the classes formed this year.

You consider an apprenticeship system impossible as regards carpentry. But from your five years' experience in India in carpentry, do you think that, if there were a number of available workshops, an apprenticeship system or technical school system would be better?—A combined system would be better.

If the shops were available you would like to send your students for a year to the shops?—Yes.

You would do that after the completion of their course here?—Yes. After the 6th year. In the workshop the whole of the time is devoted to one subject, but in the school a certain amount of time is devoted to one subject and a certain amount to another and so on. No technical school training can produce a finished craftsman.

Do the students pay any charges at all?—Yes; nominal fees varying from 8 annas to Rs. 2-8 monthly.

Nothing in the nature of scholarship?—Scholarships are awarded to one-fifth of the number at the rate of Rs. 4 per mensem in the junior classes. They are tenable monthly, and awarded on merit. The scholarship is awarded to the most deserving student each month. It involves a little more work, but from experience, it seems to me to be more satisfactory.

That only applies to the junior course?—In the senior class there are two scholarships; one of Rs. 15 and one of Rs. 10 a month. The present size of the class is limited to five. The scholarships are awarded on merit.

I think you said the junior course is three years?—Yes.

You also told the President that if the elementary schools had a course of manual training two years could be cut off?—Yes.

Are we to infer that one year would do if there were such manual training?—One year would not do. I assume one course following on the preliminary course, and that course would be of four years' duration. Now the junior course or the elementary course to some extent performs the function of a manual training course. Part of it is spent in drawing and other subjects which would be taught in a manual training course.

You mean two years out of the six years' course?—Yes.

Six years' course turns out what are called highly skilled workmen?—Yes.

Cabinet-makers?—Yes, as far as is possible under present conditions.

Very different from a village carpenter?—Yes.

How long would it take to turn out a village carpenter?—Two years.

Do you find your students show any special aptitude in drawing?—Yes. At first they do not, because they do not seem to appreciate anything at all of a practical nature. But when we have had them a year, they seem to realise drawing as something to be used, and they take a greater interest in it and try to master it.

You had some experience of teaching in England?—Yes.

Do you find any greater aptitude for drawing there?—Greater aptitude in England. It is considerably greater, not from an artistic point of view perhaps, but from a mechanical point of view. The reason is that in England the ordinary class of person who eventually becomes a skilled mechanic has had a certain number of mechanical toys during his boyhood, whereas an Indian has not had this advantage. That seems to be the real reason for it.

Supposing you had a large number of village schools in carpentry all over the country, at what part in your course would you consider you could turn out suitable teachers for those schools?—Six years.

Hon'ble Sir F. H. Stewart.—How much approximately can the ordinary Bareilly carpenter earn monthly?—Rupees 20, 25 or 30, if skilled.

Have you any indication at all as to how much the average student who passes out of your school should be able to make?—Rupees 35 to 40, but no students have yet completed the full course.

Can you increase the number of students here at all considerably without increasing the expenditure on the school?—Yes. We can, but we are limited. We are full now. We cannot increase the size of the classes without detriment to the teaching owing to our limited accommodation.

An education that costs Rs. 35 a month for six years is a fairly expensive education?—Yes.

Did you introduce the present course?—I introduced the six years' course. There was no systematic course at all before; there was no such school. One complete course has not yet been finished, and it is impossible to judge of the practical results of the school.

You are improving the efficiency of the workmen?—Yes.

Are you getting a better class of students too? Do the local workmen come to your evening classes?—Yes. We have evening classes. The local workmen come to them in increasing numbers. Last year we had so many that we had to stop admissions.

Is there any special difficulty in the manufacture of bobbins?—As regards the manufacture of bobbins, there are suitable woods here. The students who pass the course here will be able to handle the machine for manufacturing bobbins. I have seen many machines that have been thrown out of order owing to unskilled handling.

Witness No. 6.

Mr. Nand Kishore Kacker, *Barrister-at-Law; Member of the Board of Industries, United Provinces; Director and Honorary Manager of the District Co-operative Bank, Limited, Bareilly; co-operated Director and Vice-Chairman of the Co-operative Furniture Workshop, Bareilly; and Member of the United Provinces Chamber of Commerce, Cawnpore.*

Written Evidence.

Co-operative societies.

The Co-operative Furniture Workshop of Bareilly, a limited liability co-operative society of carpenters) is an institution which aims at organising and developing the well-known furniture industry of the Bareilly District in the United Provinces. As far as I know, this is the first attempt in these parts to manage a non-agricultural industry on co-operative lines. Bareilly is an important centre of furniture industry and goods valued at several lakhs are exported yearly to all parts of Northern India. There are over a thousand families of carpenters in the town itself but there are hardly any who own a decent business of their own or who can command capital.

The local firms are therefore owned by big capitalists who are not carpenters themselves. The carpenters, who are employed by the furniture merchants, work under the contract system under which they get advances from their employer or employers and in return have either to supply them ready-made articles or have to work at their

workshop on terms imposed by their employers. In order to keep control over the workers, the furniture merchants generally have recourse to Act XII of 1859 (Breach of Contract Act) under whose provisions a worker may be sent to jail for his failure to comply with the agreements made by him with his employer. Obviously the conditions under which the carpenters have to work are most oppressive and the middleman commanding necessary capital makes the best of his opportunities; and, as generally is the case, the evil effects of capitalism are visible here also and the carpenters are victims to all the evils of poverty and degradation.

It is needless to say that the system of making advances has a demoralising effect on both the employer and the employee. This has, on the one hand, tempted the creditor firms to unduly press the debtor workers and on the other hand, the debtor workers to cheat their employer creditors. In Bareilly this system has been so much indulged in by both of them that it has now become a living scandal. Many hard-earned fortunes have been ruined and many honest wage-earners have had to live all their lives in slavery on account of this system. The carpenter, however, is in the worse plight and the industry is deteriorating, since the work turned out under the contract system, especially when the worker cannot count upon getting more than his living wages, is necessarily slipshod and clumsy.

In order to ameliorate the condition of the carpenters of Bareilly and with a view of improving the furniture industry, the idea of a co-operative concern suggested itself to the local co-operators and having been approved by the Registrar of Co-operative Societies, United Provinces, the Co-operative Furniture Workshop was registered in April, 1913.

The membership of the workshop is confined to the carpenters resident in the Bareilly District and the number of the shares is limited to 1,000. The value of each share is Rs. 50, which is payable in fifty monthly instalments of Re. 1 each. The necessary capital is lent by the district bank at 9 per cent. per annum. The members receive piece wages and are allowed to engage their own labourers.

After a deduction of one-fourth out of the annual profits, the byelaws allow a dividend at a rate not exceeding 10 per cent. on the paid up value of shares and a bonus proportional to the amount of wages earned by the members during the year. Also a certain portion is set aside for the encouragement of education amongst the children of carpenters.

The workshop is managed by a Board of Directors, six of whom are shareholding carpenters and two are co-operated members nominated by the directors of the district bank. The chairman of the board of directors is one of the shareholders of the district bank.

The Principal of the Government Carpentry School of this place is one of two co-operated directors. His advice is bound to be very valuable on technical matters and may lead to improvements in the methods of work and the education of members in better and more artistic designs than those obtainable in the market.

Although a little loan business is permissible by its byelaws, it is not a credit society in the exact sense. On enquiries made in the beginning it was found that a credit society could neither benefit the carpenters materially nor assist them in improving their efficiency and skill, and what was really wanted for them were favourable conditions of work rather than cheap credit.

To meet this end in view the chief aim of the society is joint production and sale so that the carpenters may not only realise the economic gains obtained by their joining it, but feel the moral gain by being made their own masters and earning independent wages. If these ideas become prominent as the society grows, the members are bound to feel real interest in their craft and this will certainly lead to all-round improvement in the furniture industry of this place.

A carpenter, or any artisan for the matter of that, who works under the system in vogue here cannot have any inclination to master the improved methods of work. In Bareilly there is no regular or definite system of instruction either in carpentry or its allied processes of veneering, staining, and polishing. Varnishing is of inferior quality and the knowledge of drawing does not exist at all. Usually a carpenter's son begins to work with his father as soon as he is able to handle the tools and gradually picks up a little knowledge until he is considered worthy of some wages; and I believe such is the case with many other artisans all over India. However, this want is supplied by the establishment of the Government Carpentry School here and it is hoped that in times to come it will exert a very powerful influence in improving the furniture made here both as regards design and finish. The local Carpentry School is no doubt a very useful institution in its own way, but it is beyond its functions to perform what a co-operative society can do. It is only in a co-operative workshop that one learns to appreciate the value of approved improvements in the method of his work not to speak of his material and moral gains.

As said above, the Co-operative Furniture Workshop draws its capital by means of loans from district co-operative bank at 9 per cent. per annum. These loans amounted

to Rs. 28,560 on the 30th of June last and the share-capital of the society amounted to Rs. 1,259 on the above date. A very large portion of all this is sunk in the building, stocks of finished articles, and raw material.

The pernicious and unbusinesslike system of making advances is entirely discouraged and the members are paid their piece wages daily. The raw materials are purchased by the society and stocked in their own buildings. The finished articles are sold to the general public by the society at prices fixed by the committee of directors; and the articles are always not made to order and number of finished articles are stocked on the premises.

There are innumerable difficulties in the working of a society like this, the chief of which are the following:—

1. First and foremost of these relates to the education of members of the society, be it of carpenters or of other artisans. The prejudices of the members and their want of business habits are the chief causes which make the task of organisers extremely difficult. The traditions of the Indian masses are the result of a very slow evolution and to educate them in the co-operative principles which to a certain extent contravene those traditions is not by any means an easy matter. However, this is a question which concerns the co-operative department and need not be discussed here.

2. The second difficulty is that of management. Since the manager has to be the master and servant of the society at one and the same time, his position is a difficult one. But this is bound to be minimised when the manager and the directors both have realised that their work lies towards the good of the concern and that alone. This is also a question which may best be left in the hands of co-operators for solution.

3. The other difficulties, which are peculiar to the co-operative societies of artisans alone, are the cost of management and the marketing of finished articles.

To meet the requirements of the Registrar of Co-operative Societies, the societies of the nature of this workshop have to keep elaborate account books and stock registers. Consequently the cost of management in a co-operative concern is heavier than what it is in a non-co-operative firm. The establishment of the Co-operative Furniture Workshop, for example, consists of a manager, an assistant manager (a carpenter foreman), an accountant, a stock-keeper, and a few coolies. The expenditure on establishment and contingencies alone in this institution amounts to about Rs. 2,000 yearly.

The marketing problem is the greatest of all difficulties. In a workshop like this, as all the members work daily on the premises, the society's amount of supply is sometimes far in excess of the demand and a large stock of finished articles gets accumulated sooner or later. While in non-co-operative firms there is very little chance of such an incidence because they can regulate the number of their workers according to the market of their goods.

In view of the last two difficulties a co-operative concern like the Furniture Workshop usually requires larger capital to carry on the business than what is required by a non-co-operative merchant and the profits made by the former are comparatively not as large as earned by the latter, who having made advances to his workers, is able to impose terms favourable to himself; while the wages received by the members of a co-operative society have as a rule to be on a liberal scale. As an instance the profits of the workshop may be cited in support of this view. Last year's net profits of this society amounted to Rs. 571 only. After providing for the statutory reserve the balance of profits was just enough to suffice for the distribution of dividend on the shares and bonuses to members and nothing could be provided for bad and doubtful debts or for depreciation of large stock of finished goods which has already accumulated. Considering the large capital that is invested in this business, the profits are surely not satisfactory.

With all these difficulties the Co-operative Furniture Workshop has done fairly well during its short existence. Some of the members have already begun to learn business methods and habits, although it is sometimes very difficult to induce certain number of them to look further ahead than to-morrow in their own economic interest and they are apt to migrate at intervals. Some of them have also realised that they have a direct interest in the prosperity of their concern and that the effects of any success of the workshop would reflect on their own individual prosperity.

The position of the manager was indeed very difficult in the earlier stages. The directors were unable to distinguish their position as workers and as individual members on the Board of Directors and they could not tolerate the supervision and control of the manager whom they knew to be their servant. However, a little tact and feeling of loyalty on the part of the manager has greatly minimised the chances of friction. The directors have also learnt toleration and the workshop is now working smoothly without any friction whatsoever.

As far as the co-operative character of the society is concerned, it has attained a certain measure of success. The progress which it has made on its material side is also hope-inspiring. It has considerably extended its market and its sales during the year ending 30th June last amounted to about Rs. 1,000. The marketing problem remains as yet unsolved. In spite of our constant endeavours by way of advertisements and exhibition of our articles in fairs and at yearly co-operative conferences of these provinces, a somewhat heavy stock has accumulated which may prove something of an incubus.

As regards the improvement of the industry, I am willing to confess that the work-shop has been able to do very little. When the society has established a sound financial business, it will no doubt turn its attention to improvement of processes, workmanship, and designs. It is as yet a question to be decided whether it would pay the society to do really high-class work for which the market is not very extensive. However, the work-shop has not been slow in combining the higher-grade work with their ordinary cheap lines of chairs, tables, etc., for which there is a large demand all over India.

By what I have said as yet about the workshop, let it not be concluded that I feel pessimistic about the success of a co-operative society of artisans. But my position, speaking from industrial point of view, is that unless a co-operative concern of this nature is placed in a position to compete on equal terms with the non-co-operative establishments and to sell its finished products without much delay, it will not help much in improving the industry, however successful its activities may become on its material side.

My suggestions for the removal of difficulties which have been mentioned above will be found in another place (paragraphs on Government assistance) and they are equally applicable to each and every society of the industrial classes if started on the lines of the work-shop.

In my opinion there are possibilities of large developments if co-operative societies could be encouraged for any of the following industries :—

1. Cotton-weaving industry of Moradabad and Tanda.
2. Lace-making industry of Agra, Benares, and Lucknow.
3. Blanket manufacturing industry of Muzaffarnagar.
4. Durrie-making industry of Agra and Bareilly.
5. Brass and copperware industry of Benares and Moradabad.
6. Dyeing and calico-printing of Lucknow and Farrukhabad.
7. Silk industry of Benares and Azamgarh.

As far as I know, it is a usual practice with almost all the industrial classes of these provinces to take advances from the middlemen dealers and I believe the conditions under which they work are more or less similar to those prevailing in the furniture industry of this place. Therefore all the abovementioned industries, if worked co-operatively, will have to be protected against the unfair competition of non-co-operative firms.

The organization of co-operative societies for the above industries should be on the lines adopted for the furniture workshop of this place with such modifications as the local circumstances of a particular trade may necessitate. I am not in favour of starting purely credit societies for the artisans. So long as the artisan is not saved from the present ruinous system of advances from middlemen, the supply of cheap credit to him is more likely to demoralise than to benefit him. The primary object of the society should be to teach the artisan to work for himself independently of the middlemen, thereby creating in him a real desire to take direct interest in his craft. This will ensure better work and greater advantages leading to improvement of the craft and economic gains of the crafts-man. At the same time I am of opinion that, for an industry which has lost ground by reason of very unequal struggle between the hand-power and machine-power, the economi-expedient of supply of cheap credit should by all means be adopted through co-operation. For example, the hand-loom industry can be largely assisted by encouraging credit socie-ties of the weavers in places like Moradabad and Tanda.

Limits of Government assistance.

Since a co-operative institution like the workshop works under some disadvantageous conditions, as pointed out above, I do not think that any aid given by the Government to such institution would in any manner compete with existing, or discourage fresh private enterprises. On the contrary, I am of opinion that Government aid to co-operative esta-blishments will not only place them in a position to tide over the difficult situations in which they are likely to find themselves, but will furnish them means to compete with the non-co-operative establishments on equal terms.

Government assistance.

I am not in a position to express any opinion on the question of Government aid to non-co-operative enterprises. But I have to suggest a few methods of giving Government aid to the existing or new industries worked on co-operative lines. I am well aware that Government has never taken financial responsibility for the co-operative movement except

on two or three exceptional occasions. In putting forward the undermentioned sugges-tions, therefore, it is not my intention to urge that the Government should depart from the policy already laid down. Co-operatively every enterprise should be self-supporting and self-contained, but for the sake of industrial advancement of the country, for various reasons set forth above, it is essentially necessary that some special concessions—monetary and others—be granted to those co-operative institutions which aim at development of parti-cular industry.

Following are the suggestions which I put forward for sympathetic consideration of the Government :—

1. In order to afford opportunities to co-operative institutions to sell their finished products without much delay and to avoid heavy accumulations of their goods, the Government should guarantee the purchase of their pro-ducts by those of their departments which require them now and then.

2. Since the co-operative enterprises borrow their capital from the district co-operative banks which as a rule cannot lend them on less than 9 or 10 per cent, the Government may advance them money at 4 per cent. for purchase of machinery and plant or for constructing warehouses and other build-ings necessary for carrying the industry. No co-operative concern of the nature of the workshop can well afford to sink large capital in machinery and buildings borrowed at high rate of interest charged by the district banks.

3. Any facilities for the purchase of raw materials and some concessions in the shape of supply of those which are under the control of the Government, at slightly cheaper rates than what is charged from the contractors, will go a long way in protecting the co-operative establishments against unfair-competition. For instance, in the case of the furniture workshop, some-thing should be done in the way of direct purchase of their timber from the Forest department and Government should see that it is sold to them at a little lower rate.

4. Where there is in a place a technical school and a co-operative enterprise dealing in the industry taught in the school, full opportunities be given to the co-operative institution to make full use of the expert advice. A certain amount of co-ordination between the school and the society will also prove of great value. To bring about the desired results the follow-ing means should be adopted : First, the Head Master of the school should be deputed to supervise all the work turned out by the society and be recompensed by the Government for doing this extra work; secondly, all those orders which are received by him through the Government officers for the Government offices should be placed with the society ; and lastly, the members of the society be allowed to have free access to the factory of the school to see the working of the machinery and the technical methods of the different processes of the industry.

The Government has already recognised the necessity of the development of co-operation among the industrial classes and the co-operative department is, in every way, encouraging the formation of societies amongst them. The help which the Government has been given to industries and the sympathy with which it views the activities of co-operation lead me to hope that, when co-operation and industry combine with each other for the purpose of commercial and industrial advancement of the country, the Govern-ment will not grudge these small and modest concessions in spite of the prevailing finan-cial stringency; and I feel sure that they will greatly help the cause of minor industries in India and will enable the co-operative institutions to bear the shocks of financial failure with great endurance if misfortunes ever create any shocks at all.

Sales agencies.

In the capacity of honorary trade correspondent, I have had several occasions to send the Bareilly furniture to the emporium of village industries at Cawnpore for the purpose of display and sale. To judge by the orders received through the emporium, I am convinced that the emporia of this nature would serve a very useful purpose in assisting the minor industries of India. I am, however, of opinion that they should be opened in almost all the big cities of the country. One at Cawnpore is hardly enough for the whole of these provinces. I would suggest the opening of a few more in these provinces, viz., at Allahabad, Benares, Lucknow, Agra, and Bareilly. The question of management of these is not at all difficult, at least in these provinces. At all the places mentioned above one or two honorary trade correspondents can be found to look after their business under the guidance of the Director of Industries. Another suggestion I have to make in this connection is that the emporia established in different provinces of India should have an inter-connection with each other for the purpose of exhibition and sale of the products of their provinces. The emporium of one province need not confine its business to the indus-tries of its own.

(Mr. N. K. Kacker did not give oral evidence.)

LUCKNOW.

WITNESS NO. 7.

MR. P. H. SWINCHATT, *Principal, Government Technical School, Lucknow.*

WRITTEN EVIDENCE.

Technical aid to industries.

Demonstration factories.

Q. 19—20.—A demonstration factory for pressed metal-work would help established industries which at present are compelled to purchase imported parts to complete the work they are doing. I have in my mind the lamp industry at Delhi, which would be greatly assisted if a good pressed burner could be made in the country. A demonstration factory for this work should be established in the place where the industry to be assisted is now carried on and in this instance should be Delhi. The opening of a pioneer demonstration factory to make copper and brass sheets would help the metal utensil manufacturers in the United Provinces.

Assistance in marketing products.

Exhibitions.

Q. 31.—Industrial exhibitions are useful in introducing materials and tools to prospective buyers who are engaged in industrial work and who are on the look out for improved machines and equipment, as the advantages claimed could be practically demonstrated, but I do not think they are of any great assistance to encourage the opening of new industries.

Training of labour and supervision.

General.

Q. 45.—(*a*) To improve the workman's efficiency and skill generally the first thing to be done is to try to make him more ambitious and give him increased pay for better work. General education will greatly improve matters and with the aid of technical schools workmen will become more intelligent and efficient in every way. When an increased number of properly equipped factories are established and worked on thoroughly up-to-date lines with efficient supervisors it follows that more skilled men must be the result.

To help this forward special demonstration classes could be opened in established workshops or in existing technical schools where specialised instruction by English instructors (actual workers) could be given in the processes which now are not efficiently and skilfully done. Only promising workmen should be selected for this special training and prospects of increased pay must be definitely given for better work. Factories should be asked to submit samples of work as now made and also samples of work done to the required standard, so that their requirements may be known and instructors know exactly what is to be done.

(*b*) With the increase in the number of oil and steam engines it would be a help to all industries employing power if more men were available with the necessary knowledge and experience to do general repairs when required, also in many districts there is no facility whatever for having repairs done at all. If a demonstration factory were opened where this class of work could be properly done and at a reasonable cost, men who have worked as *mistries* or workmen could be deputed to the demonstration factory so that they could be instructed in this class of work. A demonstration factory of this description could be attached to an existing technical school, but it would require a separate staff for its operation.

Apprenticeship system and industrial and other schools.

Q. 46.—I have trained apprentices in the Engineering workshops which I had charge of before I came to India in 1900. These were in machine shops, fitting shops and pattern-making shops also in the drawing office.

Q. 47.—Students who have completed a course of training in a technical school are more fitted for responsible positions.

Q. 48.—Apprentices in workshops should be allowed to spend, say three half days a week in technical schools where they could receive theoretical instructions and also general instruction in workshop practice that cannot be given in the workshops in which they are apprenticed.

Q. 49.—I have had a night school working at the Government technical school, Lucknow, since 6th April, 1908. Instruction is given in the following subjects :—

English, vernacular, practical Workshop arithmetic, dimension sketching and mechanical drawing. Also the workshops are open for men to gain experience in the working of modern machines, tools, etc., and power plant which they have no opportunity of doing at the workshops in which they are employed. There are at present 72 on the rolls, all of whom are employed in local workshops.

Q. 50.—Industrial and technical schools should be under the control of a department of industries through an officer with technical experience.

The Education department should be in touch with industrial and technical schools so that a good type of student can be influenced to enter these schools. If technical schools could attract a smarter type of student much better results would follow.

Training of supervising and technical staff.

Q. 51.—Properly equipped technical schools with as good a trained staff as can possibly be obtained are necessary for the training and improvement of supervisors and skilled managers, at the same time these classes of men are born, not made, and for technical schools to have effect very careful selection would be necessary so that the right men are dealt with. Broadly speaking, if better supervisors are to be made, then it means that those now working must be kept up to their work more strictly by the ones in authority over them and in time this will result in work being more efficiently done and better supervisors being available. If this is to be supplemented then it could, in the case of supervisors of workshops, be done by the establishing of demonstration factories, which could be worked on thoroughly up-to-date lines; at the same time, this system would be rather of the "hot-house" variety and would, to a certain extent, be a very difficult problem to make a commercial success, as men after going through a course or say having worked in a demonstration factory for a prescribed period would have to be found employment. This could, to some extent be, avoided by deputing men already employed, for a course of instruction to the demonstration factory, but this would be in many instances inconvenient to their employers and probably would be difficult to arrange.

Q. 52.—The only assistance that supervisors, managers, and technical experts of private firms require to study conditions and methods in other countries is to be given opportunities to do this. Personally I think it will be very difficult to arrange for this; moreover, it is necessary to work for lengthy periods in factories in which special methods are to be studied and to do the actual work before any good can follow.

Generally speaking, I should say that better results would follow to the industries of a province in which several private firms are engaged, by the deputing of a Government official to study conditions, etc. in other countries, as by doing this all the firms could be made to benefit. If the expert of a private firm were to do this, it is questionable if the full information would be given to opposition firms engaged in the same industry.

Q. 53.—When firms are assisted by Government in any industry, they should be required to take several apprentices and agree to their receiving a proper training.

ORAL EVIDENCE, 4TH NOVEMBER, 1916.

President.—I notice in your evidence that you suggest the opening of a pioneer demonstration factory for the making of copper and brass sheets, Do you think that will help the metal industry in the United Provinces? Where would you suggest one?—It might be in Lucknow. The nature of the idea when I made a suggestion like that was that utensil goods manufacturers find a difficulty in getting sheets of the proper gauge and if they could have a mill in which to have sheets rolled I thought it would be a great help to them.

Do you think this should be done at Government expense by the establishment of a demonstration factory?—A demonstration factory, I take it, should be opened by Government. Of course, I do not know whether any private firm would open a factory of this description. I do not suppose they would. If you take a trade like the lamp business you want sheets, and if you have a mill for making brass sheets it would be very useful.

You will have that factory run on commercial lines as nearly as possible?—Absolutely on commercial lines.

Could you give us some idea of what the organisation will be like? What staff you will get and what capital you will lay out?—That I could not say.

Your experience of trade apprentices in engineering workshops was, I understand, before you came to India?—Yes. Not in any workshop in India, because I have spent the whole of my time in India in Lucknow.

Do you call this an industrial school?—It was called the Government Industrial School until about two years ago when I got the name altered to Government Technical School.

What was your object in changing the name from 'industrial' to 'technical'?—To represent more clearly the purpose of the school. One day, some years ago, a man came to the school and enquired what had all the boys done to be sent here, he being under the impression that it was a sort of reformatory. I thought that the name 'industrial' was not the right one for the school, hence I wanted to change the name so that the work of the school would be more clearly known from the name.

Have you in your mind any clear distinction of what an 'industrial' school is and what a 'technical' school is?—In England an 'industrial' school is a penal school. It is a reformatory school.

You have no other distinction ? I wanted to give the school a better name. Training of a higher grade is given in a technical school.

In relation to another question as to the relation between the Department of Education and Department of industries, you say that the education department should be in touch with industrial schools. You do not use the word 'industrial' in the same sense ?—I simply put the word 'industrial' because you have it down in your questions.

What do you mean by the department of education being in touch with industrial schools ?— The whole of my object in writing like that was that I want a better type of boy to be influenced to join technical schools. The type of boy that I want is one whose age is not more than, say, sixteen. I prefer fifteen when he comes to the school. He should pass at least the 7th or 8th class. Then if a boy of that sort attended a school and completed the course of instruction in the prescribed period of three years, it would bring him to 18 or 19 when he left the school to start his practical apprenticeship, his apprenticeship being for two years. That would bring him to 20 or 21 by the time he completed this period. At present we get students coming to the school with a scholar's register in which their age is put down as 15 or 16. The real age is probably 20 or 21.

This year a Government order was passed that no ages could be altered. In certain examinations they want their ages reduced. In others they want their ages increased. It is possible, or has been possible up to the present time, for a boy whose age was put down (let me say a year or two too old or too young, to go to the Inspector of Schools with a horoscope and have his age altered. I want the ordinary schools to lead up to these schools.

They should actually advocate the boys to go into these schools ?—I want them to let the boys know that there are such places as technical schools and that there is a certain advantage for a boy who is prepared to work well.

In what way precisely must the education department keep in touch with this school ?—All I want is for the other schools to arrange to allow some of their good boys to come to this school after completing the 7th or 8th class instead of keeping them to go on to the matriculation standard. This is the whole object that I have in view.

Would it, in any way, help your object if there was a little more manual training in ordinary schools ?—If manual training was introduced into schools it would help.

Have you got any other suggestions of that kind ?—We have already suggested to the head-masters of local schools that picked boys should be brought round to visit the school periodically and see what is being done.

Would you prefer a boy to complete his training by going out-of-shift classes or evening classes, or you would prefer to send him to a college of engineering for 3 years ? —By out-of-shift classes the point that I put down there was more in connection with a workman, not a boy. I meant the men themselves so that they could get an opportunity of doing work in a proper way.

Which is the most hopeful way of obtaining a man who is fit to be a manager ?—It is difficult to say where you can get a man from. No amount of university training will make a manager unless the man has the tact and ability and is naturally gifted for a manager.

What system would you prefer as the most hopeful one to discover the right sort of man ?—The point to be considered is that, if a man has had a certain amount of experience in a factory, the people under whom he is working can tell whether he can handle men at all and can tell whether he is really the right type of man to be given the opportunity to better himself.

You would really prefer a workshop system accompanied by well-developed evening classes ?—I should call it out-of-shift classes. The part I wanted to make clear is that, if men have to be improved in the methods of their working or the way they arrange things, they could be sent to a demonstration factory where they could see how things should be done ; that was the opportunity I thought that would do some good. How it is going to be worked is another matter.

I understood that in the Bombay Technical Institute there was a system by which students were given marks for the quantity of work done. Do you think that is practicable in any way ? In a technical school you have not got the time to show boys how to do work quickly. If you show them how to do it correctly you will have done as much as it is possible to do. The whole of the practical work that a boy gets in a technical school is equal to 18 months workshop practice in India. Marks are given to students for the work done during the year.

Do you think that it does a boy any harm to be working slowly for three years ?—He has to learn to do a thing and in starting to learn to do the thing he could not but do it slowly. The whole thing in connection with the work of the school, as regards getting

them to do things quickly with the work in the shops, is that if they are to do things quickly it means a certain amount of repetition work.

Mr. A. Chatterton.—You have been out here for 15 years ?—16 years exactly.

In the beginning you were under the Director of Public Instruction ?—Yes.

In regard to the development of the institution, did it take place when under the control of the Department of Public Instruction or later?—It has been developed since 1907, since we had some money given to us.

Who was responsible for the lines on which this institution has developed ?—The Committee of Management of the school.

Did you submit your plans and did they approve of them or did they initiate a scheme ?—I suggested the things and the Committee approved them.

You propose the establishment of demonstration factories for copper and brass sheets. Where do you propose to get your raw materials for this factory ?—They have to be got from somewhere. Probably imported, which would not be difficult. The point from which I looked at it is this. Suppose you have in the country 8 gauge sheets or 10 gauge sheets it would be a great benefit if these sheets would be rolled and made into thinner gauges. That is one of the great points in the whole thing.

Do you think it would be a commercial proposition?—It is simply to help the industries in the province. I do not want an immense plant, but a plant simply for making brass or copper sheets that would help the utensil manufacturers in the province.

The object of this school is to train mechanics, pure and simple. Is it not ?—It is to train men who will be able to take charge of the mechanical side of a small factory. I should call them something better than mechanics. I would give them a training which, if they have got the right stuff in them, would enable them to become engineers in time.

You want to train such a class of men as can be put in charge of small pumping stations ?—They are doing it now.

Is there a considerable demand for your men ? How many do you expect to turn out ?—No. In a very few years at least 18 or 20 annually.

Do you look to the development of industries in the province to absorb these men ? —I hope that the industries will absorb the lot.

Have you got in these provinces a system of school final certificates ?—Yes, but I do not know much about it.

Is that the class of boy whom you want to get into your school ?—The question of age comes in. If a boy can get a certificate by the time he is 16, let him come in. I do not think a boy can get the school leaving certificate by 16. I may be wrong.

Have you got any boys who have attained to this standard ?—They are all below that standard. I want as good boys as I can get. The more they know the better, provided they are not too old.

As regards the question of teaching the boys, do you give them any repetition work here ?—It is not actually a repetition work. We try to teach them to work accurately. We have done repetition work last year in connection with munitions and we got boys to do more work than what an ordinary workman would do. We have not got time for repetition work in the ordinary school. Eighteen months' experience is absolutely insufficient. Did you find repetition work a valuable training ? Not very much as general experience has shown.

Would you advocate introducing a certain amount of repetition work so as to enable these boys to acquire a certain amount of dexterity ?—I think the repetition work and the dexterity should not be attempted in a technical school. It should be left to the workshop part.

Are the students able to appreciate experimental work on the steam engine ?—A few of them, not all. Fifty per cent. of the boys in the mechanics class are able to take full advantage and appreciate the opportunities given to them. These boys after they have served their two years will get great benefit from it.

Is there any danger of trying to do too much in that direction ?—We are not attempting to do too much. Our aim is that they shall really have a good grounding for the second class engineer examination.

Dr. E. Hopkinson.—You want to give men training in various branches of engineering as distinguished from training to be a skilled artisan in some particular mode, *e.g.*, a driller or moulder? The idea is that I want to let a boy who is taking his three years get a knowledge of doing general work, that is to be able to make the casting of an engine bearing to fit that bearing up and to be generally a handy man. We do not specialise in any one direction and do not make them only turners or smiths.

Do you contemplate that the boys that leave you will be compelled to serve as apprentices?—Every boy is compelled to serve a period of two years before he gets a certificate.

Where?—In the railway shops or in the Cawnpore factories.

Do you keep in touch with the boys?—Till the end of two years and after that as long as we possibly can.

Afterwards do you give them help?—We give a scholarship of Rs. 8 a month to each boy who leaves the school during his apprenticeship. The minimum pay that he receives is Rs. 20, Rs. 12 from the employer and Rs. 8 from the Government. Many of the boys receive Rs. 25 a month from their employers.

These are selected boys?—Boys who complete the course of the school successfully.

At the end of the course a certificate is given?—Yes, only when the employers say that the boys have fulfilled the conditions and worked satisfactorily. That certificate allows a boy to sit for the second class engineer examination.

When the boys go to the railway workshops are they moved from one shop to another?—They go into the machine shop, the fitting shop and the erecting shop. They will not put them in the power house.

What becomes of the boys afterwards? Have you any record?—The school has so far turned out only two batches. Records are kept.

How long ago?—This year and last year. They are doing well.

You do not make any attempt to turn out draughtsmen?—The committee have suggested that we should not turn out draughtsmen, so we cannot.

Suppose you got a boy who is clever in this line?—There is the great demand for draughtsmen in these provinces.

Are any fees paid at all? Is there any entrance fees?—There are fees for every class except the oil engine driver class and the automobile driver class. There is no entrance fee except the entrance fee into the hostel and the caution money that we take and return. The fees are very small ranging from eight annas to one rupee a month.

Do you find that private engineering shops are ready to take the men as apprentices?—I had six apprentices to place this year and had openings for thirteen.

When was the school transferred to the Director of Industries?—I do not think it has ever been transferred. The post of Director is an extra post that has been recently created.

Is the annual report sent to the Committee of the school?—It is sent to the Director of Industries.

How often does the Committee meet?—Twice last year.

Who is the chairman?—The Director of Public Instruction or the Director of Industries?

You simply lay the schemes and recommendations?—Yes, they decide upon them and make recommendations.

Have you any relation with the School of Art and with the School of Carpentry at Bareilly?—No connection whatever except when there is mutual help to be given.

Is your idea of the object of demonstration factories to give the men knowledge of the commercial side of things?—A demonstration factory is a factory in which the number of workmen will exceed the number of apprentices. A technical school is like a factory with 150 apprentices in it and 6 or 7 workmen. In the demonstration factory you would have more workmen than apprentices and work would be done commercially.

What is to be demonstrated?—Whatever they are making.

Hon'ble Sir Fazulbhoy Currimbhoy.—Do you think that it is advisable to have closer relations between the technical school and the trade? Personally I think that the head of a technical school has plenty to do without bothering about the selling of the stuff.

Do you think that, if a lower grade feeder school were established in connection with the school, you could get the proper boys you want?—A single feeder for the school would not be sufficient. We want the pick of the boys from the general schools.

Where do you generally send the boys to the railway workshops?—This year we sent them to the mills at Cawnpore. Have the Committee of Management any experience of the matters that are brought before them? Yes, there is the Loco. Superintendent, the Superintending Engineer, Public Works Department, and the Deputy Commissioner. I could give you a list of the members of the School Committee.

Hon'ble Pandit M. M. Malaviya.—What was the nature of the work that you were doing before you came out to take up this appointment?—I had charge of a factory at home in which we made engines, lathes, machine tools and chocolate machinery and axle machinery, and did general repairs to iron works and local factories, also I had eight years experience of teaching workmen attending evening classes in Birmingham.

You think that Lucknow will be a suitable place for the opening of a pioneer demonstration factory for making copper and brass sheets? Have you compared the amount of metal work done in Lucknow and Benares?—Not in the least.

You have suggested that Government should aid industrial enterprises. But do you not think that, before giving any aid to any undertaking, Government should publish proposals for starting it, and see if private enterprise will take it up?—Most decidedly. Government is not to do anything if there is anybody else willing to take it up.

You think it would be a good thing if Government published proposals and showed how a particular industry could be worked profitably?—I suppose it would not do any harm.

You have said that general education will greatly improve matters. Do you think that if drawing and manual work were compulsory subjects in the general course that would greatly facilitate the imparting of technical education?—Most decidedly, yes.

You drew a distinction between technical and industrial schools. Did I understand you to mean that a technical school is that in which instruction is imparted in the principles of science and art applicable to an industry and that an industrial school is one which teaches the practice of any trade or industry later on?—The difference I mean to draw is this. You can call that an industrial school in which subjects like blacksmithy and carpentry are taught and a technical school is one in which something more advanced is taught.

You are clearly of opinion that the theoretical portion should be taught in a technical school?—Yes. It cannot be taught in an Indian workshop.

You have spoken of the advantage of putting industrial schools under the control of the Department of Industries. Don't you think that the present system under which you are working is better.—What I meant by the Department of Industries is the Director of Industries. I say later on that the Education department should not be cut adrift.

Has your experience of the working of your school been satisfactory, *i.e.*, the school being under the Director of Public Instruction, and the Director of Industries being a member of the School Committee?—It has worked quite satisfactorily.

Then you are in favour of continuing it under the control of the Director of Public Instruction?—As it is at present, that is my idea.

Do you mean to say that no amount of training will qualify a man to be a manager?—I mean to say that provided the man is born, the school will help to complete the business. The school will not be able to do anything unless you are starting with the right kind of student.

Do you know that, in the higher technical schools of Japan and Germany, they have trained a large number of men who are managing industrial concerns?—Yes.

In regard to the study of foreign methods you think it will be very difficult to arrange for sending out technical experts of private firms to study foreign methods?—Yes, I think it will be difficult. I do not think that the time has really come for that. Men must do the work themselves as much as possible. Little can be gained by studying foreign methods without actually doing the work.

Do you think that a want of this nature can be met by keeping in touch with technical journals? It helps very little. You are not going to create really efficient men by issuing a periodical.

You are opposed to sending men to foreign countries?—If you send a man from India to England to study any industry, you will find that people are not very willing to help him. The man has got to do some job himself to learn anything about it.

You would leave him to work out his own way?—If he wants to learn to do a thing, he has got to go and get a job and do the thing himself.

Do you think that a good knowledge of English is of primary importance?—The more English they know the better.

Do you not think that students who have passed the middle vernacular examination with some practical knowledge of English will be very suitable students? If the English is very weak it will be difficult for them. I do not think they can get on without it. Personally I would not fail a boy for not knowing English well. The more English he knows the better.

Hon'ble Sir F. H. Stewart.—Are your ex-students able to get employment easily?—This year I have got three students, who have completed their apprenticeship. One is employed as a drawing master on Rs. 30 and they have promised him Rs. 50 next year, one boy has applied for a job in Agra, and the third boy has got work with his own relations who are opening a mill at Muzaffarpore, I think. The difficulty is this and there is no getting over it. When a boy has finished his apprenticeship he should continue to go on working even at low wages simply to get experience until his employers do not want him to leave. We have not got to that as yet.

They were not really fit for employment?—They were fit but these boys ought to accept lower wages to gain experience.

Where do they come from?—From other parts of India as well? This is definitely put down in connection with the school. We do not want to take them from other provinces. They must have been resident in these provinces for at least three years.

Are there any similar schools in other provinces?—I do not know. There may be in Bombay.

Are your classes full up?—We have got the full complement that we are allowed to take. We have admitted 25 boys this year.

What is the total?—One hundred and forty-nine altogether.

Are the candidates in excess of vacancies?—In many of the classes except the junior classes. The candidates are not of the right sort. They are too old.

Do you have to teach English? Did we not see a dictation class?—English is taught and it is a big advantage in knowing it. English is not taught in the mechanics classes, only in the junior classes of the school.

With reference to your answer about the correlation of the functions of the Department of Public Instruction and the Director of Industries, what you mean to say is that you found it successful in the case of this school?—Yes, as far as my experience goes everything has gone on nicely. The whole idea that was present in my mind when I spoke about it was that the Department of Education should help us to get the proper sort of students. I did not mean anything more than that.

And this is where you think that really the connection of the Director of Public Instruction might stop?—So far as I am concerned, yes.

Sir D. J. Tata.—In answer to one question you said that you hoped that industries will absorb all the men that leave you. Are you in touch with employers as regards their wants of men who are technically trained? Do employers know that you have got men trained in a certain way and do they come to you and ask you to supply artisans who might be useful? Would you not like to have some relation with employers?—We keep a register of the boys out of employment but there have been so few boys turned out by the school so far. I want to go to all the factories personally and see the type of man they want. That is going to be done. The Director of Industries is also in touch with employers.

In your Advisory Committee are there any employers of labour?—There are M. Prag Narain Bhargava and the Loco. Superintendent and the Director of Industries.

They know the class of men whom you turn out and provide openings for them? Yes.

Is there any overlapping of activities in the Bareilly school and your school?—I do not know. There should not be any fear of overlapping in connection with this school.

It is possible only in the case of wood work but this is being practically limited to pattern making here.

Do you think it would be an advantage to impart some technical education in primary schools?—No, but after boys have finished the primary schools.

Do the students who work here get any return for some of the work? Do they get the proceeds of the sale of the products they make?—I paid them varying wages when they were doing munition work—from two to eight annas a day.

If there is a system of paying them for some of the work, would not that tend to attract more boys to the school? When you come to consider that the boys come into the lower classes, what work can they turn out?—They cannot do very much work but we give boys scholarships to help them to attend the school and work and that will make up for the wages. But there are not very many of the artisan class attending the school.

Hon'ble Sir R. N. Mookerjee.—How should these demonstration factories that you refer to be run?—It would be on absolutely business lines.

Will it not interfere with private enterprise?—I have not troubled myself about private enterprise at all. I was looking at it from the point of view that if you want to improve a man working in a particular industry and if the existing factories would not do it and there is shown to be a demand, then demonstration factories should be established. They would not interfere with private enterprise. I have not the slightest idea whether private enterprise should or should not open demonstration factories.

Are the boys who come to the school able to understand sufficiently lectures given in English?—Yes.

Is it possible for the Indian lads like those you have here to follow your lectures and to take full advantage of them?—To get over that difficulty at present in this school, we take boys who have studied up to the 7th or the 8th standard. Still we supplement it with vernacular and get along.

Is it not your idea that they will be responsible officers afterwards?—No, these are not all going to be managers.

Don't you think that after these three years they should get some education in mathematics or in a technical school or engineering school? You have to depend a good deal on the boys themselves. If they want to get on they must be self-taught, after leaving the school, while working in factories.

Will not the master of the school be able to say in that case whether a boy is the right type of person to get?—The man in the factory must know. The factory conditions in India are so difficult and that is one of the reasons why I want to take them out of the technical schools before they are too old.

WITNESS NO. 8.

HON'BLE MR. C. F. DE LA FOSSE, M.A., *Director of Public Instruction, United Provinces.* *Hon'ble Mr. C. F. de la Fosse.*

WRITTEN EVIDENCE.

Training of labour and supervision.

Q. 49.—A few day schools have been opened for short-time employés, notably at the Woollen Mills and at Messrs. Cooper, Allen's, Cawnpore. I have not seen either of these two schools but from reports received from inspectors I gather that the progress of scholars in the three Rs. in their own vernacular is fair. At the latter some object lesson teaching is also given connected with leather and leather work. The children of factory hands can, if they so desire, attend ordinary primary schools in the neighbourhood of their homes. The department believes that elementary education would sharpen the intelligence and broaden the outlook of artisans and so make them better workmen; but I doubt whether employers generally, whether Indian and European, share this view or would, without some pressure, be willing to test its correctness. They are a little afraid of the consequences of a purely literary education however elementary. Their objections can sometimes be overcome by adding to the course of instruction some object lesson teaching along the lines of the industry which the children are destined to pursue.

There are night school classes at the technical schools, and at times they are well attended by workmen and at times attendance falls remarkably. But on the whole they are appreciated. The better workmen learn, besides reading and writing, to draw parts of machinery and to read and work to sketches and they are often interested in seeing up-to-

date machines at work and in studying their operations. Other night schools, started by private agency, give instruction mainly to the servant class and to employés in shops. They are to be found in most of the big cities. Some teach a little English, which is said to be very helpful in getting certain kinds of employment, but most confine themselves to the vernacular. College students under the influence of 'social service leagues' occasionally give their services gratis as teachers in night schools of their own founding but such efforts are ephemeral. The Department has endeavoured to encourage private effort in starting night schools, but has too often found these places degenerating into cramming establishments for boys whose progress in ordinary schools during the day has been slower than their parents could wish. Except in the cold season few persons, after the labours of the day, are ready to attend school in the evening to acquire a literary education. I am inclined to think that night schools for teaching the three Rs. should be left to private effort to establish. Assistance from public revenues could be given, when it was found that they would meet a genuine need, if developed and improved. They should of course be open to inspection by the local inspecting staff.

Q. 50.—Lord Morley dealt with this question when communicating his orders on the proposal of the Industries Commission which met in the United Provinces in 1907 (vide his despatch No. 110 of 30th July, 1909). He decided against placing industrial schools under the control of an independent industries department. Doubtless he was influenced in coming to his decision by the failure of the South Kensington Science and Arts Department when it was independent of the Board of Education. Experience in the United Provinces has confirmed the soundness of this decision. Since industrial, or as they should more appropriately be called technical, schools cannot do their work properly unless they combine general with technical education, and as an industries department cannot be expected to be familiar with all the details of general education, e. g., subjects, standards of instruction, courses and text-books. A director of industries is not able to deal satisfactorily with questions relating to such points or to the recruitment of scholars. The best arrangement is inspection by the industries department and general control by the education department. The technical schools in the United Provinces are under the management of committees which can very well look after their interests, should questions of local concern arise. The Director of Industries is a member of all Government technical school committees. I attach a note showing in detail the way in which the Director of Public Instruction and the Director of Industries share in practice the control of the Government technical schools between them. Institutions, like the so-called weaving schools, which are concerned only with teaching trade accomplishments might well be left to the Director of Industries to manage.

General official administration and organisation.

Q. 60.—Having had experience of a Director of Industries, who was an expert in technical matters and of another who was a business man, I should give my vote for the latter. A non-expert official would seem to me to be likely to be positively dangerous in such a post. Indian administration has suffered quite enough already from the brilliant amateur. Expert opinion is, I presume, competent opinion derived from practical experience. No one man can possess it in regard to industries generally; but business training is of much wider application and is valuable in considering whether what is being produced is, all things considered, worth producing as a 'business proposition.' Technical knowledge is in the case of a director of industries, not so indispensable; for such advice can usually be obtained from experts on points in which a director of industries needs it.

Organisation of technical and scientific departments of Government.

The Director of Industries will be able to give the Commission full information in regard to the questions contained in this section. My own opinion, if I may venture to express one, is that an imperial scientific and technical department would be of great use. It is wanted, among other things, to guide provincial boards of industries, which, judging from my limited experience, are apt to be either rash or timid, as the case may be, for want of knowledge I have separately noted my views on the organization of technical institutions and the co-ordination of research, in response to an invitation issued by the Industries Department of the Secretariat.

Note showing in detail the way in which the Director of Public Instruction and the Director of Industries share in practice the control of Government technical schools between them.

1. The Director of Public Instruction has full control of the policy of the schools and exercise authority over the superior staff and major works. The following passes through his office:—

(*a*) The annual budget.

(*b*) The annual report on technical education.

(*c*) Copies of proceedings of committee meetings.

(*d*) Any correspondence relating to alterations or amendments in the Code and Curriculum.

2. As regards appointments, etc. of the subordinate staff, the Director of Public Instruction deals only with the cases of those members of the staff who are connected with the educational (literary) side of the schools. The rest of the staff, irrespective of the salary of the posts and including the drawing masters and the clerks, is placed under the control of the Director of Industries, except in so far as it is already in the hands of the Principals concerned. But all proposals for increasing the pay of the staff, both technical and educational, or for any addition to the staff, are sent through the Director of Public Instruction in connection with the proceedings of the school committees and the annual budgets.

3. As regards the purchase of machinery and other equipment approved of by the committees, the Director of Industries indents for the articles in question direct from the Director-General of Stores without any limit as to the amount up to which he can order such goods, provided Government has sanctioned the purchase and budget provision exists. He has also been empowered to execute contracts and other instruments for a sum not exceeding Rs. 500 and not affecting real estate. In accordance with this and with reference to rule 13 of the Stores Rules (paragraph 2463 of the Manual of Government Orders) he is empowered to make purchases under rules 1, 2 and 4 of the Stores Rules up to a limit of Rs. 500. Power has also been delegated to him to make purchases in India under rules 3(*a*) and 5 up to a limit of Rs. 250.

4. The Director of Industries indents direct on the Government Press for forms, and on the Controller of Stationery for stationary and rubber stamps.

5. Power has been delegated to the Director of Industries to sanction transfer of money under sub-heads of the budgets.

6. The Director of Industries disposes of all matters relating to aided, weaving and industrial schools (as a part from the Government technical schools) other than budget proposals involving increased expenditure; the latter passes through the Director of Public Instruction.

NOTES BY (1) DR. E. G. HILL, *Principal, Muir Central College, Allahabad*; (2) MR. A. W. WARD, M.A., *Professor, Canning College, Lucknow*; *and* (3) *The Hon'ble* MR. C. F. DE LA FOSSE, M.A., *Director of Public Instruction, United Provinces.*

(1) NOTE BY DR. E. G. HILL, *Principal, Muir Central College, Allahabad.*

So far as I am able to judge the preliminary note is exhaustive. The chief points of direct interest to one engaged in the scientific training of Indian students are those raised in III, sections 10—13 and V, section 19, viz., organisation of departments for the development of research in various industries and the development of research institutes and prevention of the unnecessary overlapping of research activities.

2. Eventually the future scientific development of industries in India must depend upon Indians themselves and to create a generation of young men ready and capable of such development is of primary importance. I consider it essential that students in our science colleges should be brought as much as possible into contact with research institutes and technical processes and suggest for the furtherance of such an aim that it is desirable for such institutes to be directly in touch with the Universities.

3. As regards organisation and administration, it is imperative to remember that the relative efficiency of an institute for technical research increases with increase of staff. Several small laboratories are very much less efficient than one large one. This fact points to one or two imperial institutes as opposed to a number of provincial ones. I think one institute in Northern India and one in Bangalore should be arranged to meet all needs, the work of the two being more or less limited.

4. General supervision should be vested in an Imperial officer who would be in touch with scientific departments and Boards of Industries, also with the new committee for scientific research, the imperial institute and such new bodies as the Association of British Chemical Manufactures.

To bring the institutes into direct touch with the Universities, I recommend the association of the members of the Faculties of Science of our Universities with the managing bodies of the institutes. Such a measure would prevent the overlapping mentioned in V, section 19 (*h*) of the note.

Suggestions for simpler researches which could be carried out in University colleges might be made by this board and sent out to colleges desiring to attempt such work.

5. A suggestive address given at the Columbia University by Dr. Mees, Director of the Kodak Research Laboratories, may be found in *Nature* of July 13th and 20th of the current year.

(2) NOTE BY MR. A. W. WARD, M.A., *Professor, Canning College, Lucknow.*

The Tata Institute has made an excellent start, but the staff is small. This has just been emphasised by the action of the Government of India in bringing two experts from England to deal with the indigo question and the extraction of tannin from indigenous material. This casts reflections on either the efficiency or numbers of the staff of chemists at the disposal of the Government. Were the staff at Bangalore as strong as it ought to be, it should receive the full confidence of the Government. In this connection it is worthy of mention that, during the recent session, good work has been done at Bangalore on the value of indigenous dyes.

Some restriction should be placed upon the range of activities of the Tata Institute at least for some years to come. No attempt should be made to establish schools of medicine, or law or civil engineering. There are special reasons for the department of electro-technology, but even these may be reconsidered, as such a department is more appropriately associated with institutions devoted to mechanical and civil engineering. Metallurgy, as a process of research for utilizing Indian mineral deposits, might be included, but in the main the Tata Institute should be restricted to the field of applied chemistry. This covers an immense ground vitally necessary for the development of the natural resources of India.

The research laboratories should be imperial in their interests and should be supported by imperial grants. This would tend to raise their status, to widen their sphere of usefulness, and to the better co-ordination of their functions.

The relation of technological institutes to technical colleges or schools should be clearly recognised. The main object of the former is to extend the application of scientific knowledge, that of the latter to teach the craft as at present practised. The institute should train pioneers of industry, the colleges and schools, small masters, foremen and workmen. The professors at the institute should be almost solely engaged in research, those at the college with teaching. The failure of the Agricultural College at Cawnpore furnishes an excellent object lesson. It was started with the idea of combining elementary teaching, college classes and research, and two men and a boy with the advice of the Collector were expected to run the show. It should have been an agricultural college designed to encourage and prepare large landholders to cultivate their fields in a scientific and profitable way. It should have been equipped with a large staff whose business was to teach. In its vicinity should have been a large model farm, not less than a thousand acres, on which machinery could have been profitably employed. The true function of such a college would be the exposition of known facts, and not research to discover new ones. Research would be justified provided the men so engaged were not required to teach classes. If both are attempted either the classes must suffer or the research must suffer, or still more probably (as at Cawnpore) both will suffer.

In this connection I may be permitted to quote an extract from an article on "The Third French Republic," by Professor Emile Bourgeris in the Cambridge Modern History.

"One of the chief needs of an agricultural people is a complete system of schools, professors and lectures on agriculture. After 1871 by the scientific researches of the National Institute of Agronomy, which was added to the school of woods and forests and the Veterinary College of the eighteenth century, by the diffusion of knowledge which was entrusted to the professors of the national schools, especially the forty technical schools of agriculture, horticulture, dairy and cheese farmings, and the two hundred professors established by the departments, it has been proved to French farmers that the secret of their prosperity lies in the substitution of scientific cultivation, based upon methodical experiments for the simple customs of the past, often mistaken and unproductive. Not since the middle of the eighteenth century had a like effort and a like progress been experienced in French agriculture. Everywhere, great improvement in methods has been manifest: the soil has been enriched by a more judicious and orderly employment of fertilising materials, the adaptation of cultivation to different soils is better understood, and by specialisation the land has become more productive; agricultural machinery has been transformed in these forty years. The agricultural output, which, between 1800 and 1860, only rose from four to six milliards, has now reached a total of eleven milliards.

In the matter of manufactures and commerce, the resources of the State were especially, and at this period lavishly, employed in creating for the nation a material equipment, which had been left in a singularly inadequate condition by the second Empire. Credit is due to France that, immediately after her disasters, she did not shrink from this increase of burdens, but reasoned that by this means alone she could be enabled to liquidate the claims of her onerous debt."

There is in India at least no fear of the research activities of colleges competing with those of the technological institutes. As a general principle the former should engage in pure science research, and the latter into research for industrial purposes. All teaching at colleges should inculcate methods of research. There is no fear at all of too much research, but there is absolute certainty there will not be enough.

In conclusion I beg to refer to Earl Pearson's prefatory essay to volume 32, Encycl. Brit. 10th edition. It is the mine of suggestion and wisdom, on all points connected with the application of science.

(3) NOTE BY THE HON'BLE MR. C. F. DE LA FOSSE, M.A., *Director of Public Instruction, United Provinces.*

I have little to add to what Dr. Hill and Professor Ward have said. Their opinions on matters of this kind are far more valuable than mine.

I am rather sceptical as to whether research work, which would be really useful in the development of industries, is likely to be produced in Arts Colleges. They are generally not well-equipped for such work. Only two colleges, the Muir Central College and the Canning College, teach beyond the M. Sc. standard and even in them the staff would find little time for research work of this nature. I see no harm, however, in encouraging such research, if it does not result in dissipating funds in equipping them which would be better devoted to a central institute.

The time for suggesting the establishment of an institute in Northern India similar to that at Bangalore does not seem to me to have arrived. I do not personally favour the suggestion in any circumstances. The Tata Institute is capable of expansion and it would be better not to duplicate machinery for research but to extend plant there as it may be needed. Apart from the cost, the larger the number of scientists working in close contact with one another the better. The plea that distance may deter young Indians from going to Madras does not seem to me of much weight. The number of young men competent to undertake research is not likely to be large, and genuine students should not be deterred by any such consideration. It is not desirable to entice large numbers to enter upon work which in all countries is reserved for the comparatively few who, by training and ability, have justified their selection for such work.

The distinction which Professor Ward draws between provincial technological institutes and an imperial institute, like the Tata Institute of Bangalore, is important. Should the scheme for a technological institute at Cawnpore mature that distinction should in my opinion be kept clearly in view to avoid overlapping of functions with the Tata Institute and wasteful duplication.

Professor Ward's strictures on the Agricultural College at Cawnpore are based apparently on some misconceptions of the facts and his condemnation of the present organisation of the college is sound. The attempt to evade the necessity of providing a whole-time and thoroughly competent staff is not very creditable. I pointed out to the late Director of Land Records and Agriculture, who did me the honour of consulting me, that the arrangement would not pass muster if subjected to expert scrutiny. But this is not all that is at fault with the college. The arrangement of the courses is unscientific. There should be a two years' course for landholders and others preparing for practical farming. The better men should be allowed to remain on for a third year to specialise in some particular line. There should be in addition, and quite distinct from the above, a University course of four years leading to a degree. This course should be arranged mainly for inspectors, instructors and investigators.

ORAL EVIDENCE, 4TH NOVEMBER, 1916.

President.—With regard to the relationship between you and the Director of Industries, I understand that heads of technical schools are members of your staff?—Yes; they are educational officers.

Does this Lucknow Technical School come under Mr. Silver?—He is in direct control of the technical schools. The actual administration of the technical schools is done by the Director of Industries and only important matters are referred to the Director of Public Instruction. Any changes in the staff, or any alteration in the budget, or any developments of the courses, are referred to the Director of Public Instruction. But in reality the Director of Industries practically administers the school.

Supposing a question of discipline arose, it would go to Government through the Director of Public Instruction ?—Yes, that is so. The Director of Public Instruction is in control of the discipline of the staff, in ultimate control I should say. And if there was a difference between him and the Director of Industries, it would probably have to be solved by the Local Government.

Do you think that one difficulty in the way of providing a staff under the Director of Industries is due to the fact that the Department itself is new and small and consequently it would be impracticable at present to organise a regular service for it ?—There are two branches of the staff. There is the ordinary teacher who is usually lent by the Department for a certain number of years. But in regard to technical work the appointment of mistris or others who are connected with the technical side of the work is made by the Director of Industries without reference to the Director of Public Instruction.

He is developing a large staff of his own but they are not a superior staff ?—Yes.

You are in fact lending your officers to assist the Director of Industries ?—Yes, because he would have some difficulty in recruiting them. Men of the educational service are willing to serve provided their prospects are not interfered with in any way. Otherwise they would be discontented.

How do you distinguish between 'industrial' and 'technical' schools ?—The name 'industrial school' in the case of this institution was objected to, because it is not really a trade school. 'Industrial' is better applied, for instance, to a weaving school, that is where a particular industry is taught. But this school aims at technical education.

How would you classify the Carpentry School at Bareilly ?—I would call that a technical school, because the classes have to learn mathematics and drawing and other subjects which are connected with an ordinary education. In the case of a weaving school or a blacksmiths,' there would be no need to require any general education. The terms, however, are not really very clearly distinguished.

May we have liberty to use your note on technical research institutes, as well as those of Dr. Hill and Professor Ward ?—Government has agreed that they may be used by the Commission.

You are writing your note as an administrative officer but not as one connected with scientific research ?—I am simply commenting on the two notes which I had to send on to Government. Otherwise I should probably not have touched those subjects.

Mr. A. Chatterton.—You are in favour of keeping the Director of Industries under the Director of Public Instruction ? That is the present system and I am in favour of it.

Has not the Director of Public Instruction got enough to do himself ?—That is an administrative question. If the Director of Public Instruction has more work than he can do then Government would give him extra assistance. I have already got two Assistant Directors to assist me in the administrative work, and, if it is necessary, I think the Local Government will give me a third or a fourth.

Under the existing arrangement, which I understand works extremely well, does the Director of Industries take the whole responsibility for the industrial schools ?—He looks after the industrial schools and, in short, runs them. But whenever there is a big question of expansion or large expenditure in the budget, these matters come up to the Director of Public Instruction. If there is an important change in the work or any change in the curriculum, that would come up to the Director of Public Instruction so that I would know what he is proposing to do.

Does it not happen that these questions are referred to the Assistant Director of Public Instruction ?—I do not think so in any case. All papers of an important nature come before the Director. All the reports of the committees come before the Director. Any change in the courses comes to him. The files that come to the Director may not be very numerous but they are all of an important nature.

If there is a difference of opinion between the two, it would add largely to the work of the Director ?—Not necessarily. I should rather think it would add to the work of the Secretariat.

Do you think the present system will prove satisfactory at the time when a considerable expansion takes place in industrial schools ? If technical schools were entirely divorced from the Department of Public Instruction, any questions which require expert knowledge of general education would not be properly handled. For instance, there are questions of text-books, for example, the teaching of nature study, and the courses of study and also the question—which is a very important one—of the appointment of teachers for

teaching those subjects. If the two departments were entirely separated, two things would happen. First, you would find a difficulty in recruiting suitable teachers for the ordinary work, and secondly, you would find that changes would creep into the curriculum which would not be sound from the point of view of general education ; and there might be a further difficulty, namely, that of fixing the standard of admission. Unless the Department knows exactly what standard of preliminary general education is required, students might get admitted who had not received a proper preliminary education. So there ought to be co-ordination between the two.

Would it not be possible to attach to the Director of Industries some officer of the Educational Department ?—He would not be able to get such ready assistance from the Educational service if the services were split up. At present we have only three small technical schools. The question, therefore, is concerned with the future development of education in India.

Would you want to control the higher technological institutions also ?—They would have their own committees. That is the system which has been adopted for these provinces. For instance, Roorkee has a committee on which, among others there, are the Director of Public Instruction and the Director of Industries. But it is not under the Director of Public Instruction. I could not alter the courses.

You have certain control in connection with the budget of Roorkee ?—Yes, but it is practically formal. The budget goes through me as a matter of convenience to Government. But there has been no occasion on which the Director has had to tamper with the budget.

In preparing the annual budget, there might be a tendency to starve the industrial side of the Department ? The two are quite distinct. The technical branch has got its own budget and the educational branch is entirely separate from it. The former is passed by the Financial Department of Government. The educational budget goes through the Judicial Department. There is no likelihood of the one affecting the other.

Why should the Director of Industries not deal with his own budget ?—Supposing he wished to increase the staff of mathematical teachers, he would have to satisfy me that it was necessary in the interests of the school to increase the staff. I would make enquiries and I would include, if necessary, the salary of a teacher of sufficiently high standard.

Don't you think that the Director of Industries should have complete control as far as possible in financial matters ?—I do not think he should have.

He might consult you and the final decision might rest with you. The budget should be really his budget?—So far as the budget is concerned, he has practical independence now. It comes to me for examination and in examining it I may find that there are things which we cannot afford to do. I then write to him to find out which among the new items are most urgent. In that way I save Government a considerable amount of trouble.

In that respect you are acting as a Secretary to Government in such matters ?—It is better that the Director should know what is going on. It is a good thing for him to be in close touch with the development of technical schools because he is concerned with their recruitment and also in regard to the staff.

Dr. E. Hopkinson.—Is there any manual training at all in the elementary schools ? —We had at one time clay-modelling and we still have a little drawing. Clay modelling was found to be a farce in view of the sort of teachers that we were able to get and I do not think drawing has produced much results.

You are then despondent as to the possibility of the introduction of manual training ?—Elementary school boys range generally from the ages of 6 to 10. It is not easy to decide what kind of manual training to give them. They are too young to handle tools. Their chief business is to learn the three Rs.

Does the relationship of the Director of Public Instruction, which you have described as appertaining to this school, apply also to the School of Arts ?—They are under exactly the same system of organisation.

What is the nature of your connection as Director of Public Instruction with the industrial schools, *e. g.*, weaving schools ?—I confess that, in regard to weaving schools, I am merely a post office between the Director of Industries and Government, because really there is no education work done there.

The Hon'ble Pandit M. M. Malviya.—You are strongly in favour of elementary instruction as promoting the industrial efficiency of the people ?—I am.

You are also in favour of drawing and manual work being included in the subjects of study in the schools as making towards that end ?—Not in the primary classes.

At what stage could that be done profitably ?—In the Anglo-vernacular schools we have manual training from classes V to X.

Would you be in favour of introducing elementary drawing in the upper primary section ?—We have it.

You know that in Japan, after the primary classes, the boys go to a supplementary technical school where they receive technical instruction ? Do you think that we might usefully introduce a similar system in this country ?—I think that would be a useful development.

What is the total number of technical schools in the United Provinces at present ?—There are only four. There are technical classes attached to orphanages, but Government has got only four.

You say that " The department believes that elementary education would sharpen the intelligence and broaden the outlook of artisans and so make them better workmen ", but you doubt whether the employers share that view. Are you not in favour of putting some pressure on them in the interest of the community as a whole ?—I am.

You also think that if a system like that of supplementary primary education with technical instruction were introduced, as it is in Japan, then probably the objections which the employers have would disappear ?—That is rather a different question. What I was referring to in my writen evidence was giving the rudiments of a literary education to everybody in India, not of any technical education which you could attach as a sort of continuation class to primary instruction. That is, I think, a different matter.

What is the number of agricultural schools that we have in the United Provinces ?—Of purely agricultural schools we have none : We have agricultural classes attached to one or two high schools.

Do you agree with Professor Ward that there should be a complete system of agricultural schools for promoting agriculture ?—Mr. Fremantle in the Allahabad District is experimenting with Mr. Higginbottom in that very direction. They are getting together some of the ordinary teachers and giving them elementary training in agriculture and then by means of plots of ground attached to the school and the growing of crops are endeavouring to interest the agriculturists in new methods of agriculture.

Do you think that there is a fair prospect of night schools being successful here ?—Given sufficient money they will be efficient.

You are not in favour of the Department taking them up ?—I am not.

You are willing to help them with funds when there is a genuine need ?—Yes.

In view of the insufficient provision for education that we have, don't you think that night schools might be taken up by the Department of Public Instruction ?—I do not think it is necessary. Wherever there is a genuine desire, they can be assisted. But they are of an ephemeral nature. If the Department were to build and equip a school, it might find that after some time it was no longer needed, because the people who demanded the class no longer wanted them. They have a tendency to collapse. I do not think it would be wise to sink money in night schools.

Supposing the premises are rented, could we not persuade the teachers of the Department to take up teaching work in the evening on a little extra pay ?—I do not think it would be wise to have a teacher teaching in the day teach again in the night.

Hasthe system of morning schools ever been tried ?—Mr. Fremantle in the Allahabad District has got half-time schools. Some boys come in the morning for three hours and the remainder come in the evening.

Has not that been successful ?—Not very, because the parent sends his son to school as often as not only to get rid of him during the day. As soon as he is old enough to work he is taken away. For that reason half-time was not altogether popular.

Do you think that if the Department of Industries and the Department of Education were altogether separated, the educational side will suffer ?—There might be a tendency in that direction.

In view of the numerous problems which require to be dealt with and the extent of the country, do you not think that there should be in Northern India at least one research institution ?—I have already given in my note my reasons why I am against any such proposal.

You agree with Professor Ward in his condemnation of the present organisation of Agricultural College at Cawnpore ?—Yes.

What has stood in the way of that college being put on a sound footing and being made more useful ?—It is largely a financial question. The cost of maintaining a full-time staff would be very considerable.

Was the teaching work practically neglected ?—The corporate life of the institution as a college suffers undoubtedly by the fact that two of the most important professors have their interests divided, and mainly their interest lies in research.

And all that is needed to make that institution run on sound lines is more finance ?—It is a whole-time and properly qualified staff that is wanted.

And proper arrangement of the courses ?—I think so. That is my personal view.

Hon'ble Sir Fazulbhoy Currimbhoy.—What is the fear of employers as regard elementary literary education ?—They are afraid that it may turn the boys to literary pursuits and that it may affect the recruitment of labour.

Do you think that this is possible with only a smattering of the three R's ?—A clever boy starting in that way might wish to rise in the educational ladder and work up to higher standards.

Are you in favour of making education compulsory in the case of these boys ?—I am.

Then why do you want to penalise only the factories ?—I want to make it compulsory everywhere, not merely in factories.

How is the cost of the day schools met ?—We give a grant-in-aid. The building and the equipment are provided by the firm and they also pay half the cost of the teachers.

Do the half-timers attend the school ?—Only the half-timers. They go in shifts.

You are not in favour of any change in the relation between the Director of Industries and the Department of Public Instruction ?—I am not not in favour of any change in the system as it has developed in these provinces.

If an imperial service is established for developing technical and industrial education, you will not object to the present control being taken away from the Director of Public Instruction ?—I would object strongly still. What I understood by the proposal for an imperial body of experts was a body of experts who would assist in the industrial development of the country, like the Board.

You then say that the control must be by the Director of Pubic Instruction ?—You do not want a separate service entirely ?—So far as the technical schools are concerned, it will be an advantage to have a connection between the two branches such as we have developed in these provinces as the result of experience.

Do you not think that the education and the technical budgets affect each other ?—They are entirely distinct. The budget of the literary side is something like 29 lakhs. The technical side budget is still small.

Suppose the Director of Industries prepares his own budget and if he has to spend, do you not think that the technical side will have a larger amount than the literary ?—Not necessarily.

I think his budget will be a very large one ?—In regard to recurring expenditure, at present no ; in regard to non-recurring expenditure, possibly.

CAWNPORE.

WITNESS No. 9.

DR. E. G. HILL, D.Sc., *Principal and Professor of Chemistry, Muir Central College, Allahabad.*

WRITTEN EVIDENCE.

Research abroad.

Q. 22.—It appears to me that the answer to this question depends entirely on what the Government of India is prepared to spend on its research institutes. There can be no advantage in conducting researches in England, if Indian institutes are adequately staffed and fitted, but it is hopeless to expect one or two men to tackle, say, all the chemical problems of a country like India. The efficiency of any research institute increases enormously out of proportion to increase in staff and what are needed in India are institutions which are large enough, and I mean large in every sense of the word.

Advisory Council for Research.

Q. 23—I think the chief way in which the Advisory Council might be of use in India would be to keep some office in India informed about laboratories in England. It would be useful for a worker in a technical laboratory to know what was being done at the time in similar English laboratories—

(1) to avoid possible duplication of work,

(2) more especially for reference.

A periodical list of English laboratories with the subjects of research undertaken in them and a list of workers might be most useful.

A similar Council in India consisting of a selected group of research workers and a similar group of business men might refer certain problems to colleges. *Too much must not be expected from teaching institutions. The staffs of these are small*, the institutions are isolated, and the time available for research is very limited. At the same time, it is surely waste of time for scientists in India to engage in research into *pure* science at any rate for years to come. (I do not refer to small researches of an educational value to students). Europe has so many greater facilities for work of this nature that pure science may well be left on one side as a subject of research in India. The difficulty in colleges has been to find out exactly what is wanted by commercial firms. The Department of Industries is now bringing forward problems for solutions, but the list needs careful revision. Some of these have received much attention in England and Germany; it would be unwise for colleges to touch these. Others seem entirely suitable.

Technological institutions.

I think technological and research institutions should not be allowed to develop as separate units, for the reasons already given. It is far more advantageous to have one institute with a staff of 100, than five institutes each with a staff of 20. Experience in Europe and America has proved this beyond question. It is true that Bangalore is not very central, but I consider it much wiser to develop this one institute than to start new institutes in North India, unless the Tata Institute were to become very highly specialised (say, iron and steel). In such a case I should welcome a large technical institute in North India.

I would have such institutes imperial in character.

Indian Science Congress.

The Indian Science Congress has certainly done something to stimulate research, but its organization is not adapted for the assistance of industrial development. It is affiliated to a purely academic institution (the Asiatic Society of Bengal), it has no permanent committee, and no habitat. Its members consist largely of people remote from industrial work.

It might be possible to develop an industrial section, but I think that an Indian Advisory Council, as indicated above, would be much more useful.

Study of foreign methods.

Every encouragement should be given to Government technical and scientific experts to study conditions and methods in other countries.

Reference libraries.

Allahabad is fairly well-equipped with scientific works of reference. The Public Library and the Muir College between them take most of the important periodicals and have a reasonable supply of back numbers. It is probable that the Public Library will transfer its scientific volumes to the new University Library. If so it is essential that these should be readily accessible to the scientific public whether connected with education or not.

Until the University (as distinct from affiliated colleges) takes up scientific work, it is doubtful whether the books of reference are not better located in the Public Library, as this body can arrange for books to be sent out of the station to depositors of Rs. 16 which the University would not do.

ORAL EVIDENCE, 6TH NOVEMBER, 1916.

President.—Will you please tell us particularly which phase of chemistry you have paid special attention to?—Chiefly organic chemistry.

How many years have you been here?—Twenty-one.

You have had an opportunity of forming a well-considered opinion of the scientific and technical organisation in India?—Yes. I think so.

One of the questions that we have asked is, whether it is advantageous to have provision for research for special subjects in the United Kingdom, and if so, for what special purposes it is advantageous to conduct researches in England rather than in India. Will you please give us a summary of your views on that point?—As I have stated in my written evidence, it seems to me that it entirely depends on the amount of money that Government is prepared to spend on research in this country. If it is prepared to build a research institute on the generous scale in which money is spent in America on research, I should say that there will be no need for research work to be done in England on Indian problems, but it is imperative that the scale should be a generous one.

As a whole, supposing sufficient facilities were provided in this country you would prefer to have research done here?—Yes, on the spot.

For what special reasons?—Partly, I think the work should be done in the conditions of the country in which the manufactures have to be carried on, and partly there is no doubt that it is easier to get samples of materials, both from the point of view of quality and quantity, more satisfactorily here than in England.

And in dealing with problems connected with organic chemistry specially, when you have to take raw materials from the country, is it not a fact that the period of a plant's growth affects its value from the industrial point of view?—The plant at an early stage of its growth might have almost a different composition from that at a later stage.

Consequently, I suppose that you want, not only to be able to test the plant at different periods of its growth, but test different varieties of the plant and at different periods of the year in different districts of India?—Quite so.

That probably makes it difficult, if not impossible, to have your research work done in England?—I think so.

In addition to doing most of the research work in this country, would it not be probable that every now and then you might come across problems that could not be solved in this country, no matter how perfectly you develop your research equipment, just as, for instance, there are specialists in America who deal with things not taken up in England and specialists in England who deal with things not taken up ordinarily in Germany. Do you think it will be possible to co-operate with the Advisory Council for research in the United Kingdom?—I certainly think so. On the lines I have indicated there should be a similar Advisory Council in this country which would co-operate with the Advisory Council at home.

Do you think that a council could be formed in India to correspond with that at home?—Not at present, until we have got some scientists in this country.

You know the system adopted by the council at home. They have a small council of distinguished scientific men some or most of whom are either directly connected with industries, or the application of science to industries. Under that small council there are a series of specialised committees. As to the merits of a piece of research, and who should conduct research and what kind of research should be undertaken, they are settled by the small committees under the Advisory Council.

The question was considered whether they should have a large council representing most of the interests, or a small council with a series of specialised committees. They decided in favour of a small council with a series of subordinate committees. Do you think that that system would be an advantage to India, or would you have a large council?—It is essential in my opinion that the first step in India should come from the business man. By that I mean that it is up to the business man to indicate on what lines he wants research done. We must work to his needs. So that I should feel inclined to think that the small council should be a council of business experts, and the Advisory Committee one of specialists and scientists.

You know the constitution of the present Board of Scientific Advice?—Yes.

If we add to that Board representatives of chemistry and tropical medicine and of any other distinct and important subjects not now represented, don't you think that that Board will serve the purpose of the Advisory Council in India?—No. I do not think so. It consists of heads of departments. We are talking about commercial development, about industrial development. I would have a committee of men actually engaged in business. You told me just now that in England you have a council consisting of men in touch with business. I should like to see that development in this country too. In my opinion the Board of Scientific Advice has failed in suggesting research work. I mean by suggesting research work, suggesting research work outside their own departments.

But you do not think that if we add to it representatives in chemistry and tropical medicine and some other important subjects that board would not serve the purpose?—As far as tropical medicine goes, one would say at once, yes; because it is only remotely connected with industry, but so far as chemistry goes I should say, no. I think we do really need business men to let us know what industrial needs are.

Would not that come from the sub-committees appointed under the Board of Scientific Advice? Could you not have the assistance of a certain number of sub-committees under the Board of Scientific Advice which would include business men? Would not that meet your point in the matter of chemistry?—To some extent it should depend on the relation between the council and the committees. If the committees report to the council and make suggestions to the council, I think, it would. If everything is directed by the council entirely, and suggestions come down from the council to the committees only, I think no.

In that case the Board of Scientific Advice would be more a judicial authority than a suggesting one?—Yes.

That is probably the main function of the Council. It ought to decide between the relative claims of different researches? If you had a series of these committees, each committee sending its own proposals for research, there would be a time when the Government must ask for somebody's advice as to the relative merits of the different researches?—It would meet my objection to the present constitution of the Board of Scientific Advice if the sub-committees have business men on the Board.

I notice that you say that the Board of Industries in this province has been referring certain problems to the colleges and universities in the United Provinces of research work?—Yes.

You have seen this list of problems referred to colleges for solution, because you are a member of the Board of Industries. (The President reads out the list). How many colleges in the United Provinces are able to tackle this list?—I have had a man who wanted to do some research work under me, and we started with mowha oil and til oil and I should think he would probably take 1½ years to do anything with those to give a result that may be useful from a commercial point of view.

And even then will he have gone beyond the laboratory scale?—I think he might. Of course, as you know, all this research has a large element of luck. You might get a result in one day which would prove more valuable than a piece of work which took three or four years.

Do you approve then of the publication of a list of subjects like this?—I think it is useful, because out of it one may be able to pick one or two things.

Would it give you an idea that these researches are being undertaken by certain colleges and that it would be unwise for you to take them up?—Would it give me that idea?—No. I know the colleges. An Indian capitalist wished to have some work done connected with the manufacture of artificial perfumes, and for that reason he wanted til oil purified. Til, when scented, is used very largely as hair oil, but if til oil can be used for the enfleurage process of extracting perfumes from flowers that would save an enormous amount of time and an enormous amount of labour. At present the method by which perfumes are collected is to put til seeds in layers and put flowers on the top, and then put another layer of til seeds, then flower again and so on, and this is kept for a fortnight. Afterwards the flowers are removed and some fresh flowers are put on the seeds and this is repeated for six or seven weeks. But if we can purify the oil from a slightly disagreeable smell and use the ordinary enfleurage process, this could be carried out in three days and on the spot instead of sending the seeds round to the districts where the flowers are. That is the sort of thing my student is now trying to work on, and if he got a result in eighteen months I should think he had done very well. A list of this kind is enough to occupy 100 chemists for years.

Do you think that it will be possible, as it has been suggested, with this list before you, that we shall have enough in the way of chemical problems in India of industrial value to occupy the whole of a department of chemists? Do you think it would be wise to organise a large department of chemistry for the whole of India and settle afterwards the way in which the Local Governments get their share of chemists, and the way in which the colleges should co-operate?—I think that would be infinitely preferable to dotting here and there small technical institutions with one or two chemists.

Don't you think that that overlapping would be prevented more efficiently by an organised department?—Quite so.

When there is a difference of opinion, if the results here disagree with the results obtained in Bangalore, there is at present in India no authority to bring you together?—That is quite true.

I have a case now of two departments in India in correspondence with me. I have to pick up the essential points. Each department convinces me entirely that it is right. That is because I am not an expert in that particular line of work. If we had a department in India governed by distinguished chemists, it would be able to bring these two together and settle the differences on the spot?—Yes.

For that reason you say you would like these departments to be imperial in character?—Yes. That is one reason, and for another reason one large institute is much more efficient than several small ones.

It does not matter so much if you have an institute or department, if the branches in Bangalore, Cawnpore, Pusa or anywhere else are all correlated by one system?—I do not think I would go so far as that. I do not think that having four or five institutes correlated by one head is as efficient as having all the men working together in one institute.

Take the case of chemistry. You have mineral chemistry, organic chemistry, physical chemistry, agricultural chemistry and so forth. Would it not be better to have agricultural chemistry at Pusa, organic chemistry, say at Bangalore, and mineral chemistry somewhere else?—I do not feel convinced. For instance, agricultural chemistry rather stands by itself. Often the work done by the agricultural chemist is work which may as well be done in any other institute. And very often an organic chemist wants the help of a man who may be a physical chemist. If he has not one on the spot he has to worry over a problem which may be elementary and may be solved with the help of the physical chemist in a very short time.

As regards the question of library, it would not be necessary to duplicate reference libraries?—No.

Supposing a department of that kind were formed by the Government and chemists were lent to the Local Governments either for the control of field experiments or for some temporary investigation, can you give any idea as to the number of chemists that you think that we may gather together in one imperial department?—It is rather a difficult question to answer.

I found in my tour through India a large number of chemists who are isolated from one another, each undertaking research independently. Their pay ranges from Rs. 500 to Rs. 1,000 without any prospect of getting beyond that and no prospect of any increase in position. They have no common journal for the publication of their results. Do you think we get the best of our chemists in India?—They are working in as bad conditions as can possibly be.

You know roughly how many problems are now crying in India for solution, not in pure science, but in the application of chemistry to industrial problems. Do you think that we should be extravagant if we asked the Government of India to furnish 100 chemists?—I should have said 100 chemists myself.

And would you place under the chief chemist to the Government of India different sub-divisions according to the kind of chemistry, organic chemistry as one subject, mineral and metallurgical chemistry as another subject, agricultural chemistry as another subject and so forth?—An organisation of that nature, yes.

Mr. A. Chatterton.—Some mention is made in your written evidence here that problems have been sent to the chemical laboratories in the colleges in the United Provinces for solution. Have you any students who are doing post-graduate work?—I never have more than one at a time who has taken his M. Sc. and is doing research work for the D. Sc. Frequently I have got none at all. But I have just persuaded the Local Government to modify the scholarship rules which were not satisfactory and I think we shall now attract more students who have taken the M. Sc., and who will be ready to come and do a couple of years research work before they go out to their profession, which is almost invariably teaching.

Would you advise students of that class to take up research work in the Indian Institute of Science at Bangalore?—I have had students go down to Bangalore and come back again. If there were a really adequate technological institute, I should certainly advise them to go to that, unless they wish to take up research work in pure science. But as I have stated in my written evidence, I think it is a waste of time to do research into pure science in this country except for its educational value.

In the training of students elementary research is part of their ordinary work?—Of a really elementary nature.

And you would continue in your own laboratories research in pure science on a more advanced scale?—Yes. I would specially do so if a student stated that he was studying chiefly to be a professor or teacher in an institution.

Have you any large amount of time to spare for research work outside your normal duties as professor of chemistry?—I am now the Principal of the College, and I have very little. Under war conditions our chemical staff is short-handed. The staff consists of two professors recruited from Europe belonging to the Indian Educational Service and

three Indian professors and two demonstrators. Normally, in ordinary times the professors of chemistry would be able to spare a good deal of time for research work.

You say it is desirable to carry on research work in India for certain reasons and you are in favour of a Central Technological Institute for all India. For the same reasons that you have advocated research work in India, is it not desirable that the research work should, to a large extent, be done locally? Should each province have its own centre of research rather than that the whole should be assembled in one place in India?—I think not. I think that I should prefer to see all the people working in the central institute. I think that you avoid the possibility of duplication. The President says that it may be done through a central head of the department. There is no doubt that if you have two or three chemists working in one laboratory, even though they do not work at the same problem, they would help one another apart from the stimulus of intercourse.

You said that to a large extent many of the chemical problems which should be dealt with should come from the manufacturers?—Yes.

The manufacturers would be better in touch with the local institutions?—I think that it is a matter of organisation. If the department is organised so that the manufacturer gets into touch with the head of the department, I think that difficulty would be overcome.

Four or five chemists would work better than one man?—You compare two institutions one with a staff of a hundred chemists and the other consisting of five institutes each containing twenty chemists. Do you not think that an institution with from five to ten expert chemists is a fairly complete unit?—No. I think there should be five to ten men working on organic chemistry, let us say, ten men on geological chemistry, ten on mineral chemistry.

Where are ten men working in the world on geological chemistry in one place?—I do not know enough about geological chemistry to tell you.

Or inorganic chemistry outside Germany?—In London. In many of the firms in America you find far more.

You think that at the present time there is no necessity to have a separate institution in the north of India, but that you might concentrate the whole thing at Bangalore and develop that?—I do not say that. I am very doubtful as to that. Bangalore is not central and it is not a government institution to begin with. It is rather difficult to see how it could be absorbed by Government. What I do say is that I should be in favour of a large *central* institute, but that I would sooner see Bangalore developed than see a large number of small institutes spring up.

Dr. E. Hopkinson.—You state in your written evidence that too much must not be expected from teaching institutions. You mean too much research work?—Yes, for the reason that the time of the staff is limited and the staff itself is so very limited in extent.

Don't you think that the students of Allahabad University, for example, ought to be quite free to pursue what line of research they like and what they feel they are specially fitted for? If you have a professor who is distinguished in some particular line would you not leave him quite free to pursue that line?—Yes. I would not have him hampered by the Board of Scientific Advice.

You would not restrict the activity of any professor of any university if he has a natural bent in any particular direction?—I quite agree with your suggestion.

Professors would naturally take into account more particularly the educational uses of any line of research?—Yes.

I should like particularly to ask you this point. In many of the provincial or younger universities in England, the professors are always ready to undertake in their laboratories, I won't say research work for local industries, but testing work or something between testing work and research work. Do you consider that that should be a regular practice here in the Indian Universities?—I do not think I have considered it very carefully. Personally I have been for years the bacteriologist to the Municipal Board at Allahabad, which practically means that some of the work is done by one of my assistant professors. I think it has been of good educational value in the laboratory. Then again, at Lucknow, the professor of chemistry in the College there is a food analyst. I think it is a good thing to have work of that kind done.

Take bacteriology. You say that the opportunity of solving local problems has bee valuable from a teaching point of view?—Yes.

Is it not also valuable to a professor, because it widens his outlook?—Yes, it is also economical.

So you would stimulate the activities of the universities in this direction?—I am afraid they have been limited. I am quite in favour of such action. It really comes to practically allowing a professor some amount of private work. Whether he gets fees or not is immaterial, but he should be encouraged to bring his college life into touch with the local needs of the people.

It may be private practice, or it may be done with the consent or approval of the Principal or the governing body?—That is what I mean.

As you raise the point I should like to ask you definitely if you think that it is desirable that such work should be paid for independently, and whether the professor should receive fees for extra work of that kind?—I certainly think so. If we do not charge a fee we should be inundated with work. Whether I get the fee or my professor gets it is immaterial. If we get the fee we have to pay it into the treasury unless we get special sanction to retain it.

In the next paragraph do you intend to draw a distinction between technological and research work?—I do not mean different things. I meant the same thing by technological and research institution.

Sir D. J. Tata.—You speak of a central institute as against a department. Do you not think that the large distances we have to cover in India—the geographical difficulties—are against a central institute? Consequently, if there was a central department and the work of all technological institutes in the various provinces was correlated that might be an advantage?—Bangalore is not very central. But I think it may be possible to choose a place more central. Personally I feel very, very strongly that it is essential to get all your work as far as possible in one place.

There may be problems which may absolutely belong to a particular province or district, and to take the materials on which to carry on research all the way to this distant place may be a little difficult and awkward. And so if there were small institutions for special research in special districts and all their work was correlated under a department, would that not be an advantage? You may be investigating a problem, for instance, on something which grew in Bihar, and if you have a research institute there and the research is completed what would happen there? After all, one does not expect these problems to come up continuously. One hopes to attain a solution of a majority of them.

You think that this sort of work can be done by deputation? The central institute can send out a sort of deputation to the spot?—Yes.

You think there is a great advantage in having a scientific atmosphere created so that everybody who is working in the field of research could be constantly in touch with men who are doing similar work in other departments?—I think there is no doubt about that. That would be one great help.

You mention a figure of 100 chemists as being at least necessary for starting a central institute. That will cost a very large sum of money. You said that a very generous scale should be adopted. Where is this money to come from?—An American scientist in recently discussing the development of industrial research in England estimated that to maintain a sufficiently large laboratory it would cost three million pounds a year and that this would only represent one-third per cent. of the manufacturers' profits. Of course, these figures are not applicable to India, but I think that the money for the research institute would be available. Supposing that you had 100 chemists and paid Rs. 1,000 each it only comes to Rs. 1,00,000 a month. There are a great many men in England and in this country who are quite capable of taking subordinate positions in research. I would not say that we want 100 chemists all of the highest grade.

I fully admit that the advantage to industries would be very great, that the money spent on this sort of research would be paid twenty fold, but do you admit that the public is educated enough to pay for this in the first instance in the hope of getting this money back?—Is it not the function of this Commission to educate the public.

Do you not think that till the public is educated it is the Government that should provide these funds? Or is such an institute to be supported by the industries themselves?—I am afraid that if Government does not provide the money no one else will. In the first place it will have to be maintained by the Government.

You are doing some work in your laboratories here. Cannot your laboratory be a sort of feeder institute to the central institute, to which it can give its problems for solution?—I am just in such a position that I am not able to refer to the central institute. I should only be too glad if the central institute would refer simple things to me for my students. I have been in the country for a long time now, but my knowledge of what is needed by the commercial world is still almost nothing, because Allahabad

is an academic centre and we do not come in contact with the people engaged in commerce.

You think that the object can be gained by the central institute referring problems to the local institutes. Should there not be some scattered feeder institutions, as it were, that would take up certain problems which could be referred to them as well? Would you not be content with a central imperial institute that is doing scientific work, and would you not like to have smaller scientific institutes scattered broadcast all over the country for teaching and at the same time carrying on a little research?—If you mean by teaching, technical schools, it seems to me that this is quite another matter on which I am afraid I cannot give an opinion. I know nothing about it But for the purpose of research I should say no. Keep as far as you can to one central institute. That is my opinion.

I am thinking of the quetsion of training up young men in this country to devote themselves to scientific research. How could that object be attained?—I think the way in which that can be done is by giving them as thorough a scientific education as possible in our colleges and then sending them to the central institute.

This institute should be a teaching institution?—Every research institute is what is needed in research to begin with is not men trained in special methods but men who have had a good general scientific education.

The way in which you would put the research institute in touch with the industrial and commercial centres is by an advisory board on which industrial men should have some part?—That was what I suggested originally, but I would accept the President's suggestion.

In answer to the question in what way the Advisory Council for Research in the United Kingdom can give assistance to Indian industries, you suggest that "the best way would be to keep some office in India informed about laboratories in England and that it would be useful for a worker in a technical laboratory to know what was being done at the time in similar English laboratories to avoid possible duplication of work, etc." Could not the same result be achieved by consulting the technical journals in which the details of such work are published from time to time?—They publish results, but they often do not get the results till three or four years after the work is begun and one does not know what is being done in the meantime.

Should this office be constantly enquiring in what ways the various people are working?—Yes, by having returns prepared and sent out here.

Hon'ble Sir Fazulbhoy Currimbhoy.—In your written statement you said that you did not think that it would be feasible to carry on research in England?—I should stick to what I had said as a general statement. There might possibly be hard cases which might be referred to a very celebrated man at home who would not come and could not come and work in this country. But if it means the organisation and maintenance of a special institute for carrying on research in England, I think that the money would be better spent if it is spent in this country for carrying on research.

Are you not of opinion that there may be a central institute in this country with separate institutions for the different provinces?—I am of opinion that there should be a central institute and not a number of small institutes in the provinces.

This big institution, if it is going to be established, will take a long time, and a lot of money would have to be spent. Don't you think that in the meantime some of the colleges should be equipped in which students would be given scholarships or prizes to begin with?—I think it is better to spend the money on the central institute direct.

What is your opinion about the material?—Do you think that the people are intelligent and capable of doing research work?—Some of our best men are very well capable of doing research work under supervision. I do not think they have sufficient imagination to inaugurate research work, but they are very good, skilled manipulators,—many of them.

Don't you think that after some years they can come to the top?—I don't think I am prepared to answer that question at all.

You refer to the difficulties of the colleges in finding out what kind of research they ought to take up. Can this not be obviated?—I think that Mr. Silver, the Director of Industries, has done his best to obviate it. He has given us enough to go on for ten to twenty years.

WITNESS No. 10.

THE HON'BLE MR. L. P. WATSON, *Messrs. Cooper, Allen & Co., Cawnpore.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

Capital.

Q. 1.—I have from time to time been associated with schemes for raising capital for industrial enterprises, and there has never, in my experience, been any difficulty in getting the capital required.

Q. 2.—Sound business propositions have drawn the capital required mainly from business-men.

Q. 3.—I believe that ginning factories suffer most in this respect, and in a less degree tanneries and leather factories generally. The capacity of output of the tanneries in the Bombay and Madras Presidencies in particular is far greater than the off-take is ever likely to be under existing fiscal conditions. I am, of course, referring to the state of affairs in normal times.

Government assistance.

Q. 5.—I am not specially attracted by any of the methods enumerated except perhaps no. 7. At the same time, I can readily imagine that, under certain conditions, it might be found desirable, or even necessary, for Government to afford financial aid to a particular industry, but the form in which this aid should be given would have to be determined by the special circumstances of the case, and no hard-and-fast rules need be laid down.

Q. 6.—Where financial aid has been rendered to an industry, I consider that Government should, so long as the industry remains indebted to Government, exercise some control over its operations. I cannot think, however, that it would be either in the best interests of Government or the industry to appoint Government directors. Government control should, in my opinion, be confined to a general audit of accounts, particular attention being given to (1) the checking of raw material prices; (2) the fair distribution of charges such as salaries, wages, steam power, etc.; (3) the total cost of production; (4) the selling price of the finished article. The Government auditor would be able to decide whether the industry was being run on economical and ascertained lines, without interfering with the actual management of the industry.

Pioneer factories.

Q. 8.—I would suggest that factories pioneered by Government should be handed over to private capitalists or companies as soon as there is reason to believe that they have reached a profit-earning stage. There are certain factories such as those employed in the manufacture of munitions, etc., which might, with advantage to the State, continue to remain entirely under direct Government control and management, but I would strongly urge that, where political reasons do not enter into their calculations, Government should not, under any circumstances, convert industrial undertakings into permanent Government institutions. The management of a Government factory is, generally speaking, composed of units working under conditions which put a distinct barrier in the way of industrial development. Inspectors-General, superintendents, and overseers are all pensionable employés of Government, and although I do not, for a moment, wish it to be inferred that I regard this as likely to kill initiative, I do maintain that it fails to produce that desire for betterment which actuates the average business-man and which is the fundamental principle governing all industrial development. The history of India's industries and those of Cawnpore in particular provides ample and conclusive evidence of this.

Limits of Government assistance.

Q. 14.—There should not, in my opinion, be any limitations imposed on Government aid to a new enterprise if it competes with an established external trade, provided there is a reasonable prospect of its ultimately becoming self-supporting, or if the trade, with which it is competing is being bolstered up by bounties or subsidies or protected by tariffs. The effect which the relinquishment of an enterprise might have on kindred industries, or the hardships it might entail on labour and so on, would necessarily have to be taken into account.

II.—Technical aid to industries.

Research abroad.

Q. 21.—I have had no experience whatever of the aid afforded by the Scientific and Technical department of the Imperial Institute to Indian industries, but it seems to me conceivable that an institute of the kind in England conducted by an efficient staff composed of experts, with some personal knowledge and experience of India, might serve a very useful purpose.

III.—Assistance in marketing products.

Exhibitions

Q. 31 and 32.—My experience of industrial exhibitions in India is that they afford peculiar facilities for social intercourse, but they fail to accomplish to any appreciable

extent what should be their prime object, *viz.*, the bringing together of buyers and sellers and I am of opinion that, at the present time, at all events, Government would hardly be justified in encouraging them.

Government patronage.

Q. 37.—Lists of the articles imported by Government should be published and samples made readily available at such centres as may be considered most convenient for the inspection of likely manufacturers.

Q. 38.—I have no criticism to offer on the rules regulating the purchase of stores by Government departments. Rules are no doubt necessary and I am sure that those in existence are strictly adhered to, but we want something more than mere automatic formula to encourage and develop India's industries. There is a feeling in the minds of a good many manufacturers in India that Government, notwithstanding the rules laid down, are still purchasing from outside markets large quantities of stores which could be obtained in the country. If this is the case, I believe it to be attributable to two main causes; (1) a want of knowledge on the part of Government buying departments as to what India can produce, and (2) ignorance on the part of the manufacturer as to what Government actually requires. If these two disabilities were removed we should hear less in time of Government's iniquities in passing the local manufacturer over. What I would suggest as a preliminary step is that the superintendents and assistants of all Government buying departments should visit periodically all factories producing goods of the nature of those now purchased from abroad, and learn something, not only of the goods that are actually being manufactured, but of the possibilities of the industries visited. With the knowledge which they would in time acquire, and which I would respectfully state they do not at present possess, Government's buyers would be able to very materially reduce their home indents and by doing so encourage and develop local industries to a very marked extent and within a very short period. It would, on the other hand, be the duty of the manufacturer to study Government's requirements more carefully than he has done in the past, and this, it may be taken for granted, he would do, if the bare possibility of Government patronage was assured to him. What the manufacturer wants also is a fair comparison of the prices of the articles he produces with those imported by Government, and it is incumbent on Government when making comparisons to see that they are allocating a fair proportion of all charges, packing, rail, and sea freight, import duty, etc., over their home purchase.

V.—Training of labour and supervision.

General.

Q. 44.—The average Indian workman has the knack of acquiring with remarkable rapidity a certain dexterity in the handling and use of tools, but he seldom attains to the stage in which he might justifiably be termed a skilled workman. This, to my mind, is due to various causes—a lack of real interest in his work, and the want of individual taste, etc. He generally fails, however expert he may be otherwise, to observe the importance of giving his attention to details. The want of finish in Indian-made articles is proverbial, and in the trade in which I am employed, that of the manufacture of leather articles, this is the most glaring defect. Personally, I do not look, for at least some time to come, for any very marked improvement in this respect. I have noted, however, with feelings of extreme satisfaction, and it has been noted by other employers of labour, that the comparative cleanliness and orderliness in their home lives which has been secured to a percentage of the workmen by the erection of model villages has been reflected in their work, and I am very sure that the skill and efficiency of the labourer is to a very great extent dependent upon healthy, cleanly and, orderly home surroundings, whatever his caste or creed may be. In our factory the steps adopted to improve the labourers' efficiency and skill are those usually obtaining in most factories, viz., good pay for good work, and a system of bonuses for exceptionally good work, and so on.

Q. 50.—Industrial schools should, in my opinion, be under the control of the department of Industries.

VI.—General official administration and organisation.

Q. 56, 61, and 62.—These questions have been replied to by the Secretary, Upper India Chamber of Commerce, and I agree with the views he has expressed, and I would only add that I am strongly of opinion that the Board of Industries should be composed mainly of business-men, and not largely of educationists, journalists, and barristers, as it is at present.

X.—General.

Q. 111.—Yes.

Q. 113. Yes, but my investigations are not yet sufficiently completed to warrant me in referring to them.

ORAL EVIDENCE, 6TH NOVEMBER, 1916.

President—I understand that you are the President of the Upper India Chamber of Commerce?—Yes.

And as such you are a member of the United Provinces Legislative Council?—Yes.

I understand that the opinions given in your written evidence are your personal opinions; they do not represent the Chamber of Commerce?—No.

In your preliminary notes you state that you have had no experience whatever of the aid afforded by the Scientific and Technical department of the Imperial Institute to Indian industries, but it seems to you conceivable that an institute of the kind in England conducted by an efficient staff composed of experts, with some personal knowledge and experience of India, might serve a very useful purpose.—Yes.

Can you suggest any way in which the present staff of the Institute could be supplemented by experts with Indian experience?—I thought perhaps there might be an interchange with officials in the Indian service.

A scheme of the following kind has been suggested to us, namely, that the Indian Government should send home one mineral expert, one vegetable expert, and possibly one forest expert. These officers should remain on duty at home for say, two or three years, and as the two or three years expire they would be replaced and would return to the Indian service, the idea being that they would carry on enquiries at home on behalf of Government and on behalf of the firms in India either acting in conjunction with the Imperial Institute or with the Board of Trade or with both. They will also pick up information in England for transmission to the departments in India, thereby helping them in investigations and research. Do you approve of this system?—I think it is a very excellent idea: I had in my mind some such scheme when I made my short note. I should prefer the younger men, as retired officers would, I fear, lose touch with India.

Would you prefer the younger officer to be associated with the Board of Trade acting in conjunction with the Imperial Institute?—With both.

You say that the lists of articles imported by Government should be published and samples made readily available at such centres as may be considered most convenient for the inspection of likely manufacturers, and you develop that idea by stating in your note "What I would suggest as a preliminary step is that the superintendents and assistants of all Government buying departments should visit periodically all factories producing goods of the nature of those now purchased from abroad, and learn something, not only of the goods that are actually being manufactured, but of the possibilities of the industries visited". I suppose you mean most of the Government officers in India who are purchasing officers?—I refer to the absolute heads of Government buying departments.

Do you think that we should have in India a stores purchasing department similar to that of the India Office and that the stores department should contain enough of variety in the way of technical experts to judge the quality of the materials to be purchased and to know the firms that are producing the articles of the quality Government requires. Do you think that a scheme of that kind could be worked out?—It seems to me feasible. I am averse, however, to the multiplication of Government departments and would make the best use of the existing ones: My idea was that the officers responsible for the purchase of Government stores should visit the factories to enable them to come in contact with the suppliers and to understand what they are capable of producing.

But that would be done by the stores department?—Yes, that would be so.

There will be a large number of articles required that could not be manufactured in India, and would not be manufactured for many years to come, and these indents will be passed on to the India Office by the stores department?—Yes.

In answer to question no. 111, can you mention any industries for which India seems peculiarly suited on account of its resources in raw materials, labour, and market?—I have in my mind one or two industries such as the extracting of tanning material and paper pulp. But I should like to carry my investigations a little further before mentioning them.

Mr. A. Chatterton.—In answer to question no. 6, you state that Government control should be confined to a general audit of accounts, particular attention being given to the checking of raw material, prices, fair distribution of charges, total cost of production and the selling price of the finished article. I have had some experience of this, and what struck me as an even more important item is the stock-checking?—Yes. I regard that as a very important point.

The auditors generally do not check the stock?—They are expected to check the stock.

The point is this. There may be a large amount of stock which may have deteriorated considerably in value, but which is entered in the books at its original value. Have you any practical suggestions as to how the real value of the stock may be arrived at for purposes

of audit?—I think the inclination would be, so long as Government assistance is being given for the manufactures to undervalue the stock rather than to overvalue it. Government could always insist on an expert examination of the stock and could see that it was correctly valued.

In answer to questions 31, 32, and 33, you give your opinion about industrial exhibitions. Has it any particular reference to the big industrial exhibition held at Allahabad some years ago?—I do not think it accomplished very much in bringing buyers and sellers together. It afforded facilities for meeting friends. I consider it was a good *tamasha*.

Could you tell us here that it was a failure from a business point of view?—I regard it as such. The industries exhibited derived very little benefit from it.

I understand that there was a proposal made at the Allahabad exhibition to hold another one either at Calcutta or Madras or some other centre and that the manufacturers and also their agents were strongly opposed to it?—Yes.

It rather puts them to heavy expense with very little return?—Yes.

Dr. E. Hopkinson.—In answer to question no. 1 do you refer to Indian capital?—I am referring to local Indian capital of these provinces.

You say that the capacity of output of the tanneries in Bombay and Madras is far greater than the demand in normal times under existing fiscal conditions. Do you mean that the trade is killed by foreign competition?—It is killed by foreign duties. England is practically the only buyer of Madras and Bombay tanned cow-hides for the simple reason that other countries have imposed such heavy import duties on these that an export trade is rendered impossible.

The home Indian market is a limited one and more than supplied?—Yes.

In regard to the appointment of Government officials as directors of industrial companies, can you give your reasons for objecting to the appointment?—There is always the risk that a Government official might only possess a superficial knowledge of the industry and might consequently be more of a hindrance than a help.

What is required of him is to see that the business is financially sound?—I provide for that by appointing an auditor instead.

Do you think that an auditor will serve the same purpose as a director?—I think so In this connection he would serve a better purpose.

Have you any objection to exhibitions for quite special objects, for instance, motor exhibitions as distinguished from general exhibitions?—I have no objection to them at all. But I do not see that they are likely to bring buyers and sellers together An exhibition of special objects in Calcutta, for instance, would not be likely to attract many people from other parts of India.

In answer to questions 44 and 45, you say that the average Indian has a natural dexterity in the handling and use of tools when young, but you suggest that this disappears after a time?—It does not disappear, but he does not improve greatly beyond a certain stage. The period when he begins to stagnate is after he consummates his marriage.

Does it come back later?—In some cases.

Do you think that given the dexterity which you remark upon that could be turned to better account by some system of manual training in the elementary schools?—Yes, I think certain advantages would be got in that direction. We introduced a system of manual training in our own factory. The skill and efficiency of the labourer is to a very large extent dependent upon healthy and cleanly surroundings and in keeping the good ones together as far as possible. There has been a marked change in their during the last 15 years.

I should like to ask whether the boys who come to your school are entire. illiterate?—Illiterate when they come. We only employ them for a few hours a day and keep them at school for the rest of the day. They are taught to read and write in the vernacular and we teach them something of our own particular industry, *viz.* what a hide is and the uses to which its different parts are put, etc. The manual work they do is in the factory and not in the school.

Are the teachers factory foremen?—The teachers are Government certificated teachers. There is no connection between the factory foremen and the teachers. That is probably a weak point which I think could be put right.

The boys who attend the school are confined to half-timers?—Yes. When we started the school we had some difficulty in getting the scholars to attend school. But we are

now getting scholars from outside. People are beginning to realise that it is an advantage to their boys to gain some elementary training.

You have made it compulsory in your factory?—We make it compulsory, because we do not allow them to run wild when they are not working in the factory.

Hon'ble Sir R. N. Mookerjee.—In answer to question no. 2, do you refer to Indian capital or European capital?—Mostly from European business-men. There are very few Indians.

The auditors are public auditors?—I mean Government auditors from the Accountant-General's department.

Sir D. J. Tata.—With regard to exhibitions, do you think your object would be gained if you had a sort of travelling exhibition?—I think the purpose would be served by the opening up of agencies in the different big towns for the exhibition and sale of particular articles.

With regard to what you said about the purchase of stores by Government departments in Europe, are you aware of any vested interests?—No, I am not.

With regard to your answer to question 38 you say—"What the manufacturer wants also is a fair comparison of the prices of the articles he produces with those imported by the Government, and it is incumbent on Government when making comparisons to see that they are allocating a fair proportion of all charges, packing, rail and sea freight, import duty, etc., over their home purchases." I do not quite follow?—Suppose the Government wished to bring out a particular article that is manufactured in this country and I, as a manufacturer, submitted my rate, say Rs. 20, I expect, when Government imports that article from home that it will add to the English price packing, sea freight, import duty and all other charges landed at Bombay or Calcutta before drawing a comparison of prices.

President.—Does it not follow naturally in this way that the Government will accept from you a price that will pay them?—I do not know what Government does. I have had cases where my price has been compared to the price of the London manufacturer without taking into consideration the charges I have referred to.

Sir D. J. Tata.—In answer to question 44 at the very end, you say you are sure that "[the skill and efficiency of the labourer is, to a very great extent, dependent upon healthy and cleanly and orderly home surroundings." Do you think that it might be an advantage in your factory to give yourselves good food to your operatives, say in the middle of the day?—We frequently give food to our workers when they do work at night but hitherto we have not given them food during the day.

Do you not think that if you gave them good food the second generation will probably be better and turn out better work?—It would be an advantage in some cases if we fed them and clothed them, but they would not accept these conditions. Much of the money earned is wasted on marriage ceremonies, etc.

Hon'ble Sir F. H. Stewart.—With reference to your answer to question No. 50, you put industrial schools under the control of the department of Industries. You eliminate the Director of Public Intruction altogether?—I do not see that he is wanted very much.

Would you form a separate department of Industries as an Imperial department?—Certainly.

Whom would you put at the top? Who will be the head man?—I should have a business-man. I should make his status equal to that of the head of the Commerce and Industry department. My idea would be to separate the two departments, a head for each.

Manual training takes place in your factory?—Yes.

An improvement might be made in that direction if Government were to start a general system of technical training?—Yes. The technical school in Lucknow has been doing some good work. There is no doubt in my mind that cleanliness and orderliness in their home lives produces good taste.

With reference to your answer to question No. 5, you are not attracted by any of the methods that have been suggested for financial aid to industries either on a large or small scale?—I would judge each case on its merits.

You do not approve of the appointment of Government directors? I am not referring to officials but to non-officials?—I have had no experience. I cannot help thinking that

the interference of a director of that kind would cause a manager or proprietor possibly to lose an interest in the industry.

You do not think it is a very practical suggestion?—No.

You think that the needs of the case might be met by the appointment of Government auditors? Do you think that Government auditors would supply that need?—I have had experience of Government auditors. Some of them are very competent men indeed, and quite able to deal with manufacturing accounts.

Would you leave them under the Accountant-General or put them under the department of Industries?—Under the department of Industries as the reports would have to go first to the Director of Industries.

Hon'ble Sir Fazulbhoy Currimbhoy.—Do you consider that trade, which is competing by being bolstered up by bounties or subsidies, should be counteracted by the starting of similar industries with Government aid? What particular trades bolstered up by bounties or subsidies or protected by tariffs, have you in mind which need counteraction?—I was not referring to any particular trade.

Referring to Government purchase of stores, you emphasize two difficulties. Do you think that they would be remedied by having a central commercial information bureau which could circulate information and samples?—No. I would rather favour a stores department as suggested by Sir Thomas Holland.

Do you seriously attribute the want of finish in Indian-made articles to the habits of life of the workmen?—I think that counts a great deal.

Is it not the climatic condition that contributes to this very largely?—I do not think so.

Are not your schools subsidised by the municipality?—No.

Is there any drink evil amongst your mill-hands?—Yes. Unfortunately we employ a large number of Chamars.

Does it largely contribute to the absentees on holidays?—Frequently. But I frequently find that the man who drinks is a very good workman.

On the day he gets his pay and drinks, does he appear for work on the next day?—We have to bring them in. We keep a close eye on them. We have that trouble particularly at the present time.

Have you noticed the tendency to start concerns without first making sure of the extent of raw material available, the vicinity of such material, and the suitability of such material?—It no doubt occurs.

Witness No. 11.

Mr. C. T. Allen, *Merchant, Cawnpore; representing the North India Matches, Ld., Bareilly; the Cawnpore Fibre Co., Ld., Cawnpore; the weekly newspaper "Commerce," Ld., Calcutta; fruit-growing in the United Provinces.*

Written Evidence.

I.—Financial aid to industrial enterprises.

Capital. *Q.* 1.—No difficulty in raising capital from British sources: complete failure in an attempt to raise capital from Indian sources (under the best auspices).

I suggest that the best ways of interesting Indian capital, would be *(a)* by printed propaganda and advertisement through unofficial media, which in turn would be recognised and assisted by Government and its officers? by the systematic introduction in any form of advertisement for subscription of capital, of the name of one or other of the *sound* banking institutions of this country.

Government assistance. *Q.* 4.—Extremely disappointing. The refusal by the Government of India of a request for a loan, during the War period, of two lakhs to help to maintain a pioneer industry. The loan had the backing of the Lieutenant-Governor of these Provinces and unquestionable security.

Q. 5.—(1) & (2) Only in special cases where considerable sums have been already expended by an individual or individuals in the genuine endeavour to promote a new industry.

(3) A desirable method, without subsequent refund.

(4) Only under very special circumstances.

(5) *Only* when Government may have on hand plant and machinery which has been used for trial or experimental purposes by them.

(6) Desirable under two conditions only:—when the industry in question is one which is vital *(a)* either to the Government, or *(b)* as a key industry, to this country's manufactures—it being understood that such support of that industry is required by those interested.

(7) On all occasions when *(a)* the manufacture is of suitable quality and price, (*b*) and particularly when an imported article competes, (*c*) when the industry which produces the article is new, and until it is firmly established.

Q. 6.—Under *any methods* where Government supply funds which are *not* repayable. The form of control should be power to scrutinize accounts if desired.

Pioneer factories. *Q.* 7.—I am not in favour of Government pioneer factories, but of factories for pioneering new industries which, run under private control, should be dry-nursed by Government in practical form.

Q. 8.—By paying the salary of practical experts, chosen and appointed with the approval of Government. By practical assistance in the erection of buildings and transport facilities (in such a case as that of the Kumaun fruit industry and also fibre-growing).

Limits of Government assistance. *Q.* 13.—The principle that an industry, once established and proved, no special aid should be given to promote similar industries in the same country.

Q. 14.—Yes, where and when it can be proved that indigenous enterprise cannot succeed and provided the imported article is not of such cost as to cripple an industry in which that article is a necessary component.

II.—Technical aid to industries.

Technical aid in general. *Q.* 15.—Some very useful information from the Director of Industries of this province: and frequent statistical data of timber and bark supplies by the Forest department. Also most useful and valuable technical aid from the Agricultural department in regard to the tube-well boring.

On the other hand, most unhappy experience in regard to the technical data put up in Government Blue Book form on the subject of wood suitable for match splints.

Q. 17.—That Government have the right to use the knowledge gained thereby.

Q. 18.—Restriction to an extent which would safeguard the interests of the pioneer, until he had gained such start as would enable him to benefit by the reward of his labours, the industry being a small one catering for a circumscribed market.

Research abroad. *Q.* 21.—Satisfactory, in the one or two instances where samples of fibre were submitted to them for valuation and comparative purposes. Its advantages are that it is very much in touch with the world's market.

Q. 22.—It is advantageous to have certain research work conducted in the United Kingdom (1) for climatic reasons, (2) for reasons given in answer to question No. 21.

Surveys for industrial purposes. *Q.* 25.—It is most desirable that a thorough, united, and complete survey be made of the best way in which to extract timber from the Himalayan forests.

Q. 27.—The results of an industrial survey should be made useful to industries through the medium of the newspapers, particularly those dealing with commercial and industrial matters, and through records available from provincial Directors of Industries.

III.—Assistance in marketing products.

Commercial museums. *Q.* 28.—The commercial museum temporarily instituted up-country resulted, in as far as the match factory at Bareilly was concerned, in numberless futile enquiries for agency rights.

Sales agencies. *Q.* 30.—Desirable, and the only way in which to bring these smaller industries before the general public; they should be developed on the lines of that which exists in Cawnpore.

Exhibitions. *Q.* 32.—Not until the country's manufactures have been more fully developed.

Trade representatives.

Q. 34.—The political department should be forced to assist the empire's trade in much the same way as America's representatives do.

Q. 36.—No.

Government patronage.

Q. 37.—Data should be available.

Q. 38.—The present ruling is a farce, since it is hardly observed in the letter, and never in the spirit in which it was framed. It should be penal for the indenting officer to Government to send indents home without first referring to the Director of Industries in each province.

IV.—Other forms of Government aid.

Supply of raw materials

Q. 40.—Government should, on the recommendation of the Director of Industries from any particular province, aid with supply of raw materials when conditions deserve such aid particularly if one of those conditions happens to be competition from an imported article which has had assistance in any form from its own Government.

Land policy.

Q. 41.—Municipal control of land, where the municipality is preponderatingly Indian and unfettered, is likely to hinder (and in the case of the Bareilly Match Factory actually has hindered) industrial development.

The remedy would be the grant of certain powers to the Collector or Commissioner, with recognized right of appeal to the Local Government.

In obviously deserving cases.

V.—Training of labour and supervision.

Q. 46.—Considerable experience in the leather industry.

Q. 49.—Day schools for short-time employees:—good on the whole.

Q. 50.—Unquestionably under the department of industries. Complete subordination of the department of education under the department of industries in such matters.

VI.—General official administration and organization.

Q. 56.—The Director of Industries, and an Industrial Board. Practically a clean sweep of the Board of Industries as at present constituted.

Q. 57.—A Director of Industries. Also a Board of Industries, with the Director of Industries as Chairman, the Board to be composed of two European and two Indian members of the province who are practically interested in industries, to be nominated by the Lieutenant-Governor; one each, official and responsible representatives of *Forests* and *Agriculture:* the Secretary to the Chamber of Commerce.

The Board should be advisory, without budgetted funds. But its recommendations should receive far more consideration by the Lieutenant-Governor and his financial advisers in the future than they have in the past.

Q. 60.—Yes. Where possible a business man.

Q. 61.—The Director of Industries should be the medium between the provincial Government and the Board of Industries.

Q. 62.—A single Chief Director of Industries, who would keep in close touch with the provincial Directors of Industry. But the Chief Director should not be considered either the *fons et origo* of industrial information, nor should his function be that of accumulating data. His principal duty should lie in representing questions, proffered by provincial Governments (at the instigation of provincial Directors or otherwise) to the Imperial Government: and in negotiating, where necessary, with heads of departments in the Imperial Government for concessions or facilities and improvements in such things as transport, irrigation, tariffs, etc.

Briefly the activities of the present department of Commerce and Industry should be decentralized and its status entirely altered.

VII.—Organization of technical and scientific departments of Government.

General.

Q. 63.—The forest research institute at Dehra Dun would benefit by being brought into closer touch with the Industries department and Board.

Provincial departments.

Q. 68.—Increase in the number of first class chemists and in chemical research would seem to be the desideratum: particularly in relation to the matter of indigenous dyes.

Q. 69.—Under provincial control, and in close touch with the department of Industries; the provincial departments to keep in close touch with each other over matters of experiment and special investigation.

Q. 70.—At Government expense.

Q. 80.—No.

College of Commerce.

Q. 81.—In no way.

VIII.—Government organization for the collection and distribution of commercial intelligence.

Q. 82.—Government statistics as at present collated are misleading, and are too approximate and general to be of any real value.

Q. 83.—The present system is not of appreciable value, and should be done away with. Commercial newspapers which are generally read, should be the media for distribution of *useful* data only: untrammelled by a wide collection of facts which may only be required by the very few.

Q. 84.—None.

Q. 85.—Government should assist and encourage those existing trade journals which are generally recognized and read.

IX.—Other forms of Government action and organisation.

Trade marks and trade names.

Q. 94.—The law relating to trade marks in this country is apparently ineffective, and out of date. Facilities should be given for proper registration of trade marks and rights.

Roads, railways and waterways.

Q. 97.—In regard to the fruit trade, which it is so necessary to this country to encourage, it is desirable that all railways should be forced to adopt the use of cold storage vans of a recognized and approved pattern.

Forest department.

Q. 105.—Until the enormous unused products of the forests in India have been fully opened up and placed at the disposal of the country, it should be made penal for that department, either Provincial or Imperial, to show a surplus in the annual budget. All returns should be sunk in the development of and opening up of forest resources in conjunction with private enterprise.

Q. 108.—I have found from experience that they hardly exist.

ORAL EVIDENCE, 6TH NOVEMBER, 1916.

Capital.

President.—With reference to your answer to question No. 1, will you give some details of your experience in raising capital for industrial concerns?—I have found no difficulty in raising capital from British sources, even in such risky ventures as the one or two I am interested in, matches, fibre growing, fruit and so on. But I may say that I failed completely in an attempt to raise capital from Indian sources. When this match factory was about to be started in Bareilly, the Lieutenant-Governor particularly wished me to give the Indians in Bareilly every chance to take up such capital as they could and I had no objection whatsoever. So I addressed the President of the Municipality, who was a leading man there, and some of his friends, and gave them data and every facility. But although they were told, and realised, that there was a strong backing to this venture, and although it was to be started actually in their own town and their own people would be employed, there was not a single offer of capital either small or large.

You propose printed propaganda and advertisement through unofficial media which in turn would be recognised and assisted by Government and its officers?—What I mean is this, that I think the hoarded wealth which is supposed to exist in India—certainly to a large extent with the zamindar classes who at present have very little to encourage them to take an interest in business—should be tapped by new methods. There is no one who really gets at these people who have their money lying useless. I also suggest "the systematic introduction in any form of advertisement for subscription of capital, of the name of one or other of the sound banking institutions of this country." Every Indian trusts in English banks, or at any rate in *sound* banking institutions. The actual name of "bank" goes far in the opinion of the Indians of this country.

Hon'ble Sir R. N. Mookerjee.—When you say that you could not get money did you issue a fully detailed prospectus of that match factory?—Yes.

Did that prospectus show, by calculations and figures, any profit to be gained?—No, because we were going largely on figures which had been put forward by, firstly,

people who were interested in selling match machinery, and secondly, on data which were given in certain Government Blue Books.

The public had no data before them in the prospectus to find whether that venture would be a profitable venture or not?—Only in general terms. No actual figures were given.

How will a bank help a company before it is formed?—What I mean is this, that the prospectus should prominently show the name of the bankers of the proposed company.

Generally, all prospectuses under the present Act must say which is the bank?—I think that is hardly brought out enough. The introduction of the bank's name should be a practical guarantee that the endeavour is a sound one.

The bank is only for depositing your money and disbursing your money?—Yes.

Apart from that, up till now the bank has not taken any responsibility for the concern?—No, and I do not think that it should take responsibility: beyond the fact that banks which are going to help the industries of this country, or whose names are going to be introduced as having Government's backing behind them, should be made to feel that they are responsible for only putting their names to what they believe to be sound ventures.

The banker is free to give his name to any venture he likes?—Yes. But if he is going to give his name to something which is absurd and risky, something that cannot possibly succeed and so on, he deserves to lose confidence and custom.

Suppose the name of the Bank of Bengal is put in the prospectus will that attract capital?—I think it should be an understood thing in the future that the venture that has this bank's name is not a bogus concern, etc.

To develop an industry or start a new company, I do not quite see how a bank can help you. What is your idea?—What I have at the back of my mind is that in the near future Government will encourage banks, by backing them, by lending them money cheaply and so on, and the banks will in their own turn help industries.

According to the Act which is now in vogue, the Indian Companies Act, no shares can be allotted, no company can be formed unless the full capital is subscribed. Suppose you want to raise a concern with a capital of eight lakhs. According to the present Act, unless you tell the Registrar that you have got the eight lakhs subscribed—it may not be fully paid, but promised by allotment—the company cannot be registered. Therefore, I do not see how the bank can help you. You must register the company and get your share capital subscribed. The bank can help you when you are in want of money for working the thing, or, after you form a company if you want any other assistance from the bank to help you?—You are dealing entirely with the question of rupees, annas and pies.

I am talking of a limited company—What I mean is that you are arguing on the matter of money.

I am also considering the very important question of managing agents.—Suppose a bank was satisfied that although the promoter could get money, and was able to raise capital, yet his management or the agents were not to the bank's liking, I consider that that bank should withdraw its name and patronage.

That is the second stage. The first stage is, if you want to form a company and you say, for instance, your capital is six lakhs, you must, by issuing a prospectus or by private efforts, first get the capital fully subscribed. Then the company will be registered and will be allowed to go to allotment. Unless you do that, the bank cannot give you any help?—Quite so. Do you think there would be any objection to bringing the bank's name into your prospectus, and saying these would be the bankers?—I do not think the bank should give its name unless the business is considered to be genuine.

President.—Do you agree with Sir R. N. Mookerjee's views?—I consider that the bank should be made more responsible in these coming days than it has been hitherto. Quite apart from the financial side, before any question of allotment takes place, it should be possible and should be desirable to introduce the bank's name, not as being responsible for, but as a guarantee that the proposed concern and the promoters were genuine.

Would you like to have the company law modified, because that could not be done under the present law?—Yes. I think the law ought to be changed. I do not propose that banks should lend money direct to all concerns. I say that they should work through a trust.

You would not lend money on plant and buildings to a concern from the fixed deposits of the bank?—I would prefer not to.

What you want is something in the form of an industrial bank, or some kind of trust that would take the place of, or act in conjunction with, the industrial bank?—Yes.

Can you draw up a workable scheme?—Yes.

Mr. A. Chatterton.—Do you mean that the Bank of Bengal and other banks should to a certain extent guarantee the *bona fides* of the company?—Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—If the people of Bareilly knew the persons engaged in a business, don't you think that, if there were good agents and directors, they would get as much money as they wanted for capital?—I don't think so from my knowledge of them. The monied class or the wealthy citizen, at any rate in Bareilly, has no intention of going in for investment. I think the city of Bareilly is peculiarly stubborn in that matter.

If people who have started other concerns in the country and have been successful start an industry in Bareilly, do you think that the money would not come in?—No. They are well enough off there without investing money in ventures of any kind.

You think that the bank's name ought to appear. May I know how banks can give their names showing that a company will work successfully?—It is up to a bank to make enquiries, and it can very soon get at the bottom of the proposed business by finding out who the promoters are, etc.

If the promoters have put enough capital into it, I suppose the banks themselves are bound to come out and help them?—It is not the case as a matter of fact. As an amateur director of a bank, I have just had to put my vote against financing five lakhs of rupees to assist certain people who are perfectly well off; but I do not think the venture is a sound one, because I happen to know all about it. The promoters were prepared to put up five lakhs provided they got five lakhs more from the bank, and I have voted against it. The money was wanted for trading. They wanted to buy raw material, and they were willing to give as security building and machinery, and even then the bank refused.

Don't you think that before inviting capital the public should be taken into their confidence by the promoters, and be told and shown the ground on which they expect to make profits and what the profits would be, so that they may decide whether to invest or not? It depends on the confidence they have in the promoters. Did you issue a prospectus of that nature?—I should make a difference and a distinction there. If I was starting a cotton mill where you are working on beaten tracks, and you know exactly what to expect and can calculate what your profits and losses will be, well and good. If you are starting a venture new to the country, with nothing to go upon, I would not, as a promoter, give any figures.

If you were starting an entirely new venture, don't you think it better to investigate very carefully the prospects of profits?—I should, in my own interest certainly, and as far as possible, but where it is new it would be difficult.

I think other ventures which were perfectly new were able to give figures and make an estimate of the profits which have been more or less correct. It may be a matter of time and trouble and proper investigation, but when the public know that a firm has made a proper investigation and are giving every thought, capital is not shy?—We ourselves made every possible enquiry, but we did not care to risk figures and statements of which we could not be absolutely certain.

Why should you expect the public to risk their money in a thing in which we are not prepared to risk figures?—I risked my money and so also did many of my friends.

Your friends and you knew, but how could the public know?—I went there with the best introduction from the Lieutenant-Governor, Commissioner, and Collector.

The public does not attach much weight to these officers where money investments are concerned. My point is this, that, if you issue a prospectus saying that you are going to run such and such a thing and that you are putting in your own money, and if you invite people to put in their money, then it would be a better way to give estimates of profits?—I gave every detail except figures.

Hon'ble Sir F. H. Stewart.—Are you going to impose responsibility on the Bank?—I should certainly think that if Government propose to assist industries by giving banking facilities or encouraging banking facilities they must assume some responsibility. I have been discussing matters as far as the Alliance Bank of Simla is concerned. I know that the United Provinces Government is anxious to enable those who are starting small or large industries to go to a bank and get money with less difficulty than they have hitherto experienced. If the Indian Government are going to give any sort of encourage-

ment, I should think that the Bank, on the other hand, should take a deeper interest than it has taken hitherto in the soundness or otherwise of a venture.

Would you approve of the introduction of an industrial corporation or something of that sort which would do that work? —Yes.

That should be a matter of private enterprise and not for the State? —Such a trust or corporation should have a good bank behind it and that bank should be one that Government recognises.

With reference to your effort to secure Indian capital for an enterprise in Bareilly, that was only a small industry? —The whole thing was a matter of 3½ lakhs.

Would you ascribe that failure to want of confidence because of the failure of other industrial enterprises which had been started? —I do not believe so, because there is no other industrial enterprise up there.

Similar enterprises had been started in the way of match factories in other parts of India and they have not been successful? —Yes.

Had that any effect? —Possibly. But I had hoped that there would have been some effect from the fact that we had British capital behind this one, and in the others there was none.

Sir D. J. Tata.—Am I to understand that your reply refers to Bareilly or to India in general? —I take Bareilly as an instance, because I happen to know all about it.

You are aware that on the Bombay side we can always raise plenty of capital for industrial undertakings? —I have no experience except as to what happens in the United Provinces. I know very little of Calcutta or Bombay. I am talking of the United Provinces only.

Government assistance.

President.—With reference to your answer to question No. 4, do you refer to the match manufacturing enterprise? —Yes.

Are you satisfied in your mind that match making is an appropriate industry to this province? —In comparison with other provinces, because it is nearer to the only supplies of really suitable wood.

From the point of view of splints it is a good province and Bareilly a good locality? —Yes.

You have to import all the chemicals? —Yes.

Can you give us in rough figures the relative cost of chemicals, paper, and wood for the splints? —Owing to the war, chemicals and paper have gone up so much in price that I should say the cost of chemicals and paper amounts to seven-eighths and wood one-eighth. In pre-war times it was wood one-third and other materials two-thirds.

Even in pre-war conditions the expensive part of your match was imported? —Yes.

Would you therefore think it feasible to undertake match manufacture in this country when most of your material has to be imported? —Yes.

What are the balancing advantages of doing so in this country instead of buying matches from abroad? —I consider that every country should be made self-supporting in its necessaries, secondly, one hopes that chemicals and paper will be available in this country at no distant date.

The first is a political reason? —Yes.

Which you could hardly expect to influence the investor? —Any necessaries for the country of this kind should be backed by the Government and that would influence the shareholder.

Do you consider the second reason as economically sound, that you should start the manufacture of an article because you hope that in the future paper and chemicals would be made here? Would it not be better to wait till those things are being made before you attempt to start an industry depending on them? —Not if you have learnt from a heavy Blue Book put up by a Government official that this industry could be successfully conducted in this country, suitable timber from Government forests, etc, being available.

You say that you were misled by the memoir on match manufacture published by the Forest department? —Yes.

Did you make any independent inquiries as to the statements made in that book? —Yes.

Can you quote them? —I could get no practical information.

A good many you could not verify and check without a great waste of time? —Yes, and it was very much a matter of time.

Dr. E. Hopkinson.—It was on the strength of the reports that you started the factory? —Yes.

When you subsequently found that the memoir was not correct, did you refer to the Forest department again? —Yes. I kept in constant touch with them and they sent us different woods to test and try at different times. In this case the match factory having been started, we were able to find that spruce wood in India which is analogous to the spruce of Norway and Sweden, was quite satisfactory for our purpose and would make excellent matches. Can you obtain it? —Yes. I can obtain it when the Forest department have developed the science of extracting this timber at reasonable cost from their forests. At present they are entirely unable to do this.

That is a point for the Forest department? —Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Do you think that the match industry can withstand foreign competition without Government aid or help? —The question you put is rather a broad one. I do not think myself that, until Government, particularly in the Forest department, shows how timber can be extracted at a small cost or a comparatively small cost from their forests, it would be worth one's while to endeavour to make matches in this country, because they could not possibly succeed.

You want preference? —Only in order to get the industry on its legs. After that we can sell tons at fair market rates.

If you get timber can you stand foreign competition without any other financial aid from the Government? —Without a protective tariff?

No, I mean without Government subsidies or bounties will you be able to stand? —Yes.

Mr. A. Chatterton.—With reference to your answer to question no. 5, are machinery and plant supplied on hire-purchase system in the United Provinces? —I am not quite sure whether it was on the hire-purchase system, but I do happen to know of an instance where plant was taken over from Government and I think it was paid for gradually, in order that the industry in question might be carried on by private enterprise.

In southern India we supply machinery and plant to small concerns on the hire-purchase system. We also supply money to ryots or small manufacturers or would-be manufacturers by loans which are granted on the security of landed property, what are called takavi loans. Do you favour either of those systems of giving assistance to private enterprise? —Only in the case of very small industries, that is, of cottage industries.

What monetary limit would you put? —I would not have suggested, for instance, that Government should buy a match plant for me, but in the case of hand weaving and so on, or even in the case of silk production, the cottage industry should be encouraged as you suggest.

Would you extend it to irrigation plant in the case of a small man who could not afford it? Would you extend it in the case of a man who wanted to put up a sugarcane machine plant for the development of his own property? —I think in those cases the Government should be entirely guided by the status of the man, whether he is sufficiently wealthy to buy for himself, or he is so poor that assistance is warranted.

In some cases a man is sufficiently wealthy but has not ready command of capital, and in some cases it is desirable to lend him money or to give him plant on the hire-purchase system, more as examples for his neighbours, who are less well off to follow in the same direction? —I entirely sympathise with that.

President.—If Government are to give loans or to supply machinery and plant on the hire-purchase system, Government should be provided with technical advisers before they give machinery and plant? —It would be up to the provincial Director of Industries to ascertain, with the assistance of experts in the Agricultural department, (for instance, in the case of irrigation and pumps), what practical help should be extended, and how, in any particular case.

With reference to question no. 6 regarding the form of Government control in cases when Government give financial aid, you think from your own experience that a Government auditor would be quite sufficient? —Yes.

Hon'ble Sir R. N. Mookerjee.—After the mischief is done, the auditor comes in? —I would have a six-monthly audit.

You might have purchased machinery which might not be good, and the auditor would come in only afterwards. Don't you think that a director who would control the work and would not allow such things would be better?—I don't think it would be feasible, because I think that if you did you would either require to have numerous Government directors, or else one man who would have to be so expert in so many businesses as to be able to guide everybody.

But every nominated director need not be an official? The nominee of Government to be a private individual?—I cannot imagine the position.

Mr. A. Chatterton.—Will it be practicable to have a non-official director?—I do not think you will find many who will have the time.

Hon'ble Sir F. H. Stewart.—For the system of scrutinising accounts you would not recommend the present Government audit by the Accountant-General? You want an entirely new class of man?—Yes.

He will have a good deal of executive power?—I think his duty would be to do his audit and make his report to the Director of Industries, who in turn would be responsible for advising the Government.

I understand that you are quite opposed to appointing Government officials as directors, but would you also be opposed to appointing non-officials who may be encouraged to take interest in any particular industry?—It would be an excellent thing if you could get them. I think it will be impracticable.

Pioneer factories.

Hon'ble Sir R. N. Mookerjee.—What do you mean by 'dry-nursing' in your reply to question no. 7?—That the pioneer should be given every chance of getting the reward of his labours.

You want some help or some sort of assistance?—Yes.

What sort of help would you want in this particular match industry?—What I ask is the simplification of wood supply.

President.—As regards your reply to question no. 8 dealing with pioneer factories, what practical assistance can be given in the erection of buildings and transport facilities?—May I give you an instance? There is a fruit industry in which I am interested in the hills. It is not possible for the fruit growers, who are experts as far as fruit producing is concerned, to sit down and do all the grading, picking, marketing and despatching of all their fruits. The thing they want is a central dépôt to which all fruits would go as in California, and British Columbia, this would be in charge of an expert who would do all this grading, marketing, etc. Fruit growers are not in a position to start a central dépôt or employ an expert. They want this sort of building, including store rooms and so on, to be erected by Government. The cost would be paid by the fruit growers out of their profits in course of time.

Sir D. J. Tata.—You talk of transport facilities. Do you think there is any room for Government helping in the matter of transport facilities?—I do. It is very desirable indeed, primarily over rail. The present wagon in which one sends and receives fruit is simply disgraceful in view of the progressive state of the country.

Having special wagons for carrying fruit over distances, only refers to fruit. Do you think the same in the case of any other industry?—I think that several industries are hampered by want of transport facilities in this country.

You do not mean freights in this connection?—No. And I mean road transport as well. For instance, if you take any station in the hills, take the particular one that I know—from Kathgodam up to Ranikhet, the transport facilities are simply disgraceful.

What is this particular place dealing in?—Potatoes, fruit, tea and large quantities of provisions for troops, in the hot weather.

Limits of Government assistance.

President.—With referenee to your reply to question no. 14, do you think that Government will be justified in backing local manufactures in matches? That I had to a certain extent in mind: but I think my reply answers the question generally.

There is the difficulty of chemicals in this country, for instance?—A very real difficulty, as I have found to my cost.

Technical aid.

Dr. E. Hopkinson.—With reference to your answer to question no. 15, did the Agricultural department tell you how to bore the well?—Well-boring has been developed largely in Australia with great success, and the Indian Government got over to this country an expert in laying down these particular wells. The man first visited this country.

He later came across with his complete plant. He was lent to the Cawnpore Fibre Company to put down a well.

He superintended the boring?—He superintended and worked with his own hands. He is an expert in that particular business.

Mr. A. Chatterton.—Well-boring has not proved an absolute success? It has proved a failure in some cases and successful in other cases, but they have not definitely got to the bottom of the whole thing yet. In Cawnpore there were three attempts by the Municipality of Cawnpore at well-boring, all of which proved unsuccessful in that the volume of water expected was not obtained.

President.—As regards your reply to question no. 18, do you think it will be possible to name any period for the suppression of this information?—Yes; but each case would be treated on its merits: and the Director of Industries might be the Judge as to when it would be fair to disseminate such information. If you were going to confine dissemination of useful information to Government Blue Books, there will be nothing to say against that, because they take a long time to come out. What I particularly mean is that if an expert is working for a match factory at Government expense, he should not be writing the result of his research to anybody until the industry has had a chance of getting on its legs, until in fact the Blue Book comes out. I consider that he is giving away trade secrets, while he is the actual employé of the pioneer industry and especially so long as the expert is working in the industry.

He is learning as much in that match factory as he is giving to that factory?—That is the experience we have had in our businesses. Experts who come out from England learn as much as they teach.

If you reach the stage of being able to teach an expert as much as he teaches you, would you be in a position to learn on your own account without help?—There is a *quid pro quo*. He is learning certain things while he is teaching us other things.

As a general rule there should be no restrictions imposed. You know exactly what you are asking and what you are giving when you go to the Government and ask for an expert, you will have to give the expert certain information and also get from that expert certain advice?—So long as the expert in actually working there and experimenting and trying, he should not be in correspondence with others who would like to start the same industry. That is what I mean. In that way there should be a time limit.

The result of the research should be closed for the time being?—Yes. Another disadvantage is that the expert may be disseminating information which is inaccurate.

Of course it has happened in practice, as a rule, that if a company came to a Government expert and asked for advice the first thing the expert would say is, state your case, and in stating their case the firm would have to give some information which must be regarded as confidential. The Government official in those circumstances would regard the information as confidential without any rule? Don't you think that there is danger in formulating a rule?—You fear that. But on the other hand, I am most anxious that the enterprise of the pioneer should have its reward.

Don't you think that, ordinarily, a Government expert or a Government official, if he is honest and interested in the general progress of the country, would exercise discretion?—I am thinking entirely of an officer of the class who comes out as an expert, who may not have such nice feelings and ideas on "confidences."

You realise that it is very difficult to supplement a proposition of this kind by a precise rule?—I think there should be an unwritten rule. I think that Government should do everything for the pioneer by helping him, even if a written rule is impossible.

Mr. A. Chatterton.—Do you think that consulting engineers and consulting chemists would help in developing a pioneer enterprise?—Yes.

Would you be in favour of consulting experts being retained by Government for the benefit of pioneering, or of persons generally engaged in industrial development?—I don't quite understand what is meant by the word 'retained.'

At the present time there is not sufficient practice for a consulting expert to make a living in this country. He should get a permanent income to some extent, and if he were employed by Government giving him a retaining fee, he would then be able to help in the development of business?—I would get an expert out here for 3 years at a stretch rather than retain an expert in this country permanently.

If you have a consulting engineer in Cawnpore whose services would be available on payment of the usual fees for any industrial or agricultural work, private people might

feel inclined to take up his advice?—I think he would be invaluable. We have often found that when we have had a serious break-down, although there are many engineers here, if they disagree on a particular point of repair (we have called in 2 or 3 engineers in a friendly way and asked their opinion), there has been no real expert to whom one could turn for information on matters of that kind.

Have you found yourself at all in the hands of the agents of firms at home in consequence of the absence of such expert advice?—No, because we have got our own agent who is very much bound up in our interests.

Take a man who has not got his own agent, and who is working on a very much smaller scale. He would be very much in the hands of the agents of the selling firms?—Yes.

And it would be advantageous that he should be able to get advice which is perfectly disinterested and which he would get from the expert?—Yes.

Research abroad.

President.—We shall now consider your remarks on "Research abroad." Do you think that it would be an additional advantage if we had deputed from this country one, or two, or even a larger number of technical experts in vegetable and mineral products, so that these experts would deal with the problems sent from India and see that they are developed in the interests of India?—I think that it would be ideal.

Instead of relying as at present on the Imperial Institute in which there is, of course no Indian official of scientific and technical experience?—The want of touch with India is the drawback now.

Do you think that officials of that kind should be officials in the active service of India and therefore liable to return to India, or retired officials?—I think they should be retired.

If they are retired officials would not their knowledge get out of date rapidly?—That would be prevented by limiting the time of their appointment.

If you appoint an active official, would you not get the advangtage of learning from him lessons which he picked up at home, when he returned?—I suppose we would. At the same time it would mean the appointment of a large number of such officials: because during the time that an official returned to India his place at home would be vacant.

The idea would be to have a man on special duty at home for 2 or 3 years and before he returned to India another one would take his place and succession would be kept up?—Yes, but I think it would present difficulties. I think there would be loss of touch at home. A new man going home would have to get into touch with people with whose ways, etc., he had not before been conversant.

Roughly could you tell us whether the number of problems that might be referred to London of a technical and scientific kind associated with commercial developments (that is, the development of fibre or copra, or any of the many articles that you have been dealing with) would justify the maintenance in England of a fairly large staff of men in this way? Do you think our problems are sufficiently numerous to take this up on a considerable scale?—No, not at present.

Do you think that the problems would be sufficient if we kept at home one man on mineral products and one man on vegetable products and one man on forest products?—Yes. There should be 3 altogether.

You would not mind whether that is done in connection with the Imperial Institute or any other Institute, or say any office?—No. I have no knowledge of or leaning towards the Imperial Institute.

Mr. A. Chatterton.—What assistance did the Imperial Institute give in your fibre business?—We were quite new to fibre growing. We sent home one or two tons of it all mixed up. The Imperial Institute showed us selected samples, showing the different grades into which it should be converted and the probable price that would be obtained, and they gave us such information that we were at once able to put our agents on to selling the proper grades to the people who required particular grades.

Would it not be better done through a fibre broker?—No. His one idea would have been to sell through his particular auction mart or by some method of that kind, whereas we were able to keep in touch with people whom the fibre broker would not be interested in or get hold of.

Surveys for industrial purposes.

President.—Question 25.—I think the Government of India are losing many thousands of pounds of revenue every year because they have not had a complete survey.

Sir D. J. Tata.—Do you think any advantage would accrue from disseminating results of industrial surveys in the vernaculars?—I think if it came to disseminating facts of that kind in the vernaculars, there should be one or two vernacular papers for the purpose specially.

Personally I know one or two vernacular papers at Bombay which are well conducted, and if information of this kind was published in them, it would be very useful and would be read by people who might take advantage of it. I suppose it depends upon the value of the paper?—Yes.

You would agree to publication in vernaculars if the information could be made useful?—Yes.

Commercial museums.

President.—With reference to your answer to question no. 28, do you think there is any other advantage from commercial museums?—Not at this stage. I prefer sales agencies.

Hon'ble Sir F. H. Stewart.—Should the sales agencies be Government concerns or private ones?—The existing one in Cawnpore is run, to my mind, under ideal conditions. It has been instituted and patronised by Government, but it is run under private management.

Sir D. J. Tata.—What is your idea about these agencies? Is it to introduce the buyer to the seller simply?—No. I think the object is something wider than that. If a man goes in with others and one party buys, another sees that things *are* being sold, and that Government is behind them, and so on; this is much more likely to encourage an industry than a dead museum is. There is live business being done in one place, while the other is 'dead.'

Trade representatives.

President.—Your answer to question no. 34 does not help the Government in any way unless you can give a practical way by which it can be brought out?—By our political representatives abroad sending in regular reports from the places where they are stationed. In a place like Persia, where we tried to do business, the local political agent was so afraid of Germany politically that we lost orders.

Hon'ble Sir F. H. Stewart.—Do you think that political agents would be sufficient as trade representatives?—I think that entirely depends on position; for instance, in a place like Basrah it should be enough to have a political agent who could tell you that such and such goods are being taken by caravan up-country. If we go to a place like Bagdad a man is required who is an expert and can devote more time to trade questions of all sorts.

The question is, should trade representatives be appointed to represent the whole of India in Great Britain, the Colonies and foreign countries? Would you recommend consular representatives on American lines?—It should be part of their training to be prepared to look out for British interests in the way that the American representative does.

They need not necessarily be separate men from the political agents?—No.

Hon'ble Sir Fazulbhoy Currimbhoy.—Don't you think it is essential, in order to promote our industries, that India should have special Attachés at British consulates?—I don't think there is sufficient reason to warrant it for another 10 or 15 years to come.

Government patronage.

President.—Would you like to modify the wording of answer to question no. 38? You don't want to make it a penal offence if the indenting officer sent indents home without first referring to the Director of Industries in each province?—I didn't know how to use more parliamentary language and at the same time express the feelings that I had on the subject.

If the Government of India every year published a complete list of all articles imported during the previous year with a statement of their quality and prices, would that not be sufficient? Would not the people in the country, both the purchasing people and the selling people, be in a position to know what the Government really wants?—I think possibly that might do if you sent this information through the Director of Industries of each province, because *he* would know whether an article, approximate to that required by Government of India, would be available.

But he will know in any case because of the enormous variety of articles that must be purchased by Government departments and the Director of Industries would be in a position to say exactly what would suit the indenting officer?—From my own experience, I should say that the number of articles actually procurable in this country and made in this country is comparatively small as against the number that is indented for.

Would it not be better still to have a stores purchasing department, as they have in the India Office, where there would be experts to check the goods offered for India and where also

they can gather together similar orders sent by the different district officers and local Governments so as to get orders large enough to obtain contract rates?—I should say that is much better.

If we had a stores department in this country organised on these lines, the department would be able to say which of these things could be purchased in this country (which as isolated articles, and which on contract rates) and secondly, which of these things must be indented for from England, because of the impossibility of getting an equal quality or price in this country? Don't you think that would be better?—I think that would be the best way.

Supply of Government owned raw materials.

Dr. E. Hopkinson.—With reference to your answer to question No. 40, what do you mean by "assistance in any form"?—I had particularly in view the match industry. The Japanese Government give aid to the match industry in many forms by free import of raw material, also by subsidies, and in shipping too they give an extraordinary low rate for the export of matches to this country from Japan.

Do you think that the Indian Government should follow suit?—Not necessarily on the same lines. But here is a specially favoured competing industry from outside; a local indigenous industry is, therefore, deserving of some Government support. For instance, in Japan they work 18 hours out of 24. There are no factory regulations there. It gives them an unfair advantage over us.

You don't suggest that the factory rules should be abolished for the match industry?—No. But I should say there should be compensating benefits of other kinds from this Government.

NOTE:—Question No. 41, Witness wanted to modify and explain his written answer He said that, in regard to the matter of Indian unfettered control, he was thinking entirely of the United Provinces. He said that the municipalities in the United Provinces not officially controlled were not sufficiently advanced to look after the public interests, though he knew that in Bombay, Calcutta, Madras and some other places the Indian municipalities were perfectly capable of looking after general interests.

Land policy.

Hon'ble Sir Fazulbhoy Currimbhoy.—In what way did the municipality hinder you?—I wished to get land for this Bareilly Match Factory, and the Collector of Bareilly was advised privately by the United Provinces Government to help me as far as possible. They had an Indian municipality with a non-official chairman, and it took me something like 14 months to get land at all although the land that I wanted was outside the city: I consider that had I not had some influence and a certain number of friends among Govennment officials, I would not have got the land yet.

Do you think that the municipal administration ought to be really meddled with by Government?—No, but I say that, on this particular point, where municipal control is likely to interfere with an industry, there should be a right of appeal to somebody higher.

You were thinking about the industry; they might be seeing it from another point of view. They might not have liked to have an industry at a place where the city was likely to extend; the population might increase and they might not want factory nuisances near by?—I happen to know that it was not that. They were most anxious, and even expressed their desire, that an industry should be brought there. My whole objection is merely based on the pettiness of the municipal officials who have no breadth of vision and are unable to see that their city is going to benefit, at any rate in the matter of employment of labour, from encouraging industries locally.

Official organization.

On question 56—would you suggest that the industrial board should contain only nominated members?—Yes, because I think that suitable men are more likely to be nominated than if selected by public election.

Why should not the important chambers have a right to elect their members?—The Chambers have large interests in industries?—Because I feel that the Lieutenant-Governor would almost invariably ask for *advice* from the chamber.

The chamber might wish one man to come in and the Lieutenant-Governor might have another in view?—It is only my opinion.

President—Is not the present Board of Industries entirely nominated?—It is nominated.

Do you consider the present constitution satisfactory?—I wish to wipe it out as it is at present.

The present system of nomination by the Lieutenant-Governor is unsatisfactory?—Yes.

And yet you want it repeated?—Yes. At present the Board of Industries consists of many people who have no knowledge or ideas of, or interest in, business.

Can you suggest to us some way in which we can impress on the Lieutenant-Governor the advisability of changing the system of nomination, at the same time retaining for him power to nominate the Board?—I would qualify what I have written by saying "in consultation with the chambers of commerce."

There are two chambers of commerce here?—Yes.

You would not apply that principle outside of the United Provinces?—I would. I think it would be desirable in most cases.

You think that the chambers of commerce in our principal cities are as interested in Indian as they are in external commerce?—I think they have the knowledge as to who the best men would be. The officials, in my opinion, should be entirely nominated by the Lieutenant-Governor but he would also refer as regards them to the chambers.

Would you give to these chambers of commerce the power of election to the Board of Industry?—As far as the system at present existing, i.e., that of suggestion.

That is being done already. Your chamber of rommerce has made a suggestion to the Lieutenant-Governor, but still the Board is unsatisfactory?—I am sure the chamber of commerce, as an instance, never suggested the name of the editor of an Allahabad paper to be a member of the Board of Industries.

You have not helped us with anything like a practical scheme by which this Board of Industries may be reconstituted? You consider the present system futile, and yet you advocate the same without a scheme to modify it?—There is nothing very much simpler than that the Lieutenant-Governor should ask the chambers of commerce as to who they would suggest as the non-official members of the Board of Industries. They would make suggestions, and he would approve of them.

Would you limit his choice to those nominated by the chamber of commerce and the officials?—Yes.

Hon'ble Sir R. N. Mookerjee.—If you leave him the choice, the power of appointment depends on the Lieutenant-Governor, that is, the Secretariat Department?—He has the power of confirming.

You would not give the right of election?—No.

The Lieutenant-Governor may not accept your recommendations at all?—Possibly.

The whole thing is a farce again?—No. He would refer back to the chamber if he did not approve of their suggestions.

The Lieutenant-Governor may not refer again?—If the Board of Industries is to have power and weight with the non-official public, they must be representatives suggested by the chambers of commerce; but, at any rate, as a matter of form, and as a safeguard the Lieutenant-Governor should have the right of veto.

Hon'ble Sir Fazulbhoy Currimbhoy.—Should Government ask both the chambers or one chamber only? In this particular province there are, I believe, two chambers?—I am not sure about the second one.

Supposing there are two or three chambers in one place, how would Government appoint those members on the recommendation of these several chambers?—I do not think that Government should recognise more than two chambers in any one province.

On our side we have three chambers. I think if you progress at that place, in course of time you will soon have various chambers fighting against each other in their representations to Government?—I think you have got one too many now.

Still the majority will hold good, and their recommendations will be accepted?—I think you would be working against public interests by not getting cohesion. If you are going to have so many chambers with different views you are splitting up the value of representation of our needs.

In your opinion the nomination must be through the chambers which would just recommend to Government. Must Government nominate the men so recommended?—Yes, but with the power to refuse without giving reason for doing so.

And there must be only one chamber?—No, perhaps two chambers; one an entirely European Chamber, or a Chamber with European and Indian representatives, as apart from a chamber of Indian representatives.

If there is an entirely Indian chamber?—That would be the second one. I would put the limit at two chambers, who would have the right of recommending nomination to the Board of Industries.

Hon'ble Sir F. H. Stewart.—The gist of your recommendation is that the number of members of the Board should be very much reduced and that the Board should be entirely re-modelled?—Yes, for the United Provinces.

Sir D. J. Tata.—Do I understand you to say that if there are four members to be nominated on this Board, there should be two suggested by one chamber and two by the other and that Government may accept them? Would it meet your views if they submitted a certain number of names from which the Government might select the requisite number of representatives?—Yes. The Government should have the right to veto.

There will then be no question of having an unfit man?—No.

Trade marks and trade names.

Hon'ble Sir F. H. Stewart.—Have you had any special knowledge on the subject of trade marks and trade names? In what industry?—In two industries, in the polish industry, and in the boot and shoe industry.

Is it practicable to introduce a working system of registration of trade marks?—Yes.

Has the question come before your chamber frequently?—Yes.

And do you think that that is the general view, or your personal view?—It is the general view here that it is practicable.

NOTE.—Witness added that if the Commission were going to suggest that Government should give practical help, in the form of either or both land and money, in order to help indigenous industries, they should be very careful to see that there are safeguards against helping obviously futile propositions and sporadic efforts that are not really likely to be successful.

WITNESS No. 12.

Mr. E. L. Watson. MR. E. L. WATSON, *Manager of Chemical Works of D. Waldie and Co., Ld., Cawnpore.*

WRITTEN EVIDENCE.

General.

Supply of raw materials for manufacture of sulphuric acid.

Our primary raw material is sulphur from which we manufacture sulphuric acid. This again is the primary factor in the production of the majority of other heavy chemicals and is also used in large quantities in other industries.

The sulphur is imported from Sicily and Japan and is costly. A cheap source of sulphur, free or combined, has still to be found in India. A cheap source of sulphur would, by cheapening sulphuric acid, enable India to place the manufacture of heavy chemicals more on a level with Europe in regard to costs; and in doing so, would open a field for the production of other chemicals, besides reducing costs to industries using chemicals.

At present sulphur pays tariff on import at 7½ per cent. *ad valorem*. I suggest that it should be admitted free of duty for the manufacture of acids. The loss of revenue to Government would be slight. The present high rates of freight have doubled the cost of sulphur and I am of opinion that Government should waive the duty and so help, however slightly, to keep prices down. I beg to point out further that Government do allow the free import of superphosphates and sulphate of ammonia as chemical manures. The manufacture of these requires sulphuric acid in bulk. Consequently, manufacturers in India are taxed indirectly by the duty on sulphur.

Railway freights.

Cheap sulphuric acid will assist Indian industries very materially, and as there is no present source of cheap sulphur, the burden of freights should be lightened as far as possible. Freights on acids over Indian Railways are high, as the distances are very large, and present rates of freight on acids increase enormously the cost of acid where carried on rail.

I have already pointed out to the United Provinces Board of Industries, the preferences in freights on acid given to the principal ports by the Railway Companies, for long distance traffic. I attach a copy of the memorandum * for reference, and would ask the Commission to recommend fairer treatment.

The Director of Industries has been of great help in this matter and has secured favourable freights for raw material.

General official administration and organization.

The questions of the Director of Industries, Industrial Survey and Technical Research seem to me to be linked together. The Director of Industries is an industrial

* Not printed.

surveyor by the nature of his office. He needs a technical research laboratory to appraise the mineral and other resources available; but himself should be a businessman, preferably with experience of a manufacturing concern.

Technical research in heavy chemicals is largely a matter of engineering and practical methods. Large scale experiments to elucidate possibilities and cost of manufacture should be carried out if possible in existing works, the owners of which are prepared to take up the business of manufacture. Government grants towards the cost of experiments could be given and the assistance of technical advisers in supervising experiments would be welcome. The conditions as to publicity of results should be a matter of arrangement in individual cases.

For the supervision of chemical research a board of control would seem advisable. Such a Board should have academic, technical, and business representatives and should direct the work on the lines most fruitful to Indian industries.

Land policy.

In the matter of acquisition of land, I am strongly of opinion that the local Government should have powers at discretion to assist industrial concerns to acquire land for the erection of their factories. Under the present state of the Indian land laws it is a matter of great difficulty and delay to obtain suitable land with a clear title. Security of tenure should be given within a reasonable time and without the vexatious and expensive delays so usual at present.

ORAL EVIDENCE, 6TH NOVEMBER, 1916.

President.—I understand you are a partner in Messrs: Waldie and Company?—Not a partner. I am a shareholder.

You are the local representative of the company? Yes.

How long have you been in that capacity? About 3½ years.

You have many years' experience of chemical manufacture in India?—I have had seven years' experience at the Calcutta factory, that is altogether 11 years' experience.

Did you get your training at chemical works at home?—Mostly at pharmaceutical works.

I notice you say that at present sulphur pays a tariff on import at 7½ per cent. You suggest that it should be admitted free of duty for the manufacture of sulphuric acid, as the loss of revenue to Government would be slight. In this respect you point out that Government allows the free import of superphosphates and sulphate of ammonia as chemical manures?—I think there has been no taxation on chemical manures. I presume they are still coming in free of duty.

When 7½ per cent. is charged on the value of the sulphur, what does that amount to on the sulphuric acid?—Five-sixths of the cost of acid is for sulphur, therefore the tax on 81 per cent. acid comes to practically 6¼ per cent? It hardly seems correct that the industry should be handicapped in that way, considering the fact that raw material has to be imported for the industry. Sulphate of ammonia is being manufactured in India, but there is comparatively little consumption in India, as the bulk of it is or was exported.

In these times the profits on sulphate of ammonia are considerable?—Yes, but the cost of manufacture is proportionately high owing to the cost of sulphuric acid per ton.

What was the cost of sulphuric acid per ton before the war?—Fifty rupees a ton for chamber acid. But in that case it was being supplied to a railway colliery, and the freight was of course very much lower. The cost of acid per ton of sulphate of ammonia is of course higher than that, as 75 per cent. of the salt is sulphuric acid of 100 per cent. strength.

You think the duty is actually discouraging the manufacture of sulphuric acid?—To a slight extent. Every encouragement ought to be given.

Do you think that the transport of acid in India on rail hampers the development of your markets?—Yes.

You know of course that even under the best conditions the cost of transporting liquid acids must be very expensive?—It is.

Do you think that the actual rates can be lowered with advantage?—I am talking not of the transport of acid in tank wagons where you pay on the net weight of the acid

but on the transport of packed consignments, and on these we have to pay the highest rates of freight.

From your experience of the accidents that have occurred, do you think that these restrictions are unnecessary?—If the railway companies would instruct the coolies to take reasonable care of these packages, then I think that the restrictions could be relaxed. I have sent wagon loads and we have never had any trouble. The breakages occur in smaller consignments owing to the carelessness of the coolies.

Can this difficulty be got over by having local distributing centres in order to help the trade?—The trade is too small at present.

What is the smallest unit of sulphuric acid that would pay a company to employ a first class manager?—Three thousand tons per annum where only sulphuric acid is made—less for a factory in which sulphuric acid is used for making other chemicals, and is only a means to other ends.

Do you think about ten thousand tons of sulphuric acid is manufactured in the whole of India?—I should certainly think so.

In answer to question No. 2 you say that the Director of Industries is an industrial surveyor by the nature of his office. He needs a technical research laboratory to appraise the mineral and other resources available, but himself should be a business man preferably with experience of a manufacturing concern?—Yes. He should be a business man.

Do you think it practicable for a provincial Department of Industries to have at its disposal a research laboratory that will deal with mineral and vegetable questions of all kinds, or will it be necessary to have larger technical departments by gathering together the wants of the different provinces and organising them into an imperial department of technology?—I do not see why the Director of Industries should not have a research laboratory on a small scale under his control.

It would require within your knowledge a large number of experts to deal with dye questions, tanning extracts and minerals?—Yes. If you are going to make an Imperial Institute it will be rather unwieldy. I think it will slow down the rate of work. Technical research is in a very elementary stage in India. We are not going in for original research.

Mr. A. Chatterton.—I suppose you would like to have local research laboratories so that the practical men taking up a problem will be able to get from time to time such assistance as they want and which they do not themselves possess?—Exactly.

Ordinarily what is wanted is not scientific research but a knowledge of what has been going on in other parts of the world so that it may be adapted to local conditions?—Exactly.

Would you have local technological institutions of an advanced character or would you prefer to send serious problems to a central technological institute?—I would prefer to send them to a central technological institute.

Do you think that one institution for all India would be sufficient at present?—Talking from a commercial point of view I think that a small institution is quite sufficient at present. If it requires expansion it will be expanded.

In regard to the carriage of sulphuric acid, can you tell us what the present arrangements are?—It is carried in special vans. On some railways we can send acid once a week, in others once a fortnight when the special van is provided.

You pack sulphuric acid in ashes?—In fine ashes free from cinders.

Does the absence of a glass industry in India impose any restriction on the transport of sulphuric acid?—Sulphuric acid was formerly carried in jars which were very expensive in cost, breakage, and extra weight. Glass carboys in iron baskets have now been permitted. These will be cheaper than the jars and there will be lesser risk of breakage.

Have you got any suggestions to make as to the cheapening of the manufacture of sulphuric acid?—There are no suggestions that can be made as far as I can see unless some other raw material can be discovered in India. There is no hope for manufacture of heavy chemicals in India from sulphuric acid until cheap acid be available.

Witness no. 13.

Hon'ble Mr. H. R. C. Hailey, *Director of Land Records and Agriculture, United Provinces.*

Written Evidence.

Financial aid to industrial enterprises.

Capital.

In these provinces, though there are a certain number of joint stock companies under European management, the Indian-owned concerns have been mainly started by individuals or joint families. I believe that in Cawnpore most of the now flourishing companies were originally started by private enterprise and public subscriptions were invited after some measure of progress had been made. As regards the Indian public, it may be said that joint stock companies have not won their way to popularity, and there is a reluctance to subscribe to new ventures appealing for support. This imposes a very definite limitation on new enterprises, since the entrepreneur is limited to a large extent to his own capital. In fact the principal industries opened by Indians in these provinces, such as ginning factories, are on a scale which can be started by the individual capitalist or joint Hindu family. Further, by imposing the whole risk on the individual capitalist it discourages him from embarking on new lines of business and there is a great tendency to follow in the beaten trace. It also somewhat definitely hinders Indian capital being devoted to enterprises, such as sugar factories, which call for larger capital than the individual can provide.

This is probably only a phase in the industrial progress of the provinces. My experience does not point to any lack of capital, and the money annually employed by Indian capitalists in moving the crops of these provinces, such as cotton, oil-seeds, food grains, etc., is very large indeed, and some part of it would probably be diverted to industrial enterprises provided that there seemed equally good openings for its use. The comparative ease with which money has been raised for the Tata Iron Works seems to show that, once confidence has been secured, ample funds are forthcoming for any new industrial concern proposed to the Indian public. In these provinces there are no outstanding names commanding the same confidence, and recently quite a small concern for making a paper pulp, failed to meet the support required. But one or two marked success would change the attitude of the public, and divert to industrial enterprises some of the capital of the provinces which is now mainly devoted either to a middleman's business in grain or to land speculation.

There are some 92 ginning factories in these provinces—a number far in excess of that required to work the cotton crop of the provinces, which rarely exceeds 400,000 bales. The reason for the establishment of so large a number has been alluded to above. A ginning factory is within the means of the individual capitalist: the first ventures had proved a success and money flowed into what seemed one of the few suitable openings for the employment of capital.

Government assistance.

(Witness here gave confidential evidence regarding Government assistance to industries.)

It is doubtful whether in any case where assistance is given, Government should try to exercise any form of control. The strongest case would be where Government provides part of the share capital. But Government stands on a different footing to an industrial bank and has no trade experts at its command who can be placed on the board of a manufacturing company. The officials that Government could appoint would have no interest in the success of the concern and their duty would be mainly confined to safeguarding Government's interests as a creditor or shareholder. Such interference is not likely to conduce to the success of the concern and in most cases would be strongly resented. In the case of an industrial bank the functions of its nominee would be partly advisory and partly to look after the interests of the bank. But the object that Government has in view in affording assistance is somewhat different, viz., to build up an industry by assisting it in its early stages and it is very doubtful whether it would not do better by merely affording monetary assistance and leaving its development to persons with business experience. It would appear preferable that the agreement with the firm or company should contain definite conditions for the working of the concern, such as the employment of competent engineers for working the plant, and that Government should ensure compliance with the conditions by taking a prior lien over the plant.

Pioneer factories.

This Government started factories which would come under the head of demonstration and pioneer factories. The oil-crushing factory at Cawnpore, which was opened on the suggestions of a provincial industrial conference, would probably come under the latter head. It is designed to show that it would be commercially profitable to work the cotton seed of these provinces, the exports of which amount to some 30 lakhs of maunds. It was closed in consequence of orders issued by the Secretary of State; and subsequently sold to a private firm. All such factories seem to me to labour under the disadvantage that it is

difficult to persuade the commercial public that a Government-worked concern is really profitable from the ordinary business point of view, and would return profit in private hands. This oil-crushing plant was a case in point. I think I am correct in saying that so long as it was a Government concern—though the actual management was in the hands of a private firm—it attracted little attention: now that it has been taken over by a private firm entirely and is understood to be working at a profit, the possibilities of the industry are undoubtedly attracting attention. For this reason a system of Government aid to young industries is preferable. An exception might be made in the working of either forest or agricultural produce which has not hitherto formed the raw material of an industry in this country. For instance, a small factory might be started in these provinces for working flax which it has been shown can be easily grown and is in demand for other industries. But if it is intended that the public shall take it up, the factory should be handed over to a private firm as soon as practicable. Possibly in the case of forest produce, where Government will always control the raw material, it would be more convenient if Government worked it permanently.

New financing agencies.

I understand that the question under this heading refers to the establishment of industrial banks for the promotion or fostering of industrial undertakings. Their establishment is not infrequently advocated as a means of providing capital for starting new industries on the analogy of other countries where they have proved successful. I believe, at any rate so far as these provinces are concerned, the potential advantages of such a bank are overrated and doubt whether any addition to the existing banking system is required. Indian capital is shy of industrial enterprise, because it has more profitable openings in moving and exporting the very large volume of agricultural produce of the provinces; because the capitalistic body has little experience of industrial undertakings, and because there are no trained supervisors and workmen available to run them. One of the functions of an industrial bank is the employment of experts who can advise and judge of the possibilities before a proposed industrial undertaking. This in itself assumes a rather higher stage of industrial development than has been reached in these provinces. It postulates a competent management and fairly efficient workmen—which can hardly be claimed for many new industries for which there appear promising openings in these provinces. An industrial bank would be doing something more than financing industries; it would be pioneering them. Many of the Indian banks which failed a few years past appear to have been engaged in a perfectly *bonâ fide* endeavour to foster indigenous industries. They failed because they tried to force them and possibly there was not the human element to run them successfully. The underlying idea in the demand for an industrial bank is that all that is wanted for the prosecution of industries is that capital in sufficient quantities should be forthcoming. This may be true enough of countries with old established industries, but it is a somewhat dangerous doctrine for a mainly agricultural country.

Co-operative societies.

The only industry I am acquainted with which has been assisted by co-operation is the milk industry in a few of the large towns of these provinces.

The primary object of the formation of these co-operative societies was to free small dairymen from the bondage of their debts to the town milk-sellers in order to enable them to get fair prices for their milk and buy a better class of milking animals. Advances were given by the society to the "gowalas" for this purpose; they in turn agreed to bring in their cattle daily to a central dépôt to be milked. The animals are milked under sanitary conditions and the milk taken in sealed cans to the shops of the society. One of the great advantages to the consumers is that the supply of pure milk is thus ensured. The "gowalas" receive the price of the milk *minus* deductions for expenses and repayment of advances. They profit by being freed from the middleman and by being able to obtain further advances for the purchase of animals from the society. As a rule they make no attempt to breed good milking strains and buy their cattle from the Punjab. In addition to the above there are co-operative societies of wool-weavers in the western districts who are mainly engaged in blanket-making and there is a co-operative furniture-making society at Bareilly.

The co-operative societies of these provinces have tentatively undertaken the work of supply societies in the way of supplying agricultural requisites, such as seed and implements, to their members. As regards purely industrial matters, there seems to me some scope for the development of co-operation, where the workers are small men, carrying on their work at their homes. These men are at present much in the hands of middlemen, who supply the material and arrange for the sale of the manufactured article. Cases in point are the bangle-makers and weavers, and it will apply in the future to the growing hosiery business. The object of co-operation would be to secure the workers a supply of the glass or yarn at wholesale rates and to sell the manufactured article. These objects are satisfactorily secured in the case of the wool-workers mentioned above. The difficulty under which such men labour is that they have little or no capital and therefore have to secure their materials from larger merchants by whom they are exploited and consequently they do not receive full prices for their manufactures. The possibilities of co-operation in agriculture are very great and though this is rather outside the scope of the question yet it must be obvious that strong agricultural supply societies would materially

influence the industries of the province. For instance they have made a beginning of the supply of manurial cakes, for which there is a growing demand. When they are in a position to take considerable quantities annually, it is certain that oil-seed-crushing factories will spring up to meet the demand; one of the present obstacles to their establishment being the difficulty in procuring a regular market for the cake. The same applies to agricultural implements, pumping plant, etc.

Limits of Government assistance.

I should like to make a few remarks on this in the light of some experience gained in the Board of Industries. India is a country producing great quantities of raw material, most of which is exported. It does not follow that because private enterprise has already established a business in a particular locality aid should on this account be refused to a similar enterprise in another district. For instance, if a sugar factory is established in a particular locality there is no ground for refusing aid to another elsewhere, provided the latter does not compete with the former in the matter of raw material. The established factory is not in the smallest way prejudiced, since most of the crystaline sugar eaten in India is imported. Similarly, it is no kindness to any existing tannery to refuse aid to another such enterprise, provided that the latter is tapping a supply of raw material, which on account of freight the former could not work. On the other hand, there would be reasonable objections if Government were to aid a ginnery when there are plenty in existence competing for the raw material. The same applies in a lesser degree to, say, wool, the supply of the good qualities of which are limited and mainly imported from Tibet. Therefore though no general principles can be laid down, it seems to me to come back to this that Government should not aid a new industry when there is any chance of this industry competing with an existing industry for its raw material. The market for the manufactured article is so large that competition in the sale of the manufactured article need hardly be considered. The cry is frequently raised that Government should only assist pioneer industries, but in reality no harm is done to an existing industry in most cases, unless the new concern encroaches on or raises the prices of its raw material.

Technical aid to industries.

Technical aid in general.

There has been a Sugar Engineer attached to the Agricultural department of these provinces for some years past. He has been of most material assistance to one factory which had trouble with its plant and was unable to obtain a competent engineer in India. He has also been consulted by other factories and has advised on the establishment of new factories.

I may mention that when conducting an enquiry under orders of the United Provinces Government at the opening of the war as to the best means of replacing articles hitherto imported from enemy countries by Indian-made articles, I found in a certain number of cases that the main difficulty under which the Indian manufacturer laboured was the absence of expert advisers who could give technical assistance in starting or developing his business. For this reason I urged the appointment of a glass expert and metal working expert who have since been appointed. Similarly, I think an engineer with knowledge of oil-crushing machinery should be appointed for a term of years. I found this among Indians a far more real difficulty than the lack of capital. In several cases I was told that money was not wanted, but the trade was not likely to progress without a technical adviser. In case of the glass-workers, men had been brought from Austria and Japan with very unsatisfactory results.

I regard it as a primary condition that the firm should, in return for the loan of the services of a Government expert, agree to train Indians in the principal branches of the industry. This has been insisted on in case of the sugar factories and there are several men at the aided Pilibhit factory learning sugar-engineering who have thus an opportunity of actually working in a factory. The object Government has in view is developing the industry as a whole, not ensuring the success of a particular concern, and this can best be done by giving a practical training to men of superior education to the ordinary workmen. This method has some advantages over sending men to English colleges where the training is necessarily mainly theoretical. The case of aid by scientific experts stands on rather a different footing. If there were research institutes in Upper India, it is quite possible that the assistance of chemists from these institutes might be asked for by firms engaged, say, in dyeing or sugar-making. I believe that in Java and Formosa technical aid is somewhat freely given to sugar manufacturers. I see no reason why similar assistance should not be given in India on the understanding that the results of any investigations made may be published if likely to be of public interest.

Demonstration factories.

A demonstration factory has been started in these provinces with a view to demonstrating a sugar-making plant designed by the Sugar Engineer to meet the demand for a small plant, suitable for either gur or sugar-making.

The circumstances were peculiar owing to the conditions under which cane is grown in these provinces: under ordinary circumstances the value of any improved method could be better tested by granting assistance to a private firm.

So far as agricultural produce is concerned, I am unable to suggest any other demonstration factory which could usefully be instituted. There is a demand for a comparatively cheap and efficient oil-crushing or expelling plant and if the cultivation of groundnuts spreads as quickly as in the past, some steps towards establishing an industry for crushing the nut may have to be taken. But it seems to me that a better idea of the efficiency of any plant on the market could be obtained by arranging for a trial through a private firm. In the case of small plant for cane mentioned above, there was no such plant on the market.

Research abroad Imperial Institute.

The Agricultural department has occasionally referred certain questions to the Imperial Institute but as a rule it has preferred to go direct to responsible bodies or firms in England or India for an opinion as to the merits and utility of any form of agricultural produce grown on the farms of the department, or by the cultivators. Spinners in England and India have always been found most ready to give an opinion on any new cotton, and there is a particular advantage in referring to them as they are able from actual experience to determine its value to the manufacturer and quote its probable price. Similarly, the associated body of millers in England have been referred to as to the milling qualities of wheats, and brewers as to the malting qualities of our barleys. It is difficult to see what the Imperial Institute could do other than refer such questions to spinners or millers, as the case may be, and there is no apparent advantage in submitting them through a third party, a procedure which in any case involves very considerable delay.

To get a full opinion, such articles must be sent in bulk, for no one will undertake to give an opinion on a few pounds and it is obviously simpler to ship direct to the actual manufacturer than through a third party. As regards matters of research, so for as agricultural produce is concerned, the research cannot in many cases be divorced from the living plant and investigation must be made where the plant is grown. Cases in point are opium, sugar and indigo where the product in its commerical form has to be extracted from the plant and its value depends largely on methods of extraction employed. The Imperial Institute undertook an examination of the opium produced in these provinces with a view to the improvement of the morphine content, but the problem could not be fully investigated without an examination of the latex as it is extracted from poppy. Botanical research is necessarily outside the scope of the Institute's activities, and even in case of chemical investigation there is a very direct limitation imposed by the necessity of sending the objects of an inquiry to a distance and uncertainty as to the condition in which they will arrive. It would, for instance in case of cane, be clearly impossible to ask for an opinion on the sucrose content of a cane which had travelled some thousand miles.

It appears to me essential therefore that, so far as agricultural produce is concerned, investigations should be made locally.

Advisory council.

It appears to me that the main functions of an advisory body in England, assuming of course that they are composed of the leading scientists of the country, would be to recommend suitable men for the conduct of particular research work in India. A man so recommended would be in touch with scientists in England and could refer points to the colleges or other working bodies with which he is associated.

A beginning has been made in these provinces, in consequence of a suggestion made at the Board of Industries, to refer a certain number of questions requiring chemical research to the chemistry professors of the colleges. For the most part the suggestion has been cordially welcomed, as giving the students a chance of engaging on work of which they could appreciate the practical value. It is obvious that in case of colleges the problems submitted must be of a comparatively simple nature, until the post-graduate courses are more developed. I can suggest therefore no better system than that already adopted, viz., that the Director of Industries should submit lists of such problems to the colleges from which selection will be made. In case of other institutions such as the Indian Institute of Science at Bangalore, it may be presumed that all the research institutes will in time be brought under a single head or department by whom the carrying on of the more difficult investigations will be regulated.

Other forms of Government aid to industries.

Land policy.

The existence of subordinate rights in the Agra province offers a difficulty to the starting of capitalistic enterprises, such as sugar factories, in these provinces. The capitalist after buying the landlord's rights is not much nearer the attainment of his object, since the land may be held by occupancy tenants who have a right to hold the land on certain terms but not to sell. Full rights can only be acquired by Government acting under the Land Acquisition Act. The Government of these provinces, having parted with its rights to waste-land, is unable to afford help in starting enterprises of this nature.

While the existence of such a check on enterprise must be admitted, I am unable to suggest any alteration of the land which would not cut at the root of the tenant right in these provinces and lead to the dispossession of large numbers of tillers of the soil. The tendency of modern legislation is not to encourage peasants to part with their right, but to remove the temptation to do so by rendering them inalienable. There is no doubt that if sale were simplified, the land would find its way into the hands of non-cultivating classes and the actual cultivator would become their serf. Any removal of the present prohibitions on sale would vitally injure the agricultural interest, which is at least as important as the industrial.

The Government of these provinces cannot give concessions of land, since it has very little land left to give and is naturally unwilling to part with that little. The only remedy seems some alteration of the Land Acquisition Act permitting Government to acquire land itself for the benefit of some potential industry. The Act is so worded that it is very doubtful if it can do so, since, though section 40 seems to permit it, clause (5) of section 41 seems to require that the public should have a right to use the work constructed on it and it is open to question whether it was ever intended that the Act should be used to enable Government to acquire for private firms. It may be considered a doubtful point whether Government would be justified in acquiring land under the Act for the benefit of industrial companies when they are unable to acquire it in the open market, since this simply amounts to transferring land from one person to another on the ground that the latter can make better use of it. There are however analogies in the case of railways. I think, however, that where the superior proprietor is prepared to sell, Government might be empowered to acquire from the subordinate right holder if satisfied that the enterprise is likely to prove of benefit to the neighbourhood. The superior proprietor has at any rate the major interest in the land and if he is prepared to sell for an object likely to prove of public utility, the party with the minor interest should not be allowed to stand in the way.

Training of labour and supervision.

General.

As I have frequently visited the industrial schools of these provinces and the Agricultural department draws some of its men for mechanical work, such as working boring plant, operating oil engines, etc., from them, I have seen something of the products of the schools. Apart from turning out a body of trained men, whom, in the absence of a regular system of apprenticeship open only to large companies, it would be hard to obtain, the main advantages of these schools is that they are building up an industrial section of the community which is essential for the spread of industries. In looking for definite results it is fair to remember that these schools have been only a short time in existence, and there has been little time to make their influence felt. They attract boys not only of the occupational castes (carpenters, iron workers, etc.), but also boys of other castes who ordinarily engage only in literary pursuits and look for some sort of clerical employment. I have been told that after a year or two's training these boys often turn out better workmen than others of the purely occupational castes. I believe the boys turned out from these schools are of better general intelligence and better fitted to rise in their career than boys who from their early ages have been doing monotonous work in factories and have had no means of educating themselves. Further, they afford an opportunity for boys of the middle classes to get a technical education without going to a factory in their early youth—to which the parent has often objections—and of making a start on fair wages. But for these schools many of the boys would have swollen the ranks, already overcrowded, of those looking to earn their livelihood in some clerical line. They thus form a means not only of educating the workmen, but of attracting the educated classes to industrial pursuits.

General official administration and organization.

In these provinces there is a Board of Industries and a Director. The latter is in charge of the department and has executive powers with a budget. The Board is advisory, though it is consulted by Government as to the disposal of any funds which may be available for industrial purposes. Such an arrangement seems preferable to giving the Board executive powers. They could only be exercised through its officers and, as there could not be two authorities with executive power, the Director would have to become subordinate to the Board. The Board includes men with very varied interests, and on most questions which come before it there are a certain number of members who may be considered experts in the subject and able to advise from intimate knowledge. There can be no question that there is a growing complexity in the questions coming before Government and it seems to me that a Board so constituted could do better work in assisting Government in their solution than in trying to administer a department.

Co-ordination research.

It would seem that some co-ordination is necessary in the matter of research work. The various provinces are endeavouring to work out problems without much reference to one another and sometimes, it would appear, arriving at divergent conclusions. The case of different views held on the value of natural dyes illustrates this point. It is open to question whether the best results can be obtained by independent investigations in each province and it would seem advisable that chemical research work in industrial problems should be under a single head for all India, and possibly that research workers in this branch should be formed into a separate department. Another case in point is sugar;

there are a certain number of problems which ought to be worked out for all India and not left for inquiry in particular provinces. Probably the same applies to tanning extracts. The Local Governments cannot entertain a sufficient staff to deal with the numerous problems arising and it is waste of energy for them to try to do so.

Beyond this I would not go in the direction of centralization. An Imperial Director of Industries trying to co-ordinate the activities of the different provincial directors is more likely to impede than assist them. The main questions affecting trade, such as the railway management, forest administration, customs, excise, trade relations with foreign countries, must be dealt with by the Imperial departments in charge of such matters; an Imperial Director can advise only on such subjects and be less competent to represent local interest than the Provincial Governments and representative trade bodies. An Imperial Director could endeavour only to direct the energies of the provincial heads of the Industries department and prevent them from conflicting with and overlapping those of similar officials in other provinces. Such direction is far better left to a Local Government with the assistance of advisors drawn from the province, and, in the early stages of development at present reached, a head of a department to prevent overlappings except in the matters mentioned above—seems somewhat superfluous.

Organization of technical and scientific departments of Government.

Imperial department.

The remarks made above bear on this point. I consider that chemical research, particularly in the matter of utilization of raw materials for commercial purposes, should be under a single department for all India. I am unacquainted with mining and it may be possible that a similar department is required for minerology. The conditions of India are very dissimilar, but in the matter of their raw materials the provinces can conveniently be grouped and there should be institutes in each group for dealing with the principal material produced. Both the department and the institutes should be under imperial control. The two institutes already in existence in these provinces are examples of what I have in mind, viz., the Forest Research Institute at Dehra Dun and the Imperial Bacteriological Institute at Muktesar. There should be at least two institutes for chemical research on these lines—one for upper and one for southern India. Both would be under the control of a special department which would include the various chemists working on industrial subjects attached to the different provinces. It is undesirable that these chemists should continue to work independently of one another, and postulating that the Director of Industries should be a business man and not himself an expert, it is advisable that these chemists should be under the control of a man of standing in their own branch of work I have taken conditions as they at present exist, under which in some provinces, such as the United Provinces, there is a chemist attached to the Industries department. But looking to the specialization in chemical work, it seems rather doubtful whether it is fair to look for much results from the work of a chemist expected to deal indiscriminately with dyes, oils, tanning materials, etc., and whether really it would not be better that all connected matters should be referred to a central institute in which it may be presumed there will be several men at work on each of the major subjects. The question of laboratory equipment comes in and adequate equipment can only be provided in central institutes. Purely analytical work can be arranged for from private chemists. If, however, it is necessary to have a chemist attached to the provincial industries departments, the department outlined would have to be sufficiently strengthened to provide men to depute for service under a Local Government.

As regards the subjects to be investigated, it would obviously at first be desirable to start on a few, such as oils and dyes, bringing out a few men with special experience in each line of work. In any case the subjects should be determined before the men are brought on and more taken up gradually.

Provincial departments.

It follows, from what has been said above, that it is doubtful whether the Local Government should endeavour to organize scientific departments and incidentally to start technological institutes designed for research purposes; a provincial technological institute should be primarily educational. But this does not apply to engaging technical experts for assisting industries. I have already alluded to the appointment for these provinces of a Sugar Engineer and a Glass Expert, whose appointments were very desirable for assisting young industries. Such men stand on an entirely different footing from the research officer and they are merely giving the benefit of their practical experience to persons in this country who are ignorant of the working of the machinery involved in the business. Such men usually come out to India under contracts for terms of years and the Local Governments may be left to engage them according to the needs of their province. They should work under the Director of Industries of the province, unless some other department, such as the Agricultural or Forest department, is dealing with the particular branch of work.

Other forms of Government action and organization.

Railway freights.

So far as agricultural produce is concerned, it cannot be said that freights are high or hamper trade; but the system of granting differential freights to certain large centres is undoubtedly much disliked by the local traders and does interfere with the development of trade at small centres. The system of granting favourable rates to large centres, is apparently in vogue to simplify railway management of goods traffic: the actual result is that during the busy season there is an immense flow of traffic along the roads leading to these large centres in order to obtain the benefit of these rates. So little traffic is taken in many of the small stations that hardly any provision of roads leading to them seems to have been made.

This system of discouraging local traffic has a somewhat undesirable effect on agriculture, since it means that at a very busy season of the year the cultivators' cattle are taken away from his fields to transport produce to the nearest station enjoying favourable rates which may often be at a considerable distance. It also has a discouraging effect on the establishment of local markets which are desirable for equalizing prices

Other railway matters.

One or two other matters of railway administration seem to deserve notice. In the first place there is often a serious want of shed accommodation which in the busy season exposes the grain to damage from rain. A shortage of trucks is a common feature of such seasons, and possibly unavoidable. But accepting the fact that the railways cannot be expected to maintain sufficient trucks for occasional traffic, at least protection from rain should follow. 1912-13 was a heavy year of barley exports from these provinces—but some of it had sprouted before it left these provinces and complaints were received from England about the very inferior malting quality of much that arrived in that country.

It is by no means easy to get the railways to make any concessions to suit a new form of traffic and there is a great want of uniformity in their procedure. As much of the traffic passes over several lines reference is necessary to all, and the various managements sometimes take different views. A case in point is the fruit traffic from the Kumaun hills. One railway, viz., the East Indian Railway, has consistently allowed collective rates for all consignments to a single consignee over its line. Until this year the Rohilkhand and Kumaun Railway refused it; this meant that each box was weighed separately, and a box weighing, say, 21 seers, was charged the same as a box weighing 29. The Great Indian Peninsula Railway still refuses the concession. Again, no provision for the separate despatch of fruit is made on most railways that I am acquainted with, with the result that I had recently occasion to witness some fruit boxes being laid along side shikar trophies in the guard's van.

It would seem desirable that the Railway Board should have greater powers in fixing rates and enforcing uniformity of practice. I think there is a strong feeling—which in part is responsible for the demand for general State management—that a complaint to the Railway Board should not merely be met by a reference to the company but that the Board should have powers to compel the railways to remove anomalies and remedy any obvious defects, such as want of shed accommodation or lack of special transport facilities.

These provinces are well supplied with railways but a light railway opening up the fruit-growing areas in the Kumaun hills and assisting to remove forest produce would be of great benefit. So far as fruit is concerned, the Kumaun hills can produce admirable fruit—but the difficulty is that if situated too near the foot hills, the orchards are damaged by rain and hail; if they are situated any distance in the hills the cost of transport is entirely prohibitive.

ORAL EVIDENCE, 7TH NOVEMBER, 1916.

HON'BLE MR. H. R. C. HAILEY *was accompanied by* MR. H. M. LEAKE *and* MR. B. C. BURT, *whose written and oral evidence is given below (witnesses nos.* 14 *and* 15*).*

President.—How long have you been in charge of this office?—About four years and a half.

And you are also member of the Legislative Council of the United Provinces?—Yes.

In dealing with the financial questions on the first page of your printed notes, is it your feeling that the failures that have occurred in industrial enterprises here are mainly due to shortage of capital?—No, I am referring to failures of undertakings taken up by Indians. I do not think the failure is due to shortage of capital but largely to want of business experience.

In one place you say that there is generally not sufficient capital to embark on new lines of business and that consequently there has been a tendency to follow in the beaten tract?—Yes, I was referring to the larger enterprises, such as central sugar factories. The Indian does not readily subscribe to industrial undertakings. There were two

failures of sugar factories both of which were started on wrong lines and they failed, because the individual had no experience of sugar-making and could not find, I fancy, the engineers and sugar boilers who could be of assistance to him. In some of the other instances which have come within my own knowledge, the failures were, I think, largely due to want of experience on the part of the capitalists.

In this province have you had many of the so-called 'swadeshi' failures?—I do not think there are a large number of 'swadeshi' enterprises. There was not the same outburst of enterprise in this province as there was in the Punjab.

Are you of opinion that in this province there is a sufficient amount of capital now lying idle which might be used for industrial purposes in addition to that required for agriculture?—The answer to that question is difficult for this reason. There is an enormous amount of capital every year needed in moving the crops of these provinces. Our total exports amount to about 30 million sterling and all this amount has to be paid in cash and therefore it seems difficult to speak of any lack of capital. My idea is that it exists but it has not been diverted to industrial purposes. There is a great deal of floating capital, annually devoted to land speculation.

There is a good deal of talk in the country about the hoarded wealth and I cannot find any clear evidence as to whether there is really sufficient surplus capital to deal with industrial enterprises?—I am afraid I cannot answer that question. I can only say that, however big the crop, there seems no difficulty in financing it and the annual sum spent in land purchase must amount to a very big figure. The above are cash transactions.

How is the cotton crop distributed here?—Is it fairly concentrated in one area?—Yes, it is mainly limited to the Duab, between the Ganges and the Jumna, and a little bit the other side of what is practically the Upper and Lower Duab. Cotton is grown in some of the border districts while the rest of the province is mostly cane-growing.

Is it a fact, so far as you know, that a small capitalist will put up a new ginning factory in order to be bought off by a pool?—I know it is the case. The new man will get a profit from the pool.

Can you suggest any way by which this may be prevented?—I cannot say how you can stop a man from doing it. If there seems to be a reasonable opening for a ginning factory capital rushes in.

Is it not possible for the pools to neglect the surplus ginning factories and freeze them out?—Some of them would be competing for the cotton and thereby raising the prices in the local market.

That would be a good thing?—From our point of view, i.e., the cultivators, but not from the ginners' point of view.

Hon'ble Sir F. H. Stewart.—With regard to new financing agencies you would welcome the institution of an industrial bank?—I cannot say that there is a real opening for it. We have not yet arrived at a stage when such a bank could be usefully started. Our industries are far too infantile. I understand that it is part of the business of the industrial bank to judge whether an enterprise had a reasonable chance of success. A number of experts have to be put on to form a judgment whether the enterprise has a good chance of success and to assist in managing. I do not think the stage has yet arrived at which experts in various industries could be usefully appointed. I gather from Lord Farringdon's Committee that it was one of the objects of an industrial bank.

So you think that there is no need of an industrial bank?—I do not think that we have arrived at that stage.

Sir D. J. Tata.—You said that failure to start industries is due to ignorance and want of education in the first instance on the part of the investor?—I regard lack of experience as the principal reason for the failure.

Do you not think that a little more education would naturally make the average investor more willing to invest?—I think he does not require better education but more experience in industrial concerns.

As regards what you say about the excessive number of ginning factories, that means that people have had practical demonstration of the success of one particular industry. Would you not therefore advocate the starting of more demonstration factories by Government which might induce the people to put their capital in such industries?—My experience is that the public are not led by Government demonstration factories to put their money into concerns. Government runs the business and people do not know on what lines it is run and whether it can be successfully taken up by private enterprise. They are not led by Government demonstration factories.

Then why do they put money into ginning factories and start more ginning factories than are warranted?—They have seen it a success in the hands of private individuals. My point is that Government should assist in all cases in which it reasonably can by giving loans and supplying of machinery on the hire-purchase system. Assistance should be given to private firms.

You would then have demonstration factories run by private enterprise but assisted by Government?—Yes.

Why do not the people show sufficient confidence in Government?—When a demonstration factory is run by Government there might be a suspicion that it was not run on business lines and that all items of expenditure, such as superior supervision were not shown. Government officials do not inspire confidence as men of business. It cannot produce the same sort of confidence as would be felt if it were in the hands of private individuals.

Dr. E. Hopkinson.—With reference to the reluctance of the Indian public to subscribe, would that reluctance be removed if in any particular enterprise Government made investigation and were satisfied as to the soundness of the venture?—I think it would, to some extent. I would quote an instance in my mind. That is the case of the Electric Supply Co., in Lucknow and Allahabad. The Government or the municipalities guaranteed a dividend and the whole matter was carefully examined by the Electrical Engineer to Government and was reported on as one likely to be successful. To that extent I think it certainly would.

By what officer of Government should that investigation be made?—That is rather difficult to say. The Director of Industries might do it if he had knowledge of that line of business. If Government would examine it and would be prepared to make a small guarantee, then there will be less reluctance to subscribe.

Under what conditions should the investigation be made by the Director of Industries?—If he has expert knowledge of the particular business then it can be investigated by the Director of Industries. In this case I am referring to the investigation was made by the Electrical Engineer to Government.

And you think that the Government endorsement goes a long way?—Yes.

With regard to the ginning factory, what other undertakings besides ginning are run by Indian capital?—There are spinning and weaving factories run entirely by Indian capital. There are also several sugar factories but on a small scale.

Sir D. J. Tata.—As regards spinning and weaving factories, do you consider them to be small industries which can be managed by the single capitalist?—The spinning and weaving factories run by the Indians are on nothing like the same scale as the industries of Cawnpore.

How many spindles are there in these factories?—I have not got the figures. They are not large factories.

Could they not be floated by raising subscriptions?—Probably, but they are not doing business on a large scale.

Mr. A. Chatterton.—Has any special effort been made to provide landowners and raiyats with capital to develop rural factories for the preparation of agricultural produce? Aid was given to sugar factories at one time. The particular factories that I have in my mind were not a success.

Do you grant assistance to approved schemes of that kind by takavi loans?—We grant takavi loans chiefly for well pumping machinery; the engines are also used for grinding-flour, hulling rice or some such auxiliary work.

Are these machines supplied on the hire purchase system?—We supply takavi to the zamindars under the Act and it has to be repaid at a certain rate of interest.

When these loans are given do you take any steps to ensure that the money is spent for the object for which it is given?—That is a rather weak point. I do not think there is sufficient inquiry now to see that this money is spent for good purposes. In cases which came to my notice I found that money was inadvisedly spent.

When an application for a loan for installing pumping machinery is made, is it investigated on behalf of Government?—It is investigated by the Agricultural Engineer to Government but it does not follow that he will be allowed to erect the plant. The money is given to the zamindar and unless he asks us to help, we do not interfere. He sometimes calls us in and sometimes not.

Do you take any steps to see that a specially suitable class of machinery is employed?—The loan is repayable in the ordinary way and provided the project is regarded as feasible we do not take any steps to see that it is carried out properly.

If the schemes are properly examined beforehand, no difficulty is experienced; and what I wanted to know was whether any objection is raised in these parts of the country to any investigations which the Revenue officer has to make before a takavi loan is granted?—The investigation is made. But the important point is that we do not take any steps to see that the money is properly spent. Our procedure is We say, to the zamindar, "you may, if you like, hand the money to us.—We shall spend it for you and put down the machinery and guarantee its working." We have to get his consent before we can do it at all. Of course in certain cases he consents.

How much money is granted in takavi loans for the purchase of machinery?—I am afraid I cannot give you the information off hand. I shall make a note of the point and send you the information.

Note subsequently communicated :—

The type of machinery for which advances are made are pumping plant, small cane-crushing machinery, oil engines, etc. The demand for advances fluctuates very much from year to year and in 1913-14, which was a famine year, all money available for advances was given for seed, cattle, etc.

I think it better, therefore, to give average figures for the past four years (the figures of 1915-16 not yet being available). The average is Rs. 24,410 per annum.

President.—Could you give us some idea as to the kind of technical expert you employ from time to time in the United Provinces for the purpose of advising Government or the people who are taking up new industries?—There is a sugar expert and now there is a glass expert also. The glass expert has been engaged only for a short time.

His is not a pensionable appointment?—No.

He is not a young man?—No.

You have a metal-pressing expert; he is also fairly senior?—Yes.

What about oil and leather?—We have no oil expert. We have got no tanning expert, but we can refer to the chemist at Dehra Dun.

For agriculture you have in the Agricultural department an Agricultural Chemist and an Economic Botanist?—We have a chemist and a botanist but we have not an Entomologist or Mycologist. For this we make use of Pusa.

So far as the purely advisory aspects of science are concerned and so far as research work is concerned, you would favour the formation of Imperial departments?—I am strongly in favour of them.

And then so far as the employment of these technical experts for assisting particular industries is concerned you think that they might be employed by Government under the local Director of Industries?—Yes or in the case of the Sugar Engineer, under the Director of Agriculture.

Don't you think that there is some risk in getting out a single glass expert or a single leather expert or a single sugar engineer?—You have to rely entirely on one man Being a short-time man you cannot expect him to identify himself with the interests of the country for a long period. He cannot accommodate himself to the atmosphere of the country. Depending on these isolated experts you fail to profit by the experience of other provinces. Do you think there is any hope of treating these technical experts in some way analogous to the treatment you propose for a Scientific Research department? Can you think of any scheme by which they can be brought into a general organisation so as to secure a longer period of service and therefore a greater continuity of work in the country as well as uniformity of policy throughout India?—I think I am bound to point out that if these experts remain out in the country for a long time they begin to aspire to the position of Government supervisors and managers and become averse to doing manual labour.

Would it be possible to put them in the subordinate service of the Public Works department?—I think it might be possible. Personally I should say from my experience if I were an employer of labour I should bring out men for a short period only, seeing the sort of effect India has on these men. They do very good work up to a certain point but afterwards they are of less use.

In comparing the attitude of the subordinate class with the spirit of the officer class don't you think that the officer class would be, on the whole, more sympathetic and more helpful to the people?—Undoubtedly.

Would not a better class of engineers be more suitable as teachers and advisers to Government than the foreman class of expert?—I am afraid I cannot answer the question. My experience has been that this class of man is satisfactory up to four years. The country and the ways of the country seemed to have a deteriorating effect upon them and they want to take up a higher position.

Mr. A. Chatterton.—How did you go through the preliminaries which led to the appointment of the glass blower?—There were a large number of factories which were engaged in making glass bangles. They failed to meet the great demand for glass, chimneys, tumblers, etc. We got out an expert to show them how to do it. There were a lot of small factories working in very crude lines. We brought out a man to show how to improve them.

Do you not run the risk of bringing the wrong man?—We have been rather fortunate so far.

Do you not want experts to assist you in advising you what sort of man is required?—I think the Director of Industries is ordinarily capable of advising on the preliminary points. It is part of his functions to advise on these matters.

In the early stages is not advice necessary as to how to lay out their money?—I can only say that I was the head of a small committee that went over these provinces to see what assistance could be given to the various industries that has hitherto been in the hands of the Germans and Austrians and I have found that in all the small trades what was wanted was expert advice.

President.—Do you think that these experts should be employed by the local Government on short terms or would it be possible for the whole of the local Governments to co-operate with regard to these experts?—It comes back again to this point. The research man is bound to be a permanent officer and he had better be Imperial. The man of the type I refer to should spend only a few years in the country and the matters he will deal with will be of a local character.

Dr. E. Hopkinson.—When you decide that an expert is needed, how do you proceed to get one?—We write to the Government of India and they refer to the Secretary of State to get a man for the post.

How is the cost met?—In the case of the sugar engineer his salary is met from Imperial funds. The glass man is, I think, paid entirely from Provincial funds.

Is there any overlapping of activities?—In these minor industries I do not know of any great overlapping, one province has very little help from another in these matters.

The Agricultural department gets all information as to what is going on? Is this information disseminated?—Yes. By a series of bulletins and reports.

Sir D. J. Tata.—Does it not happen that sometimes a foreman is got about whom the agents or managers know very little? This man plays the master and domineers after a time. He gets a little above himself and does not want to work and wants to be an officer not a working man?—The reason why the Austrians and the Japanese proved unsatisfactory was exactly what you have said. For that reason if a Government servant was brought out and if he played the "bara sahib" the management need have nothing more to do with him.

In what way were the Japanese and Austrians failures?—Both were very reluctant to part with trade secrets and teach Indian workmen. I understand that the difficulties with the Japanese were even greater than with the Austrians.

Did the Japanese refuse to work with their hands?—I cannot say, but one of the difficulties with the Japanese was that they refused to let out trade secrets. They were not inclined to teach anyone in the factory except one or two whom they kept immediately under their control. This practically made them masters of the business.

I have some experience of employing Japanese in the silk farm at Bangalore and I believe they taught, as far as we know, everything they knew to the common village people?—It is a fact so far as glass was concerned the Japanese were extremely reluctant to give away any trade secret. This practice they carried on regardless of the higher authorities. In the case of one sugar factory I know of they were found to be very quarrelsome.

With reference to getting an expert, do you simply write to the India Office to send you out a man?—We specify the kind of man we want for the particular kind of work.

Hon'ble Mr H. R. C. Hailey.

Do you always get the type of man you want?—You have to depend very largely on the Secretary of State and it is a question of personality whether the individual man is capable of doing the work.

Would it not solve the difficulty if you had a sort of superior consulting engineer who would be in touch with the machine makers in England and who could get you exactly the sort of mechanics you want?—Such a man would be valuable but whether Government could get such man is a question. He would soon lose touch with machine makers in England. My own idea is when such a man comes out he would have no Indian experience and after a few years he would lose the advantages of his English experience.

Such a man would get leave to go to England and renew his knowledge?—If you could get such officers they will be valuable but they will be very expensive.

Hon'ble Sir F. H. Stewart.—Is the function of the expert mostly advisory or do you lend him to different factories for a considerable period?—They are lent to different factories. I think the glass man has been lent for two factories for some time, and the sugar engineer was lent for a whole cane-crushing season.

Did he set up the factory?—He set up the new machinery and remodelled the factory.

Was he lent free?—Yes. On the condition that the firm would train a certain number of apprentices. We have got several being trained at Pilibhit.

Can they work independently now?—They are still under training now.

Don't you think that this rather limits the utility of the expert?—We are very much in the beginning of things. Of course as time goes on his work will become more and more advisory.

Dr. E. Hopkinson.—Do you think that the Indian Universities can afford any help in the matter of research?—Not as at present constituted. The staff is small and wholly engrossed in teaching. There was a suggestion made by the Board of Industries that some of the colleges might like to take up a few commercial problems. Some were sent round and were taken up at a few of the colleges. They were of a comparatively simple character and I do not think anything more serious could be undertaken.

Do you consider that the graduates of the Universities might be of assistance in carrying out such investigations?—It is merely a question of how far the post-graduate course has developed in India. So far it has not sufficiently developed to encourage us to look for any material help.

Do you draw a line very distinctly between technological institutions and institutions which should be purely educational?—Some institutions at any rate I would keep mainly for research. It is simpler to start a research institute than try to develop one out of an educational institution. If you try to combine the two, there is a danger that either the teaching or the research will suffer. This has happened at the Agricultural College, Cawnpore.

How would this apply in practice. Say in your province?—There is a project for a technical institute which has been sent out to the Secretary of State and it has been discussed for a long time. The idea is that it should be mainly for research. I do not believe that provincial research institutes will work well. If they are provincial they are likely to be starved. I think they should be imperial in character. The present classes of higher technology at Roorkee might be developed and other subjects might be taken. Each province is not capable of starting its own research institutes.

What has become of the suggested institute for this province?—The last decision on the matter was that there should be a research institute at Cawnpore. In my written evidence I have suggested that there should be one for Northern India.

Should it be divorced from teaching?—It would admit post-graduate students who want to work on special subjects. But otherwise it would be a mistake to introduce teaching.

Do you not think that there are a certain number of questions which can hardly be dignified by the name of research and which could well be taken up locally?—Yes, it would help. Purely analytical questions might be taken up locally.

WITNESS No. 14.

Mr. H. M. Leake. MR. H. M. LEAKE, M.A., F.L.S., *Economic Botanist to Government, United Provinces.*

WRITTEN EVIDENCE.

Research abroad Imperial Institute.

While I cannot claim to be one of those who have utilised the scientific and technical department of the Imperial Institute, my reasons for not having done so, in cases

where I might, are perhaps as relevant, in that they bring into evidence the two main directions in which the Institute fails. In doing so I place no stress on the particular instances; they are, I think, merely concrete instances of a general position.

In the matter of cotton I have gone straight to the commercial man. I have found no difficulty in getting in touch with, and obtaining reports from, men who are expert in the trade. Thus, if any difficulty of interpretation crops up, I am in a position to correspond direct with the person who handled the sample and the matter is easily cleared up.

Were I, on the other hand, to send these to the Institute it would simply forward them to somebody like the British Cotton Growing Association, omitting most of the particulars about them, and I should receive back a colourless report—colourless, because the judge will have little or no information to guide him as to the essential points about which information is desired. Thus, the attention a cotton attracts depends very largely on its origin and a cotton which would be given no consideration if it came from Egypt might be reported on very favourably if its source was known to be India.

This I know is the view in Lancashire where I have heard repeated complaints of the way the Institute submits samples of cotton with the details which give them interest suppressed. This brings out the first weakness of the Institute. It cannot give, it can only procure, expert advice. It stands in the position of middleman to a producer and consumer and it is not without the weakness of this position, in that the tendency is for it to appropriate the profits.

The second point will be illustrated by reference to the opium problem. This is more complex as it is not merely a question of finding out the value of a commercial product but of producing such an one. Here it is a case of investigation, to ascertain the possible yield and methods of extraction which will give the nearest approach to that maximum. The Institute have already done a considerable amount of work bearing on this question in opium but—and this is especially necessary where plant products are under consideration—they have not access to the plant and are entirely dependent for their material on a haphazard collection of samples of which they know in reality nothing. No clearer instance of a mass of work built on such insecure foundations could be desired than the recent paper published in the bulletin on the opium question. This serves one, and only one, useful purpose, to illustrate the futility of working on such subjects where access to the plant is impossible. Frequently, as in indigo, the commercial product does not exist as such in the plant and the yield, and hence the economic value of the plant is largely affected by the conditions of extraction. Again, as in the cane, it may exist as such but loss through degradation occurs during crude processes of extraction. In such cases what is required is a study of the plant and the conditions of extraction on the spot. The work is beyond the means of the Institute or anybody working in England.

Advisory Council for Research.

These are to my mind the two points where the Institute fails and you ask my opinion whether the recently constituted Advisory Council for Research would prove more useful if its activities were extended to India. There is not very much detailed information about this body available but I gather it is a central council which will, as it develops, work through committees of experts in particular branches. This being so I should say the field of utility would be great. I may again take as a concrete instance the opium question. As I have elsewhere pointed out, the botanical work cannot develop the practical side of the problem to any extent until a reliable method of determining what I may call the 'morphine' capacity of the plant is available. That method can only be evolved by work on the living plant which is at present beyond the power of the department to undertake. Further, the present methods of extracting opium are undoubtedly crude and must lead to loss of the alkaloid. The problem is a very definite one and might be referred to the Advisory Council for consideration by a committee composed of experts on plant physiology, pharmacy and the trade. Should, as is probable in cases like this, the Advisory Council recommend the appointment of a man to study the question on the spot, the India Office would have at their hand a body of men acquainted with the work to be done, and in a position to recommend a man already trained in the particular line of research. Thus not only would Government stand a chance of obtaining the services of a suitable man but that man would have some prior knowledge of the subject to be investigated; he would be able, before leaving England, to discuss the subject with the authorities, both scientific and commercial and after arrival in this country to keep in touch with the authorities at home.

ORAL EVIDENCE, 7TH NOVEMBER, 1916.

President.—Do you think it advisable and practicable to link the various botanical interests in the country and form a more completely organised botanical department?—I cannot see how you are going to do that. We always know from reports what the other men are doing and it is thus possible to get into direct touch with any one working on the same lines.

These separate economic botanists must have separate libraries?—Yes.

Would it be possible to provide separate libraries?—It is purely a question of money.

There may be many back numbers of journals, for example which may be very difficult to get for all these libraries?—Being the first in the field in India I have been fortunate in that way.

Then do you prefer these men working independently?—I do not see what practical advantage is going to be derived by joining them together.

Could they not be united into one department as the geologists are?—I do not think it would be possible in practice. The problems in the various provinces vary very much and require working out on the spot.

Do you think then that the matter may be left alone so far as botany is concerned?—I think there might be a closer relationship. It should be possible to visit other places, where similar work is in progress more readily.

Have you had any difficulties in referring questions to the Imperial Institute?—Mine is a negative experience.

Do you find it more convenient to get into direct touch with the firms at home?—I think it is decidedly the best arrangement.

Do you find the firms help you?—Yes. I was sent home for this purpose and I have got now to know members of the firm and it is therefore a case of personal relation being established.

Have you experienced any delays in having answers from the Imperial institute?—I have so far not referred any problems to the institute.

Dr. E. Hopkinson.—Are you not aware that there is a recognised association for the purpose of promoting cotton growing within the empire?—Yes, I am in touch with it.

Why did you not refer to them?—I did so but they were not prepared to deal exactly with the points that I wanted to know. It was indirectly through them that I got in touch with the firm to whom I now refer.

Have you found any sort of reluctance on their part to give you assistance?—No.

Do you think it would be an advantage if the Agricultural department were more directly in touch with the British Cotton Growing Association?—Personally I think they should be in as close touch as possible.

Witness No. 15.

Mr. B. C. Burt.

Mr. B. C. Burt, *Deputy Director of Agriculture, Cawnpore.*

Written Evidence.

Financial aid to industrial enterprises.

More cotton ginning factories have been started at certain centres in this province than there was room for with the result that the charges for ginning were reduced to an unprofitable limit and a number of concerns have either been squeezed out or have ceased to work, while many of the stronger factories have combined to form a pool to regulate the charge for ginning. This is partly a matter of bad selection of site; there is a marked tendency for ginning factories to multiply near the larger cotton markets rather than to establish themselves near the growers. In spite of an apparent superfluity of ginning factories there are parts of the province where unginned cotton travels large distances to a ginning factory—a marked disadvantage on account of the bulkiness of unginned cotton. The cotton ginning industry also suffers from being a short season industry and the development of subsidiary industries which would enable the staff and engines to be employed through a larger portion of the year would be of extreme importance. Of possible subsidiary industries the oil-pressing industry would appear to be suitable.

Government assistance.

Qs. 4—6.—I have some knowledge of two instances in which Government gave loans on interest against landed property as security for the development of central sugar factories in parts of the province where such encouragement seemed desirable. Subject to funds being available this appears to me a method of assistance capable of extension as it reduces the necessity for Government control to a minimum; it being only necessary to see that the money is employed to advantage and that, for instance, suitable machinery is purchased.

Where Government is itself a large user of an article the manufacture of which it is desired to encourage I am of the opinion that method seven is capable of more general application than any of the others suggested and this would probably in many cases be sufficient to attract the necessary capital through the usual trade channels. This does not involve any degree of commercial control by Government but where a product of a definite standard of quality is necessary some degree of technical control and assistance might be necessary.

There are also cases where Government, though not itself a large user of a product can usefully take steps to assist in marketing it. An instance of this is afforded by the oil-pressing industry where in the initial stages both cotton-seed, cake and mahua cake were at first difficult to dispose of while the oil met with a ready market. In view of the importance of the utilisation of the cakes in the country the United Provinces Government gave grants for the purchase of a considerable amount of cake for demonstration purposes. The demonstrations with the latter oil-cake are still in progress.

Another oil seed-castor affords an instance where guaranteed Government purchase would probably stimulate production. State railways are larger users of castor-oil and the demand in Europe is considerable. The oil-cake is a well-known and popular manure but the present supply is inadequate and the price high. Very considerable quantities of castor-oil are manufactured on a small scale and sold through the usual channels but the market appears too little organised to offer prospects to a factory unless some portion of their output could be sold ahead for a considerable period.

Pioneer factories.

Q. 7.—A Government pioneer factory appears to be justified if the establishment of a new industry (or a considerable departure in an established industry) is of sufficient general economic importance and if there is definite experimental work to be done which is likely to cost more than a private capitalist could be reasonably expected to risk. In other cases it would appear better for Government to restrict itself to the furnishing of the necessary information and to appropriate indirect assistance. It follows from the above that once the necessary preliminary work has been done pioneer factories should be handed over to private enterprise, or, if unsuitable, closed. Certain exceptions however suggest themselves, *e. g.*, factories for working up the produce of State forests, which it may be necessary to maintain as Government concerns longer than would be desirable in the case of other pioneer factories in order to secure proper working of the forests and to safeguard Government from loss of revenue.

Assuming that private enterprise is not prepared to take the matter up (which is not yet certain), I consider that a good case exists for the opening of a pioneer factory for the manufacture of flax including the financing of the growers and the distribution of seed as well as retting and scutching. The prospects of the flax industry have been discussed in a memorandum which I prepared for the Board of Industries, and it is sufficient to say here that it has been shown that flax could be grown profitably in a considerable portion of the province. It is essential that the retting and scutching should be done at a central factory possessing adequate capital.

An experimental factory was in existence for some years in the neighbouring province of Bihar and results have been published which will be of great value to any other concern starting in Upper India. There are certain agricultural difficulties in growing flax in Behar which do not obtain in this province.

Co-operative Societies.

Q. 11.—These societies have up to the present chiefly limited themselves to the provision of agricultural credit. Non-credit societies are comparatively few. Even credit societies amongst the artisan classes have been much less successful than amongst the agricultural classes and this seems to be due in no small measure to the comparative mobility of the artisan as compared with the agriculturist. Some progress has been made in the direction of non-credit agricultural work, notably in seed distribution and in power pumping; there have also been occasional instances of co-operative purchase and sale amongst agricultural societies.

There are two examples of fairly successful co-operative dairies in Lucknow and Benares. These are practically institutions for the co-operative sale of produce. While acting as Director of Industries instances of useful work by co-operative stores (for the sale of yarn to hand-loom weavers) came to my notice. There is a co-operative furniture workshop in Bareilly which I believe is a success. Generally speaking however co-operative societies are mostly agricultural.

Technical aid to industries.

Demonstration factories.

Q. 10.—Where the improvement which it is desired to introduce into an existing industry is such as to involve a considerable amount of experimental work on a factory scale a Government experimental factory may be justified. A case in point is the small sugar

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factory on which the Sugar Engineer to the Government of India is working on in these provinces at present.

Where demonstration is the sole object I consider that this could be more economically and satisfactorily secured by assisting an existing factory either with a grant or by a loan on favourable terms. Generally speaking I think that commercial men would be prepared to accept technical results obtained by an experimental Government factory and would use these to form their own estimate of the commercial value of a process, but they would be sceptical of commercial results obtained by a factory under Government control.

Research abroad.

Q. 21.—I have had no experience of the Imperial Institute since working in India but on one occasion while I was in the Colonial Service a technical question was referred to the Imperial Institute, and we failed to get the assistance we required. I cannot see any way in which the Imperial Institute can be of any great use to India in industrial matters. Much of the work which the Imperial Institute does for the less developed colonies, *e. g.*, examination of raw materials has already been done for India by the Botanical Survey and in any case there is no difficulty in arranging for this class of work in India under more satisfactory conditions as regards the supply of the material to be investigated. Where the investigation of major problems are concerned it seems essential that this should be done in India by investigators who can give up their whole time to it and who can study local conditions. Where assistance is required from investigators engaged on allied problems in England this could be much better obtained by an investigator in this country by direct correspondence than through a third party. Where circumstances render it desirable an investigator engaged on a particular problem might be given an opportunity to spend a limited period in England, working in an English laboratory if necessary, if in this way he could obtain facilities for his work (or a section of it) or if he could secure in this way the co-operation or advice of other scientific workers or business-men.

Assistance in marketing products.

Cotton.

An anomalous position exists as regards cotton which is not without its effect on the cotton industries in general as it affords a distinct problem in any attempt to introduce into general cultivation a cotton of staple superior to *desi*. A market exists in Cawnpore for any grade of cotton from ordinary short stapled *desi* to middling American *once it is ginned and baled*. I know from experience that it is not difficult to get a fair price for any cotton which is better than *desi* once it is in the form in which the mills are accustomed to handle it. On the other hand, unginned cotton (*kapas*) is all treated alike by the dealers and ginners who buy it. To them "cotton is cotton" and the only points to which they pay attention in buying appear to be cleanliness and the proportion of cotton to seed—the latter in a rough and ready way only. The result is that a cultivator offering, say, acclimatised American cotton (unginned) for sale in the Cawnpore market would get no more than the price of ordinary *desi*, unless he were lucky enough to fall into the hands of a smart ginner who was willing to pay a little extra for the better *kapas* in order to improve the appearance of a poor lot of *desi* cotton. In some markets the cultivator would be lucky if he did not get a lower price for his better quality *kapas* since some better class cottons have large seeds and give a somewhat low ginning outturn.

Considering that the acclimatised American cotton which is grown around Cawnpore is some 40 per cent. more valuable than the local *desi* cotton once, it is ginned, the necessity of some arrangement to ensure the cultivator getting a fair price is obvious. Up to the present the Agricultural department has acted as a go-between between the cultivator and some of the mills who have guaranteed a price for the cotton ahead, in order to encourage the growing of cottons of superior staple. This arrangement has its drawbacks as it involves the Agricultural department in a commercial undertaking which with its small staff and limited funds it finds extremely difficult. Nor is there any permanence in the arrangement since we have no guarantee that mills will continue this method of assistance.

Training of labour and supervision.

Apprenticeship system.

There are two reasons which in my opinion militate against an adequate supply of trained labour in India from an apprenticship system alone.

(1) There is a comparative absence in India of large engineering works, which in England are undoubtedly the backbone of the apprentice system. As a result not only do other industries which require mechanics make a larger proportionate demand on a labour force which they do little to train, but there is a much smaller number of young men passing through workshops and there is a greater tendency on the part of those shops that do take apprentices to retain them.

(2) The general lack of education amongst the artisan classes limits the extent to which they are able to take advantage of an apprenticeship.

The class of boy who is now taken in by English engineering firms as mechanic apprentices has usually had a decent board school education and is in a position to improve himself, if ambitious, by attendance at technical school night classes and afternoon classes. The average Indian lad who goes into a works as an apprentice has had little education. In England the foreman class seems to be largely recruited from men who have worked their way up and who have acquired a certain amount of technical education in their spare time as well as being skilled workmen; in India the proportion of workmen who have had any education is small. There is an undoubted demand for workmen who can read and write, understand drawings and make simple sketches and calculations. It seems that the industrial (or as they are called in this province technical) schools must fill the gap. There is one other point of importance, which is apparently making itself felt in the English engineering trade also. With the higher development of machinery and the greater degree of efficiency required from the workmen there is more specialisation and consequently the average apprentice does not get the all-round experience or acquire the general skill with hand tools that was possible in the past.

In this province there are two general technical (industrial) schools at Lucknow and Gorakhpur, respectively; they differ from English institutions in the much greater time devoted to practical work and in relatively better provision for workshop practice. In addition there exists a carpentry school where the work is all technical and no general education apart from the drawing and calculations connected with practical work is attempted. In the case of the two technical schools provision is made that all pupils should be definitely apprenticed in works at the end of their school career and no final certificate is issued to any pupil who fails to complete a satisfactory apprenticeship. Apprenticeships have been obtained mostly in railway workshops and similar institutions. This seems at present the most feasible way of co-ordinating the industrial school with the apprenticeship system.

Night schools are maintained at some of the industrial schools in this province but my personal experience of them did not extend long enough to enable me to form any estimate of their effectiveness. Climatic conditions are, however, a considerable obstacle in India and it seems unreasonable to expect the same result from them as in England. At those centres where large numbers of apprentices are employed I am of the opinion that half day classes might be further made use of than at present provided that employers are willing to permit apprentices to attend.

I have purposely omitted any reference to textile operatives as my experience of industrial education in this connection was not sufficiently extensive. One point of practical importance was brought out, viz., that "mistris" in textile factories are expected to act as labour recruiters as well as superior workmen and that boys from a technical school were at a considerable disadvantage in this respect.

Industrial schools

Q. 47.—To my personal knowledge several lads from the technical schools of the province have turned out useful workmen, although the present system has only been in force for a comparatively short time; there have naturally been some failures though they seem to be earning a living and to have made some use of their training.

What is perhaps more important is the fact that these schools are inducing a considerable modification of attitude amongst classes of the community who previously would not take up industrial work. I have seen boys at the Bareilly Carpentry school who are better practical carpenters than the sons of actual working carpenters, although they came from the non-artisan class. Some of the best boys from the other technical schools are from families who have not previously taken to any form of manual labour. With the extension of primary education and the apparently inevitable tendency on the part of the artisan classes to educate their sons for what are commonly considered more dignified pursuits this seems to be of no slight importance.

Organization of technical and scientific departments of Government.

Imperial department.

Qs. 64—67.—The mere formation of an Imperial department for technological and scientific research would probably not be the best way of starting. The general tendency in India has been to start with an Imperial department and develop provincial institutions later. I venture to suggest that the experience which has been gained in the Agricultural department would indicate that the reverse course would probably lead to better results and that a start would be made in the provinces. When some progress has been made and the problems to be attacked are better defined then the question of Imperial officers or an Imperial department could be considered. For technological research one institution for all India is bound to be inadequate and as a very minimum I would suggest that one should be provided for Northern India in addition to the one which already exists at Bangalore. It would be necessary that such an institute should be comparatively general in its activities in the early stages of its career. As experience was gained it would doubtless specialise. It would be an advantage if it were not built on too lavish a scale at first, but ample provision should be made for expansion. Each province has already its own

Agricultural department the officers of which are members of the Indian Agricultural Service which is an Imperial service. The experience of most provinces seems to be the same, viz., that the most immediate need is the strengthening of the Provincial departments.

Co-ordination of reserch.

Q. 74.—Generally speaking the need in India seems to be not reorganization or co-ordination but the provision of a larger number of research workers. Research is so essentially a personal matter that it is impossible to do more than suggest the general lines on which investigation is required. It would be fatal to attempt to lay down boundaries for different investigators. A research may be started with a very definite objective but may develop in an entirely unexpected direction. It often occurs that the solution of a definite problem may involve the carrying out of a more fundamental piece of work than was at first contemplated. Nor is it in accordance with the best traditions of scientific investigation that research in a particular line should be limited to single investigators or groups of investigators and this applies particularly to fundamental investigations.

Other forms of Government action and organization.

Roads and railways.

The Kumaun fruit industry undoubtedly suffers from inadequate facilities for transport. Not only are the orchards at a considerable distance from rail head but the railways give them few facilities. Until quite recently collective booking of consignments to the same destination was not granted by the Rohilkhand and Kumaun Railway and it was necessary for a grower sending (say) 100 bushel boxes of fruit to a merchant in Calcutta to obtain a separate railway receipt for each box. This not only led to intolerable delays in booking but to a very serious increase in the charge for freight. Collective booking has now been partially introduced.

As the larger areas that have been recently planted in Kumaun come into bearing some much better arrangements for railway vans for fruit will be essential. I am not prepared to express any opinion as to the feasibility of cold storage vans but the provision of proper ventilated vans for fruit traffic seems essential; fruit should not travel with miscellaneous merchandise.

Transport in the hills.

Under present conditions all fruit estates have to send their fruits to the station by coolie loads. Not only is this expensive and a severe tax on the industry but as more gardens come into bearing and the competition for labour becomes keener the demand for coolies for transport will seriously reduce the labour force of the gardens and will make picking and packing more expensive and more difficult and will probably adversely affect cultivation both in the gardens and outside. The remedy seems to be the pushing up of branch railway lines into the hills as far as practicable and the investigation of methods of transport, such as ropeways, for bringing produce to the railway and for taking up stores.

Railway freights.

Q. 98.—Shortly after the outbreak of war I was able to bring to the notice of Government two cases in which the railway freight on minerals urgently required for the making of chemicals in Cawnpore was prohibitive. The matter was referred to the Government of India and a reduction in rates was secured. I cannot however understand why in such cases the railways concerned should not have given the concession on the representations of the firm concerned.

(Mr. Burt also submitted confidential written evidence.)

ORAL EVIDENCE, 7TH NOVEMBER, 1916.

Dr. E. Hopkinson.—Has there been any considerable development in growing o flax?—Flax-growing in the United Provinces has never passed the experimental stage as it is hopeless to expect progress unless a central factory for retting and scutching is established.

Could it not be developed as a cottage industry as in Europe?—It is not in my opinion possible to develop flax in this province as a village industry because the villager would make a muddle of the retting and because hand power breaking and scutching machines are insufficient. The objections to village retting are mostly a matter of local conditions and water supply retting should be done under expert supervision.

What steps have been taken to disseminate the information?—The experiments conducted at the Dooriah factory were made under the orders of the Government of India, and I am unaware as to what steps they have taken to make the results obtained public other than by the publication of the Pusa bulletin. Progress reports were published by the Behar Planters' Association. As far as my experiments were concerned, a note was written for the United Provinces Board of Industries and I have placed all the available information at the disposal of the Director of Industries who is still in correspondence with a number of factories which use flax.

President.—Would it not be an advantage if we had a trade representative in London and associated with him two or three technical experts to advise as to what is obtainable in India?—This might greatly help. It never occurred to me that the British Cotton-Growing Association was not fully aware of what is being done. Their publications led me to think that they were. But if there is any lack of information I certainly think that it would be most valuable.

Hon'ble Sir R. N. Mookerjee.—Is the object of getting more good cotton in India at Government expense, for internal use or for export purposes?—For either.

WITNESS NO. 16.

MR. S. H. FREMANTLE, I.C.S., *Commissioner, Rohilkhand Division, Allahabad.*

WRITTEN EVIDENCE.

Financial aid to industrial enterprises.

Capital.

At present a portion of the available capital is hoarded or spent on articles of clumsy jewellery or wasted on ceremonies and another portion is lent out at high interest to zamindars and cultivators. Co-operative credit societies can supply the place of the latter portion and can also make use of the former portion which is now wasted. The organization of capital through the co-operative movement is therefore a first desideratum.

Professional men who save money have no connection with the money market and up-country where there are no stock brokers, they have no one to advise them as to investments. The amount of capital put into Swadeshi banks shows that they are even too ready to invest in any concern started by their friends and neighbours without enquiring too closely into the financial prospects of the enterprise and the business capacity of the directors. And the old established joint stock banks and the district co-operative banks get ample funds from this source. As to industrial companies, in view of the failure of so many of these in the past and of the lack of business capacity in the prospective directors, I do not think that the profesisonal classes can be expected to invest in them, while Indian landowners, bankers and mahajans have generally a more remunerative use for their capital.

The best hope therefore of increasing the supply of capital for joint stock company enterprises seems to me to lie in the development of the banking systems, both co-operative and commercial. The one will gradually take the place of private capital now used for lending to individuals and free it for industry while the other will not only do this but will help with its surplus in financing industrial enterprises under proper safeguards.

Government assistance.

Of the methods suggested for giving Government assistance to industries loans and the supply of machinery and plant on the hire-purchase system are already in force for working up agricultural products and the contribution by Government of a portion of the share capital of companies on the same basis as public subscriptions of capital seems to me to carry very great possibilities. If Government were to subscribe part of the capital and a Government director with certain powers were appointed I think that private money would come in with much more confidence.

Co-operative societies.

It is not in conformity with sound principles of co-operation to pioneer new industries. A co-operative society must if it is to be successful be managed by the workers themselves who are small men without the technical knowledge, general education and command of resources which are necessary for purposes of experiment. The function of co-operation is to take up such businesses as have already been tried by capitalists, organizing the producers of the raw product to combine together to supply the necessary funds for working it up as in the case of agricultural co-operation or organizing artisans to combine together for buying the raw material manufacturing it jointly and selling the finished product of their trade as in the case of industrial co-operation. Co-operation encourages and assists industry by organizing the producers so that they can find the necessary capital and educating them so that they can take advantage of improved machinery and processes. Indirectly it assists industry by providing a wide market for improved implements and machinery which would otherwise never have come into general use at all and by raising the general standard of living of the people so causing a larger demand for manufactured goods.

The first stage in a new industry is demonstration by Government or a subsidised body or company to prove that the industry will pay. The second stage is that a few individuals seeing prospects of profit take it up. And the third stage is that according to the nature of the industry joint stock companies or co-operative societies organize a supply of capital and raw material and manufacture it. The work can suitably be done by co-operative societies when the product to be worked up is one largely produced by local men and expensive plant is not required. And when once an industry (such for instance as the production of butter ni

Denmark and Ireland) has been organized on co-operative lines the industry occupies a strong position and can introduce these improvements which experience from time to time dictates. At present in India we are only at the threshold of productive co-operation, and advance must be slow. For until the producers are by co-operative credit freed from dependence of the money-lender they cannot combine freely for productive purposes and the establishment and management of co-operative production requires a higher standard of education than the organization of credit and is very difficult to work. Hence until both co-operative and general education are much further advanced there is little chance of any great expansion in co-operative production.

Training of labour.

Eleven years ago in the course of an enquiry ordered by Government into the scarcity of labour reported to prevail in the large industries of Bengal and the United Provinces, I toured through those provinces and made enquiries everywhere into the means of attracting, keeping and training workmen and have from time to time renewed those enquiries. Complaints as to inefficiency and scarcity of labour are still rife and a few words concerning them may not be out of place.

India of course has a very large reserve of labour and its workers are as a rule both docile and skilful. They are lacking however in powers of application and in regularity of attendance. With the possible and partial exception of Bombay there is no settled mill population. Men work for a few years, sometimes taking their families sometimes not, go to their distant village homes on a long holiday every year or two and ultimately retire to their native villages. Their distant homes and long holidays prevent their acquiring the skill they otherwise would and make the mill population very shifting. Even when they are not on holidays they do not work with any great regularity. Workers, on the other hand, who have their homes near the mills are still more irregular in attendance because they have not to save money for holidays. Both classes of workers are restless and move constantly from one mill to another.

The remedy for these defects lies in doing everything that is possible by piece-work, making the conditions of labour more attractive, granting bonuses for good attendance, and benefits and pensions for old servants, and generally in improving the standard of living. It is not a question of pay. Factory rates are high as compared with outside rates and raising them would only mean more irregularity, since the workmen would have more scope for idleness. But it is absurd to try to compel the workman to stay when he wants to get off home by withholding the pay of one month up to near the end of the next as is done in many cotton mills. It pays in the long run to make the workmen more steady and contented and therefore more skilful by improving their conditions of work, while the standard of living and, therefore, of regularity and efficiency, would be greatly raised by a proper system of primary education of half-timers.

Industrial and technical education.

The lack of education among mill hands in Bengal and Upper India was commented on in paragraph 29 of my report of 1906, and though something has no doubt been done to remedy it since, I believe that little progress has been made and that little will be made till school is made compulsory for half-timers. It ought to be easy enough to arrange this by working in communication with the mill managers and starting schools close to the entrances of mills. The "three Rs" and drawing only need be taught. I do not believe in night schools for the multitude. Most people are too tired after a long day's work and it is only the very few men and youths that have a real taste for learning who derive advantage from them. There should be one at least in every town of any size.

As to industrial education I think that in all centres of population the vernacular middle school should have an industrial side in which there should be a course of carpentry, including drawing, design, and the use of hand tools only, while at the same time literary education is carried on to a further stage. I mean this course primarily to provide a more skilled class of carpenter, for there is a great scarcity of competent men, but it would also be used as an alternative to a wholly literary education for such as preferred it.

There is also great complaint of the want of skilled fitters, turners, moulders, etc., and I am inclined to think that a combination of the two systems of training (i.e. apprenticeship and industrial school) would be the best means of remedying this defect. Boys would be taken on as apprentices after they have passed the upper primary examination, would spend half the time in the shops and the other half in school, where they would be taught drawing as well as the ordinary literary subjects. The school would be maintained by Government and managed in consultation with one or more commercial men. The East Indian Railway collieries at Giridih had a school of this description in connection with their workshops.

Industrial schools of the types mentioned should be under the control of the Education department but be subject to inspection and criticism by the Director of Industries.

Technical schools, whose object is to teach improved methods of weaving, tanning, carpentry, etc., should be under the control of the Director or Board of Industries.

As to training of supervisors the difficulty is that such men are chosen at present not for their technical skill, which is generally very small, but for their capacity for handling and keeping labour. In fact usually the management are entirely dependent on them for recruiting labour. See paragraph 24 of my report, where the results of this system are discussed. It is, in my opinion, a bad one, both because it allows of no close relations between employer and employed and because supervisors are appointed not for their technical skill but on account of their superior cunning. If men of respectability and technical skill are to be taken on as supervisors the best means of training them would be to take on youths of fair general education as apprentice workmen and when they have "passed through the mill" and shown that they have grit send them to complete their education at a technical school. I believe that the gospel of the dignity of labour is spreading and that such youths could be found.

ORAL EVIDENCE, 7TH NOVEMBER, 1916.

President.—You have not told us in your note precisely what the exact title of your report is?—It was a "report on the supply of labour to the United Provinces and Bengal."

Where was it published?—It was published by the *Pioneer* Press.

Is there any such thing as an arrangement in the United Provinces for these reports to come into a series of a recognized kind, or are they entirely isolated?—There are very few reports of that kind. This report was entirely isolated. I was on special duty for it. We have a number of monographs on different industries of the province. They are in a regular series.

In paragraph 7 of your note you say that as to industrial education you think that in all centres of population the vernacular middle school should have an industrial side in which there should be a course of carpentry including drawing, design, and the use of hand tools only, while at the same time literary education is carried on to a further stage. What kind of start do you think it would be practicable to obtain for the purpose of training these boys in a course of carpentry, designs and so forth?—We have got a carpentry school at Bareilly and the School of Arts and Design at Lucknow which, I think, could provide in course of time competent instructors.

Do you contemplate that the young men who will be turned out from these schools at Bareilly and Lucknow will be suitable as instructors in these middle schools?—Yes. I had some talk with Mr. Herd about it at Lucknow and I said that as soon as he could give me an instructor of the kind I would start a school in Allahabad as an experiment.

What salary do you propose to give these men?—Rupees twenty-five a month.

A good carpenter gets more than that?—Well, the carpenters in this part of the world have not yet been able to get more than that. Some of the Punjabis certainly do.

Is there any settled policy on the part of the Government with reference to these industrial schools and the training of teachers for these industrial schools?—No, there is not. It is a matter which I brought before them several times.

As far as I can see the Bareilly school is not turning out men suited for this kind of work. It seems to me that there is no sign of any settled policy on the part of the Government?—There is not. Government does not appreciate the necessity for schools of this kind. It is entirely my own idea. I made the same proposal at the Naini Tal Conference in 1907.

Is it in any way a part of the programme of the Director of Public Instruction or the Director of Industries?—I do not think so.

The matter has never gone further than to pass a resolution at the 1907 Conference?—There was not even a resolution passed about it although I brought the matter to the notice of Sir John Hewett. He did not approve of it. I think something of this kind ought to be done in Allahabad now. We have got the most wretched carpenters there and the demand for competent men is very considerable. They have no education at all. They make about 10 or 12 annas a day. My idea of starting this school is that you could train the local men.

It will be better if they are taught by their own caste-fellows than getting an outsider?—Yes, if you had a school it would leaven the whole carpentry business of the place.

Have you seen any good results in the province following the establishment of these schools at Bareilly and Lucknow?—The School of Arts and Crafts has not had much time yet. It is a very recent development. The school at Bareilly is a local concern. They take no boys from outside at all. I made a proposal recently that they should start a boarding house.

Are there any other schools of the same kind in the province except that at Cawnpore which has recently been started?—There is the Benares Weaving School.

Is that flourishing?—I do not know.

After these resolutions were passed one would have expected at the end of nine years to see some changes in the carpentry industry of these provinces beyond these sporadic local schools which do not seem to follow any line of policy and do not seem to affect the country as a whole?—It will take some time to get things started. As regards the School of Arts and Crafts very few boys have come out from that school yet. It has not been going on for five years altogether. Some of the weaving schools have certainly done very good work. They have had a considerable effect on the development of the fly shuttle handloom industry.

Hon'ble Sir F. H. Stewart.—Have any co-operative credit societies been formed in these provinces for industrial purposes?—Many credit societies have been formed among artisans. A great many of them went on very well for a time, but they have not been doing very well lately. You will see all about them in the Registrar's report. At Benares there are societies of tanners, basket-makers and many different kinds of artisans.

Were these private concerns or were they under the Government?—They were not indigenous in any way. They were started by the Government Inspector.

You say that the following methods for giving Government assistance to industries, *viz.*, loans and the supply of machinery and plant on the hire-purchase system are already in force in this province. Is that assistance given through the Director of Industries?—I do not know. In the Agricultural department they do it. After all most industries consist in the working up of agricultural produce.

You think the development of the banking system is most promising if Government subscribes part of the capital. You mean that Government should put capital in the banks?—No. I was referring to industrial companies, not banks.

Would you have a Government Director?—I would have the Director of Industries as Director.

With reference to the training of labour, you say that complaints as to inefficiency and scarcity are still rife. Has there been any improvement of late years?—I am really not qualified to say except that one still hears complaints. I have however not been into the question recently, and I could not say whether there are fewer complaints than before.

With reference to industrial schools you think that they should be under the control of the Education department except for inspection and criticism by the Director of Industries. Will that answer?—Yes. I think so. If you have any schools with a literary side they should be under the control of the Director of Public Instruction.

Is the Director of Industries at present subordinate to the Director of Public Instruction?—I do not think so.

Would you not recommend the elimination of the Director of Public Instruction as regards the control of industrial schools?—I do not think so. Not for schools that have a literary side and where there is no specialization. The industrial schools which I was advocating are not highly specialized like the weaving and tanning schools.

Sir D. J. Tata.—In paragraph 1 of your note you state something about the development of the banking system, both co-operative and commercial. Can you say anything about industrial banks?—I am afraid I have no experience.

You do not approve of industrial banks?—I don't feel I am competent to judge.

At the end of para 5 of your note you refer to a proper system of primary education for half-timers. Would you approve of factory schools being established by Government aid inside the factories?—I think it is a possible system if it was under the control of the educational authorities.

I gather that the education given to half-timers is much more for keeping operatives in hand so that they do not scatter about?—It might be so. But I do not see any harm in it.

With regard to the vernacular middle schools which should have a course of carpentry, etc., you mean that such a course would be of a compulsory nature and form part of the curriculum?—I don't mean that every boy should go to the industrial side. I don't mean it to be compulsory at all. I would like to make these industrial schools a part of the general educational system; not separate.

In paragraph 9 you say that the industrial schools of the types mentioned should be under the control of the Education department. How would that keep them in touch with the requirements of an industry?—I say I want to make these industrial schools a part of the general system of the country. Therefore they must be under the Education department subject to inspection and criticism by the Director of Industries.

There is a difference of opinion whether the Education department or the Director of Industries should have control of these schools. Which do you prefer?—If it is an entirely industrial school there is something to be said for the Director of Industries. But I do not propose an entirely industrial school.

Hon'ble Sir R. N. Mookerjee.—In paragraph 8 of your note you say that there is a half-time school with an industrial side at Giridih. Has the United Provinces Government got a scheme like that?—No. I took the idea from the Giridih school.

Mr. A. Chatterton.—Is there any possibility of attracting capital to industries in this country by the formation of industrial trust companies to encourage investment in industrial concerns. They would be merely investing companies with a Board of Directors who have some business experience and knowledge of industrial work?—I do not know whether you could find competent men for such boards. The middle classes would be only too glad to have something of that kind.

I gather from your note that you are very strongly in favour of Government assistance on a comparatively small scale by means of takavi loans and supply of machinery on the hire-purchase system?—My experience of this is only in the Agricultural department.

Have you any experience of agricultural co-operative societies formed for the purpose of installing machinery and plant for working up agricultural products, such as sugarcane-crushing, rice hulling, flour-milling and so forth? Has anything been done in that direction in this province?—I do not think anything has been done. Rice hulling is too big a business to take up. As regards the methods of sugar production, that again is too big a business for them.

I suppose you are acquainted with the Industrial Co-operative Society at Bareilly and the Carpenter's Workshop?—Yes.

Have you any recent information regarding the working of that co-operative society?—Yes, they have difficulties in marketing their produce. What they do is that the society buys the raw material and they give it to the members to be worked up on contract rates. The society sells the finished products and the profits are divided among the members.

We saw the accounts of this co-operative society. We find that they have 53 members in the society who subscribe at the rate of a rupee a month for shares of fifty rupees each. About Rs. 1,250 have been so subscribed and on the strength of this capital they have already borrowed from the district bank Rs. 28,000. Out of this Rs. 28,000 about Rs. 8,000 is locked up in buildings and about Rs. 18,000 in stock' which they have not yet been able to sell. They have distributed dividends and small bonuses to the workers Does it not seem to you personally that the whole thing is rather on an unsound basis?—Well, the only thing that is unsound about it is that the arrangements for marketing have not been very successful. I notice they have a very much larger stock than they ought to have. As regards borrowed capital there is nothing wrong in that. The co-operative dairies in Ireland work on borrowed capital.

But they have no large amount of stock in hand in the dairy?—No. But they have got the building and machinery. If you develop these societies do you not want to have some very expert control for a long period for giving advice and to keep them within reasonable limits?—They understand the business perfectly well. They have got their regular carpenters who are accustomed to make and sell things. They know pretty well what price they are likely to get.

What advantage do you think has been derived by the artisans in Bareilly from the establishment of a co-operative society. Apparently they have not been able to find a market for their goods and the bonus they have got in addition to piece work rates is one anna in the rupee. To obtain that result they have entered into financial transactions which may eventually overwhelm them. It is an experimental attempt to do something for the artisans, but on the present lines is it likely to be successful?—I think if they can

get over the difficulty of marketing the society will be successful. The members have had regular work. It is an economy to them to buy wood in bulk and get it seasoned.

But there are no proper arrangements for the seasoning?—They may not be ideal, but they are better than they had been before the society was formed.

The Board of Directors consists of persons who are not professional men?—The chairman is a Barrister, Mr. Kacker. The manager is not a carpenter. But the other people are carpenters. The assistant manager knows all about the business.

You advocate the establishment of industrial classes in connection with the vernacular middle schools. Do you know that in the Madras Presidency they have been an absolute failure and we have come to the conclusion that it is better not to mix the two kinds of education?—I do not know.

Witness asked whether the schools in the Madras Presidency were for specialized industries or for industries in general. Mr. Chatterton replied that they were for specialized industries, such as carpentry and tailoring. Witness replied that it was rather a different thing. He added—"You cannot have specialized schools in many different places for the same industries. They would be suitable only to a place like Bareilly which is a great place for carpentry. Schools teaching carpentry, drawing and design should be started in many different places as in paragraph 8 of my note.

You want to provide the country with a more skilled class of carpenters. The question is whether a specialized school for carpenters should be started or whether a school of the vernacular middle type should have a carpentry class attached to it. Our experience in Madras is that it is far better to have special schools for carpenters than to mix the two kinds of education?—It may be better. But it is contrary to educational principles because the training of the hand and the eye should go *pari passu* with the training of the intellect.

Then really your schools would be manual training schools?—Yes.

President.—There is, I suppose, in these provinces an objection to these schools being styled industrial schools. They want to call them technical schools. There is a tendency in that way?—I expect so. There is always a tendency to call things by high sounding names especially in this country.

In paragraph 10 of your note you say that the supervisors in factories are chosen not for their technical skill but for their capacity for handling and keeping labour. Does that apply to big mills in Cawnpore or other small places?—I meant it to apply to all large mills.

Would you like to supplement your evidence?—I only wanted to add this about my proposal for adding an industrial side to vernacular middle schools. Vernacular education is at present wholly literary. It has got no industrial or scientific side. It is by this time perfectly well known that a purely literary education is not good for anybody, but yet we continue to impart it. There is always a difficulty in getting competent teachers for manual work.

What is the pay, do you remember, of a master in a primary school now?—The ordinary pay is from Rs. 10 to Rs. 12 in these provinces.

He would get more than that if he worked in the mills?—He would in the same way as a millhand in Lancashire, or rather his family, for several members work, get more than a clerk's pay.

Sir D. J. Tata.—Are you aware of a system which is called Sloyd in America?—It is a sort of elementary manual training. It trains boys in the use of their hands and eyes. Would not a thing like that meet your requirements with regard to vernacular schools?—I have no doubt it would be a good thing. But I think the proper kind of industrial education for primary schools is agriculture. All Indians who live in villages are naturally interested in agriculture. All we want for them is the teacher. I think that would be more interesting to the boys than any form of manual training such as you suggest.

That will not be developing industries but agriculture?—If agriculture develops industries will develop. The country will get richer and there is more chance for industries.

WITNESS NO. 17.

MR. THOMAS SMITH, *Managing Director, Muir Mills Co., Ltd., Cawnpore.*

WRITTEN EVIDENCE.

Capital.

Q. 2.—In these provinces I think it is safe to say that the bulk of the capital for joint stock industrial enterprises is provided by Europeans. A few mills, and a considerable

number of ginning and oil presses are owned by Indians. Speaking generally, Indians in the professions are not attracted by commercial projects: bank shares and deposits and property appeal more to them.

Q. 5.—Of the seven methods suggested I prefer—

(3) guaranteed dividends with subsequent refund;

(4) loans with interest; and

(6) provision of part of the share capital.

Government assistance.

Government should get its share if the venture succeeds in (3) and (4); automatically it would get its share in (6). These three methods would prove more directly applicable to joint stock concerns.

(5) would prove suitable in the case of the small capitalist;

(7) guaranteed Government purchases should be in constant operation; and

(2) bounties and subsidies as circumstances may determine.

Q. 6.—In methods (3), (4) and (6) where Government's commitment is considerable, it should have the right of nominating a director or directors. Members of the Board of Industries with commercial experience might usefully be delegated.

Pioneer factories.

Q. 7.—Assistance should preferably be given by the methods enumerated in question 5, so that the public may co-operate, but where public initiative is wanting or will not follow, Government may be under the necessity of itself pioneering.

Q. 8.—If such information is not readily available, it seems to me Government should collect, from Chambers of Commerce, managing agents and other sources, details of industries that have been tried and failed, and the reasons for their failure. This would give a comprehensive view of individual effort. It should not be used to deter Government or any one else from trying again, but rather as a guide against the mistakes of the past.

It seems to me that the question of in what ways and to what extent Government should pioneer, as also the question of what limits or restrictions should be imposed on conversion, and at what stage to close down or hand over, must be decided in the light of experience and on the merits of the particular case.

Financing agencies.

Q. 10.—I stated in my evidence before the Royal Commission on Indian Finance and Currency that I believed there was abundant scope in India for the development of joint-stock banks and co-operative societies, and that the trade and industries of India would benefit much from soundly conducted concerns. I pointed out, however, the danger of the mushroom growths that had sprung up and to which I had drawn attention the previous year in an address to the United Provinces Industrial Conference (copy* attached). The collapse of these banks began while the Commission were still sitting. Their failure is much to be regretted. These banks had a useful rôle to perform: they were penetrating small and remote places, which the bigger banks had not touched, and were inducing money from hoards, and making it available for the finance of trade. Unfortunately they were allowed to run wild, they were no one's care: inexperience, incompetent management, and too frequently dishonesty were their undoing. It will take years to obliterate the memory of these failures, and to win back public confidence in new Swadeshi banks.

The Presidency Banks and the larger joint-stock banks should fill the gap, and reoccupy the ground formerly held by the smaller institutions by establishing agencies or sub-agencies. These would be managed by Indians, and under the careful and experienced supervision of the head office, and with larger resources at their command, would be a vast improvement on what has been. The Allahabad Bank has eight such sub-agencies.

The finance provided by these banks would however only be on marketable goods. There is room for another type, the Industrial or Finance Corporation. The corporation would amongst other things make advances on buildings and machinery, and as its loans would be more or less for a term of years, it would not ordinarily receive deposits from the public, which would be liable to withdrawal, but would derive its main finance from fixed capital, such as shares and debentures.

Another method is that outlined by Lala Bishambhar Nath in his recent address to the United Provinces Industrial Conference, viz.—a syndicate of men of means who would guarantee advances made by the banks to industrial enterprises on the basis of a commission to the syndicate.

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* Not printed.

Demonstration farms.

Q. 19.—For "factories" I would like to read "farms". More demonstration and seed farms are required for cotton, so that the cultivator may learn better methods, secure better seed and improve his yield.

Q. 20.—Yes, more of these farms are wanted in the United Provinces. At present there are only six or seven. The cost is not great as some of these, I believe, are self-supporting. The United Provinces Government spends over 50 lakhs on education, and only a mere pittance of 5½ lakhs on its Agricultural Department in which, I believe, the cost of the college is included.

Commercial museums.

Q. 28.—I cannot trace any direct benefit from the Calcutta Commercial Museum; of course, it has not been long on its trial; and another explanation undoubtedly is that my company has its own dépôt in Calcutta, where there is a full display of our manufactures, and purchases can be made on the spot.

It is difficult to meet the requests of the museum authorities to have current prices exhibited. These are constantly changing with trade conditions. Cotton, for instance, to-day is nearly three times the price it was a couple of years ago.

The word "museum" is not quite a happy choice. The dictionary says it is "a collection of natural, scientific, or other curiosities, or of works of art." We are not out to sell curios, but articles of every day utility.

Sales agencies.

Q. 30.—I think that sales agencies have a promising future, "provided the artisans maintain quality and deliver promptly." Before the Cawnpore Emporium was started, I suggested to a prominent Indian gentleman in these provinces the establishment of such agencies and he agreed, but with the observation above quoted. I believe there is force in what he says, but I look to the responsible management to help in overcoming these defects.

Exhibitions.

Q. 31.—I think more benefit is likely to result from district fairs, and Government could assist by seeing that fuller publicity is given to them. Collectors might easily be instructed to advise concerns like ourselves, of the dates on which they are to be held, and give us an opportunity of exhibiting.

At the same time, I think a provincial exhibition once in, say, five years, would be a good thing, both from a commercial and instructive point of view, and Government should certainly encourage it financially and otherwise.

Q. 33.—Such exhibitions should be popular in character, but subject to the main idea.

Government patronage.

Q. 37.—More good would result from Government departments publishing lists of imported articles, and stating the prices paid, than by exhibiting in museums. As it is we find little or no difficulty in getting samples from the departments concerned. But what would help us would be the prices paid.

Q. 38.—The war, I think, will be found to have been instructive to Government departments. They have had to look round in India for immediate supplies, and I hope they have not been disappointed.

I have heard it argued that while the Government intention is clear to buy more and more in India and less at home, this is to some extent nullified by Stores departments being unwilling to purchase in India, so long as they can throw the responsibility on to the India Office of making purchases at home. I cannot speak from experience as to this, but mention the point as the Commission may be able to get further information.

Q. 45.—I consider the real line of improvement in the labourers' efficiency and skill to be—

(a) development of thrift;

(b) pride in his work;

(c) his recognition of the value of time.

Apprenticeship systems.

Q. 46.—At a recent meeting of representatives of the cotton mills in Cawnpore, it was recorded—

> "In the opinion of those present, the experience gained by workshop apprentices had been considerable and valuable, in consequence of which those apprentices had almost invariably be taken themselves elsewhere for a higher wage."

Industrial schools.

Q. 47.—At the same meeting it was recorded—

> "The meeting felt constrained to remark that no advantage was apparent to cotton mills from the establishment of industrial schools. The most satisfactory labour was found to be that obtained raw and trained in the mill."

I have, however, two lads in my workshops now, who are shaping well, and I hope they may modify this experience.

Official organization.

Q. 56.—We have an Industries department in this province.

Q. 57.—There is also a Board of Industries. It is merely advisory and should remain so.

Q. 58.—It should, however, be more commercial, industrial and financial in its composition. These members should predominate, and not as at present, where there are only three such members out of a Board of seventeen. The President should be a business man.

With such a constitution, the Board's decisions on industrial matters should be entitled to the highest respect.

Q. 60.—Our Director of Industries is a business man. The Director should always be a business man, preferably one with manufacturing experience.

Q. 62.—I do not at present see the need for an Imperial department under a single head. The various provinces will probably best develop along their own lines, and I look to a healthy rivalry between them to obtain the lead.

Colleges of Commerce.

Q. 80.—I do not consider a College of Commerce is necessary in this province. There were 14 candidates who sat for the Commercial Certificate Examination of Allahabad University this year. The previous year there were 3.

Q. 110.—In question 5 various methods of Government assistance are suggested. The cotton industry, with which I am connected, wants none of these doles. It needs neither bounty nor subsidy. It only needs the removal of a burden—the cotton excise inquity. In other words it asks nothing of Government but fair play.

It seems to me inconsistent to meditate bolstering up new industries, while throttling an existing one, to make a poor old friend like cotton find the money for the upbringing of other youngsters.

Some of the industries that may be hatched as a result of this commission may one day be treated like cotton. Who knows?

Q 111.—I give below a list of articles for which the cotton mills in India would prove a good market. I do not know if India is capable of producing all, but certain of them seem likely possibilities:—

1. Tallow, refined.
2. China clay.
3. Gums (particularly gum-tragacanth and gum-tragasol).
4. Zinc chloride and zinc dust.
5. Magnesium chloride.
6. Bleaching powder.
7. Farina.
8. Sodium sulphide.
9. Chrome alum and potassium bichromate.
10. Caustic soda and soda ash.
11. Bobbins.
12. Shuttles.
13. Picking sticks.
14. Paper tubes for cops.
15. Straw boards for bundling yarns.
16. Restoration of the dye industry.

ORAL EVIDENCE, 7TH NOVEMBER 1916.

President.—I understand you are the Managing Director of the Muir Mills Company?—Yes.

How long have you been in this work?—Three years.

And before that you were with the Allahabad Bank?—Yes.

Dealing with some questions relating to the methods by which Government might assist industries, you have enumerated only three that you prefer, viz:—

(1) guaranteed dividends with subsequent refund;

(2) loans with interest; and

(3) provision of part of the share capital.

Have you in your mind any way by which the Government should be assured of the technical and commercial suitability of any new industry that has been proposed?—I had in my mind the Board of Industries, such as I would like to see it, considering all such schemes, and further expert advice being taken.

I suppose you realise that if Government took a share in the capital the public would be influenced by the action of Government?—I think so.

So that the Government is responsible for the money the public may subscribe?—Yes, the public would be influenced.

Passing on further you refer to the fact that the Government might pioneer industries and that it should collect from Chambers of Commerce, managing agents and other sources, details of industries that have been tried and failed, and the reasons for their failure. Do you think it would be easy for the Government to have that information properly "vetted"?—I think it could be done. For instance take the joint stock companies. Their failure is bound to be recorded. You have got the Registrar's reports. Take the glass factory and the match factory which I am thinking of in Calcutta. You could get a very good account why they failed.

Do you propose any organization for the purpose of collecting and making available this information?—I think the Board of Industries could do that.

A similar thing has been proposed with regard to mining and prospecting. A company takes a prospecting licence for a limited area. It does a certain amount of work for two or three years and then gives up the license. The public ought to know what has happened, why that land has been abandoned. The public ought to know what the results were so that they could learn from the stage where the other people have left off, and so a certain amount of public time will be saved. But there are difficulties in the way of getting companies to disclose the information obtained. We must be quite sure that the information is really of a reliable nature. But don't you realise that it would require a very big organisation to put the suggestion into action?—I don't see why they should not disclose failures. It is all for the good of the State. We want to know why things failed.

You are really hopeful of collecting as much available information as possible as to past failures?—Yes.

Are you familiar with the history of banking? You remember how in the old days the proprietary banks in England, which were more or less family affairs, knew everybody in the district and they consequently often advanced money on the good name of the local industrialists. But in the case of the larger joint stock banks, the representative or the local manager, who was a stranger to the district, was responsible to his principals in London, and would not undertake the same class of venture; and so an opportunity was lost in the way of financing smaller industries. I presume that something of the kind has happened in India to some extent. The joint stock banks have not penetrated into the smaller district towns, and if they get there they will displace the sowcar. You believe that there is scope for these smaller district branches?—As I say in my note there is scope, if they were properly run.

Would you suggest that the joint stock banks should be encouraged to have smaller branches right out to the district?—They do get into small places, not exactly villages but places like Moradabad, Sitapur, etc.

The joint stock companies have not reached all the district headquarters?—They are all over the province here.

In every district head quarters there is a joint stock bank?—No. You take a district like Unao. There is no joint stock bank there but a town bank. Come to Orai down the line. There is no joint stock bank but a co operative bank, I think.

Have you any hope of getting a district bank multiplied by village branches?—Trade will take them there.

What could Government do to help forward these banks and co-operative societies, or should they trust in the pious hope of simply advocating them?—I don't think Government can do anything but advocate.

If this idea were brought to fruit and the joint stock banks did establish these smaller branches, it would necessarily follow that they would have to employ a large number of Indian sub-managers for these smaller banks. Is there any provision being made in this country for the training of young Indians to take up work of this kind?—Nothing more than the experience they get in the office.

Are they trained to take charge of a bank?—A man with some intelligence passes through the whole routine of the office. He sees when loans are proposed to the head office. The head office makes further enquiries, and the branch writes explaining why they are required and so forth. That is all education to a man.

Do you know a case where young Indians are in charge of such banks?—In the Allahabad Bank they are all Indians in the sub-agencies. These are at Sitapur, Hathras and some other places. 'Good Babus are promoted.

In your experience they prove satisfactory?—Very good, under supervision from the head office.

What kind of training have these young men had? Did they come to the banks as clerks.—Yes.

Have they ever been to a College of Commerce?—No.

To a University?—They may have gone for the matriculation.

Can you give me a rough idea when they could have charge of these sub-agencies, whether they are young men or senior members of the staff?—Probably men with 18 or 20 years' experience.

If we established commercial colleges in the country where the principles of banking would be taught, do you think that a large number of men would be available?—You don't learn banking that way.

Would it be possible to improve the chances of these young men if evening classes were conducted in the larger towns at the headquarters of these banks, so that a man doing practical work in the office could go to these evening classes?—That is sound. It is following the lines of the Institute of Bankers in Scotland. There a young man with a good secondary education at home joins the bank at 15 or 16. There are two degrees.—Associate and Member. He takes two years to pass the Associates examination. Then he proceeds to the Membership also two years, which has political economy, conveyancing and the law of documents including, I think, history of banking and various other subjects. That is a four years' course in all. He is in the office from 10 to 3. After that the boy can go home and read in his spare time. He is thus gradually assimilating what he has seen in the office and learning from books what the effect of that is.

Is there any branch of the Bankers Institute in this country?—No.

What course should be taken to establish one?—That is a big question. One thing, speaking off-hand, would be to ask the various banks in India about it.

Would it be an advantage to banking in this country if the Bankers Institute had a branch here and their qualifications were recognised?—I think if we take the model of the home institute, why should we not have our own?

Do you think Government should impose regulations as to who should manage a bank? Do you think they should have a standard of qualification?—I think not. The big banks sending out sub-agents are the best judges. It would not be a case of taking any one.

Do you know why so many bank failures occurred recently?—That was bad management from the top right down.

Would it not be a good thing if there was some standard of qualification required?—

There you were dealing with young and inexperienced bank managers. But the banks like the Alliance Bank or the Allahabad Bank are not going to send out fools to manage their sub-agencies. They are men of tried experience.

But the qualification laid down whatever it is could be of such a type that the Government under the regulations could accept the judgment of the Allahabad Bank or the Alliance Bank or any large established banks, just as in the case of mining the Government have a certificate of experience for the management of a mine. Do you think that something similar should be necessary for taking charge of the public money?—Yes. I am with you there. I would not just exactly pin myself down to tell you what was a necessary qualification for managing a branch, because a man might possess the degree of intelligence but not the knowledge of men to make a good manager.

But what I would like your judgment on is whether you think that it will in any way interfere with the natural development of banking if Government introduced some form of legislation of the kind stated before?—I cannot answer that question unless I know what the qualification is to be.

The point is that no legislation will affect the people who are qualified already. What I am now thinking of is the possibility of preventing an epidemic of the kind that occurred before. Do you think that any good can come by legislation properly arranged?—Undoubtedly we must have banking legislation.

Could you give us some ideas of the kind of legislation that is suitable for the purpose of bank managers, or what conditions should be satisfied before an institution is registered as a bank?—I think that is all expressed already. It has gone from the Chamber of Commerce to the Government. It is all on paper now.

You refer to the use of these commercial museums. Is it not difficult for a commercial museum to keep the prices up-to-date?—It is.

Is it in your opinion dangerous to exhibit articles that are priced without being absolutely up-to-date?—They convey a false impression. It might do more harm than good?—I do not know that it would do any harm. If a man came to me and asked me for an article at the price exhibited in the museum, I would simply refuse to sell if the rate had risen.

Would it be advisable to put a dated price?—No. There are so many things and so many prices.

In other words you do not approve much of these commercial museums for the purpose of helping commercial enterprises?—No. I am not very enamoured of the idea. It has not long been on its trial however.

Do you think that sales agencies for minor industries of the kind that have been started here in Cawnpore might be of any use?—Quite.

Q.—You mention that more good would result from Government departments publishing lists of imported articles, and stating the price paid, than by exhibiting in museums. That is of course consistent with your previous statement. Now it has been suggested that this difficulty of disseminating the information to the producers with regard to what Government has purchased might be got over by publishing in the form of a blue book each year a list of the articles imported by Government and the prices paid. Do you think that would meet the requirements of the producers in this country?—Yes.

Do you think it would be advisable to extend what you know exists as a local purchase department for the railways? The officer examines locally made articles for the railways. Do you think that principle might be extended to other departments of the Government?—I have not thought that out.

If each officer makes a purchase on his own account naturally he can only purchase on a small scale. But if these were gathered together, presumably the purchasing department might be able to get better terms. Do you think that the present purchases in India would in any way warrant Government in organising a department of the kind?—I really would not care to give an opinion about it.

With reference to your answer to question 110, you say "It seems to me inconsistent to meditate bolstering up new industries, while throttling an existing one, to make a poor old friend like cotton find the money for the upbringing of other youngsters. Some of the industries that may be hatched as a result of this Commission may one day be treated like cotton." Do you think it is wrong to tax a flourishing and established industry for the purpose of using a portion of the money to develop new industries?—You have only got to look down the share list of cotton companies to see how many do not pay dividends, and who might pay dividends but for this excise duty. In the form of excise

it is most wrong. If Providence is good enough to give natural gifts in the form of cotton why should we not use them to the best advantage.

If you had the excise duty removed, presumably you will have to pay import duty at 7½ per cent. on your machinery and plant which is imported free at present?—That might be so.

Hon'ble Sir F. H. Stewart.—You say that in these provinces the bulk of the capital for joint stock industrial enterprises is provided by Europeans. Is there in your knowledge much Indian capital available?—There is plenty of Indian capital in the province.

In whose hands is it?—There is the enormous wealth of the zamindars and taluqdars. The Indian mahajan has got his money invested in his own business.

Have these mills in Cawnpore got their own capital and have they no need to have recourse to Indian capital or as a general rule to the public?—No.

Of the seven methods suggested in which Government aid might be given to industries, I gather from your replies that you look with favour on Government aid being given in certain circumstances?—Yes.

Do you think that it should be subject to Government control?—Yes. Not by an official but by a director nominated by Government.

He would be a business man with a real knowledge of the industry?—Yes. He might be an all-round business man.

And he would put his own money in the enterprise?—He might or might not.

And the Government aid would be given on the recommendation of the Board of Industries. They would also help in getting a suitable director?—Yes.

As regards Government pioneering industrial enterprises, you would only allow it in cases where private enterprise had not undertaken it or had failed?—Yes.

Do you contemplate handing such over to private enterprise when they are established?—Yes.

You have given some evidence as to the necessity for banking legislation and your recommendations are given in the notes attached?—Yes. Quite a rough outline.

You say that the Allahabad Bank has various sub-agencies which are satisfactorily managed by Indians and that policy is capable of expansion?—It is a splendid opening for Indians under strong supervision. The banks have travelling inspectors who are responsible for seeing that everything is in order in the small branches.

You deal with a suggestion for an industrial corporation. Would it be merely a promotion agency such as exists at home?—It might promote. It might take big deposits. It would not accept ordinary deposits.

Such a corporation will come by itself by private enterprise or by Government enterprise?—I would like to see it come by itself.

You approve of sales agencies. How are you going to develop them? Would the management be private or Government?—I think that the Board of Industries would have to manage them because they are in touch with the village industries.

Regarding the improvement in the labourer's efficiency and skill, we had some evidence yesterday as to a practice which some factories seem to adopt of catching labour young and giving these boys a certain amount of school teaching and also of a certain training in the factory. Do you do anything of that sort?—No.

About the composition of the Board of Industries, which has 17 members, your recommendation is that it should be cut down very largely?—There are only three business men on the Board of Industries. It should consist almost entirely of business men.

You do not see the need for an Imperial Department of Industries. Do you think that industries receive sufficient intelligent attention and assistance at the present time from the Imperial Government?—I do not at present see the need of an Imperial Department of Industries. I don't think they would have a sufficient day's work to do. If you get efficient Directors of Industries in the various provinces, what is the man in the Imperial department to do just now?—You have got a Department of Commerce and Industry. I do not know what that includes and what the new Imperial man is going to do.

You think that the Department of Commerce and Industry is adequately equipped at present and has sufficient time to deal with all the industrial questions with which it ought to deal?—I would not go so far as that. Judging from the time they take to reply to letters they must be very busy.

You do not recommend the formation of an Imperial department?—I do not see the immediate need of it unless you could make sufficient work to justify it.

Your recommendation is that sufficient could be done by strengthening the hands of the provincial Industries department and the provincial Board of Industries?—Yes, at present.

Sir D. J. Tata.—With regard to your answer to question 33 as to what should be the nature of industrial exhibitions, do you suggest that they should be popular in character; or should they aim at bringing only buyers and sellers together?—Yes, popular in character.

We were told here the other day that these popular exhibitions were mere places where you went to meet your friends and have a cup of tea. Do you think that they are a little more useful than that?—Yes.

With reference to the reply you gave to the President about the possibility of Colleges of Commerce being useful, don't you think that the training a man would receive at a College of Commerce would fit him better for work in a bank than a clerk who, as you said, had probably passed the matriculation. Would he not be more useful?—It is putting the cart before the horse.

Would not the theoretical knowledge gained by him be of some value?—I do not think so.

If you were having clerks in your office would you not rather select a graduate than an ordinary clerk?—Yes.

In the same way does not a graduate of a College of Commerce also come with a little better knowledge of commercial banking, etc?—Yes, if he begins at the bottom. But the college is not the best training for him. He has gone too far to start with the first job in a bank.

Would you have any objection to take a graduate of the College of Commerce if he is willing to start at the very bottom?—I think he gets his information in the College before it is of real use to him.

You were speaking of some institution in Scotland. Did not that give some sort of information to a boy before it was of real use to him?—He got that information as he went on. He is working all the time. He goes in at 15. In his spare time he is working for his degree of Associate and for the degree of Member. That brings him to 19 or 20. It is important that this higher training should accompany his training, not precede it.

Hon'ble Sir R. N. Mookerjee.—In answer to a question put by Sir Francis Stewart about finance corporations you said your object was to promote companies?—They might do that for one thing.

Then the finance corporation would have to subscribe the remaining capital?—Not necessarily. It might put a scheme forward.

If the shares are not subscribed by the public?—They would make pretty sure before they start.

Dr. E. Hopkinson.—Is it not a fact that the exchange banks and branches of some European banks finance the imports into the country?—Yes. Exchange banks generally.

Do you suggest that this system of financing should be extended to the internal trade of country?—Yes. I think it is a great help. A small dealer wants to buy ten bales of something. He gets a favourable price. He has not the money. The bank advances it to the extent of a certain percentage on the goods and the loan is redeemed afterwards.

Would you lend money on plant or real property?—Not on real property.

You suggest that assistance to industries should be given by independent corporations, not through banks?—I rather indicated there was room for it.

Do you think that there is any probability of such a financial corporation being formed without Government aid?—I do not see why it should not.

Such a thing does not exist in England. There is no corporation definitely established for giving assistance to struggling industries?—I am not speaking of anything of the

nature of a State Industrial corporation. I am speaking of small corporations designed to help industries. I personally opposed a State bank for India.

Would you have an industrial bank for India assisted by Government?—India is too big for such an institution. I should prefer to see the public leading the way.

Is it practical politics to suggest that the public would do it?—Why should not they under good management?

I want your views. Why should a corporation take risks for the good of the industries of the country which a private individual would not take?—I don't think the corporation would take absurd risks.

Do you object to state assistance?—I have not objected. I would like to see it done without.

Do you think that it could be done without?—Probably Government might have to put some money in.

You suggest that one of the lines of improvement in the labourer's efficiency is the development of thrift. On what lines should it be developed? Workers receive a bare living wage of three or four annas a day. Where can thrift come in out of that?—The man who works in the mill getting three or four annas a day is not a skilled labourer. The skilled man is the mechanic in a mill, for instance, the weaver or the spinner.

How much does he get?—A weaver gets Rs. 20 a month. Is there room for much thrift there?—Yes.

(Witness here gave confidential evidence regarding the methods adopted in his mill for encouraging regular attendance.)

In para. 45 of your note would you not add to (*a*), (*b*) and (*c*) better housing and feeding?—Better surroundings, certainly.

You have tried the experiment of feeding your work people?—No.

Don't you think it a valuable experiment to try?—I discussed the matter of grain supplies with an Indian gentleman recently. He said they will only spend the money so saved otherwise.

You don't attach much importance to it?—I have not exactly dropped the subject.

In para. 46 of your note you say "The experience gained by workshop apprentices had been considerable and valuable." Are they spinners, weavers and mechanics?—Yes.

You give them the training and they leave you. Where do they go?—Elsewhere. It may be Bombay. Probably out of the province. I had a mistri with me. The other day he left me to become a manager of a mill in a Native State.

You conclude that paragraph by saying that the most satisfactory labour was found to be that obtained raw and trained in the mill?—That is the opinion of the Cawnpore cotton representatives I am quoting.

Raw youth does not necessarily mean illiterate?—No.

Then the conclusion is that the best spinner or weaver is the person who is entirely illiterate and who has been brought up and trained in the mill?—That is apparently the conclusion.

Do you endorse that?—My experience is not sufficient.

Mr. A. Chatterton.—There is a treasury at every district headquarter. Do you think it would be a sufficient inducement to the banks to start branches if they were allowed to take over these treasuries?—In some cases they have been handed over to banks?—It might be a considerable inducement.

Do you find that trade is hampered by the difficulty of moving money about the country?—At times.

The establishment of these local branches would greatly facilitate matters?—Yes.

Sir D. J. Tata.—With regard to your answer to Dr. Hopkinson about the value of feeding operatives, supplying them with cheap food and avoiding middlemen's profits, you said that the opinion of one Indian gentleman was against it. When you got that reply did you not try to get further information?—It was only in the course of an enquiry. I have not dropped the question.

I may tell you that in our mills at Nagpur and also at one of our mills near Bombay in times of scarcity we buy grain and have grain shops, where we supply our operatives with grain at a little below cost price, and we have found it exceedingly valuable. The operatives appreciate this. They are loyal to us. A well fed operative will give you better work. If you give him money he will spend it in drink and not take enough nourishment. Consequently I hold that it would be an advantage to give them good nourishing food, say, in the middle of the day. I want to ask you whether you would not change your opinion on this point?—I am enquiring still. You have only done it in times of scarcity.

WITNESS NO. 18.

Mr. A. Carnegie.

MR. A. CARNEGIE. *Leather manufacturer, Cawnpore.*

WRITTEN EVIDENCE.

Financial aid to industrial enterprises.

Capital.

I have had no personal experience of the raising of capital for joint stock industrial enterprises, but I am convinced that ample capital is available for commercially sound enterprises promoted by business men who are possessed of the requisite technical knowledge and who are prepared to back these undertakings to the full extent of their own resources. Concerns of this description need no Government assistance in the matter of finance. The only way in which Government could assist would be to aid them in finding outlets for their products in the case of industries which have been proved to be sound, but for whose products no assured market exists, or which find it impossible to get in touch with existing markets.

Pioneer factories.

The greatest care should be taken that Government aided concerns should not compete with existing industries by raising the cost of labour or raw materials. There should be no limits to Government aid when the industry aided competes with an established external trade, if it is proved that such aid is necessary to establish the industry and that the industry is likely to benefit the country as a whole. In the case of the leather trade it is obvious that it would be of the greatest advantage if the export of raw hides could be curtailed and the hides tanned before exporting.

Technical aid to industries.

Demonstration factories.

There is a very important field for a Government demonstration factory to investigate the possibilities of the manufacture of tanning extracts in these provinces and to demonstrate the best methods of using these extracts. An exhaustive survey of the resources in tanning materials of these provinces should be instituted and a practical trial made of these materials in Government demonstration factories. The results of these investigations should be published as widely as possible and copies of all reports sent to all leather manufacturing concerns as a matter of course.

Assistance in marketing products.

Commercial museums and exhibitions.

I do not think that commercial museums would be of any assistance to the leather trade in the present stage of its development. As far as my experience goes exhibitions are of very little practical value and the money expended on them might be much more profitably spent in other ways.

Sales agency.

The sales agency established in Cawnpore for the sale and display of the products of minor and unorganised cottage industries appears to be of the greatest value in bringing the buyer into direct touch with the small producer and eliminating the usually rapacious middleman. More funds appear to be required in order to keep an adequate stock.

Government patronage.

Government departments which use imported articles should most decidedly publish lists of these articles with particulars of quantities required and prices paid, these prices to include total cost inclusive of import duty. Samples of these articles should be available to *bonâ fide* manufacturers on application to the Director of Industries.

Other forms of Government aid to industries.

Land policy.

Government ought to give facilities for the compulsory acquisition of land for industrial purposes or for compulsory leases for long periods. At present the factory owner is, in many cases, entirely in the hands of the local zamindar and if additional land is required for extensions, exorbitant rates have to be paid. If Government is to give concessions or to give powers for the compulsory acquisition of land for the establishment of new industrial enterprises it ought to be clearly ascertained first what the object is of placing that enterprise in a particular locality. In many cases the object is to take advantage of the organisation for the supply of raw materials made by an existing concern, and to compete unfairly with the latter for the services of their trained labour.

Training of labour and supervision.

General.

Attempts have been made to improve the efficiency of the worker by attention to his physical well-being. Better houses have been built, a good and adequate water supply installed and medical attendance and medicines and in some cases warm clothing provided free. The only way in which his skill can be improved is by the attention of and tuition by factory overseers and by a monetary inducement to better work. The latter seems to be the more important and is much more effective. I do not think it is possible to induce the leather worker (chamar) to attend industrial schools. Chamars as a rule do not take up leather working as their life-work. Most of them are cultivators and only leave their villages for the leather factories when they wish to earn a little money, and the greater proportion of them take long holidays and are very irregular in attendance. Most factories prefer to train their own supervisors and skilled managers.

General official administration and organisation.

In these provinces the organisation for the development of industries is that effectively controlled by the present Director of Industries. The Director of Industries should be an able business man with considerable commercial and manufacturing experience and, if possible, with experience in India. He should be assisted by a staff of experts in the various branches of industry with which he has to deal, provided the possibilities of development of these industries are such as to justify the employment of experts.

Organisation of technical and scientific departments of Government.

Reference libraries and colleges of commerce.

It would be of distinct advantage if a library of modern technical and scientific works were provided at large industrial centres. It does not seem probable that Colleges of Commerce would be of any practical value.

Government organisation for the collection and distribution of commercial intelligence.

Trade journals.

If Government were to issue trade journals containing reliable and up-to-date details of market prices of raw materials required by Indian industries with information as to where these might best be procured they would be of great value. Market prices at various centres of articles of export should be included together with any trade information available. With regard to the leather trade I have never seen any monograph issued by the Forest or other departments and these monographs do not seem to be brought to the notice of those engaged in industries. A resume of all monographs might be published in the public press.

Other forms of Government action and organisation.

Certificates of quality.

Prevention of adulteration.

It does not seem practicable for Government to grant certificates of quality as such a system would lend itself too readily to abuse. If, however, it were possible to impose and collect effective penalties for adulteration a new and important source of revenue would be tapped.

Registration of partnership.

It is desirable to introduce a system of registration or disclosure of partnership.

Railway freights.

If the exportation of tanned in place of raw hides is to be encouraged railway freight from up-country to seaports will have to be revised. At present the freight on tanned is very much more than that on raw hides and thus the tanning of hides for export would be heavily handicapped from the start.

Forest department.

The exploitation of the resources of the Indian forests would probably be much more efficient if it were controlled by a commercial firm of standing under the aegis of the Forest department or by a special department of business men.

General.

The tanning industry of these provinces seems to be particularly well situated as regards possibilities of development. Our resources in the matter of supplies of tanning materials have never been surveyed, but there is reason to believe that they are very large and the supplies of raw hides and skins are enormous. The use of these raw hides is largely retarded by preventible causes. A very large number of dead hides, i. e. the hides of animals which have died of disease, is collected and the value of these hides is very much depreciated by the careless treatment they receive from ignorant villagers. It should be possible to effect an improvement in the preparation of these hides. Slaughtered hides also are very often badly damaged by careless flaying and in the case of municipal slaughter-houses a small premium might be offered for all well flayed hides. A *communiqué* on this subject was recently issued by the Director of Industries and a slight improvement has been noticeable.

Facilities ought to be granted for the establishment of tanneries in districts where supplies of hides, tanning materials and suitable labour are available.

ORAL EVIDENCE, 7TH NOVEMBER, 1916.

President.—Your note explains your views clearly, but I have one or two points that I should like to have supplemented. The first point is with reference to section 2. You say that there is a very important field for a Government demonstration factory to investigate the possibilities of the manufacture of tanning extracts. We don't understand what you mean by the term "demonstration factory." We have given the definition of demonstration factory in our questions "By demonstration factories are meant those meant primarily for giving demonstrations of and instruction in improved methods of established industries." You mean something different?—The second part of my reply refers to that point, in which I say that the best methods of using these extracts may be demonstrated.

There is first of all a good deal of research work to be done, in other words, you want an experimental factory?—Yes. The research work would probably have to be carried out separately from the demonstration factory.

Do you know anything about the work which is being undertaken by Mr. Pilgrim in Central India?—A little.

He is attempting, I understand, to obtain solid extract from certain plants?—Yes.

It has not been done before in this country?—*Babul* bark extract has been made at Agra, but I have not heard of its being used extensively.

Was that made in a solid form?—In a semi-solid form. I have never seen it used. My firm has had no need to use it as the supplies of tanning materials are sufficient for our requirements at present, but the time is coming when they will not be sufficient.

You think there is a sufficient supply of *babul* to your firm because your tannery is favourably situated?—It is situated about three miles from Cawnpore, in a district where *babul* trees are fairly plentiful. With regard to the tanning industry in Cawnpore as a whole I should say that the radius within which it is possible to obtain *babul* bark at a reasonable cost is rapidly extending.

What do you think a reasonable radius for assembling *babul* by rail?—I have not gone into that matter. My firm obtain all their supplies by country carts from distances up to thirty miles.

And even that pays you?—Yes, we buy bark at a fixed rate landed at the factory and the supplier pays cartage.

If you adopted rail transport you could extend the radius of action up to 100 miles?—Yes; but we are four miles from the nearest railway station.

Is there any desirability in establishing a factory for the preparation of tanning extracts if you can assemble your raw materials so easily?—I should say there is because there is no organisation for the replanting of *babul* trees. The zamindar cuts down his trees and does not trouble about replanting them. This applies to our own particular area.

Is it not under the direction of the Forest department?—No. The trees replant themselves to a certain extent but the number of *babul* trees available is rapidly decreasing.

The extraction is far exceeding reproduction?—Yes.

Do you think it is wise to allow that to go on?—The question is which is more advisable the establishment of extract factories in districts where tanning materials are plentiful or the taking of steps to extend the replanting of *babul* forests locally.

What benefits would you expect otherwise to derive from the successful manufacture of tanning extracts?—We should have a standardised article to work with at a standard price and our supplies of tanning materials would be assured. As it is at present supplies are dependent on many factors, partly on the price of charcoal and firewood.

What other tanning materials are found in the Indian forests?—Besides *babul* bark and myrabolams, trials have been made of *kahua* bark and *dhawa* leaves. In the case of *kahua* bark, the tree is not destroyed when the bark is taken off and a new covering of bark grows again. The bark is taken off to a certain depth by a specially formed tool. A mixture of *dhawa* leaves and twigs is also used.

Does that give you a high percentage of tannin?—I understand it gives a fairly high percentage but I have never seen it used.

Was not *dhawa* largely used before for tanning in India?—I believe it is used in the Central Provinces but to the best of my knowledge it is not used locally.

It has been used in the past rather freely in India?—Very probably by native tanners. My knowledge of tanning has all been acquired in Cawnpore.

Supposing this process for the formation of tanning extracts were developed and that in the solid form suitable tanning extracts are obtained, do you foresee any possibility of exporting these extracts?—Yes, I think that is very probable.

Do you think that there will be more than enough to spare for India?—Yes.

Do you think that the principal way in which the tanning industry would extend would be by partial tanning?—Yes.

With the export of partially tanned hides?—Yes, and by the extension of the local demand. The development of the local demand depends partly on the increasing use by natives of European style shoes. This is rapidly extending.

At present what is the Government doing to encourage the distribution of knowledge of tanning methods and to develop the right class of tanners throughout the country?—Very little so far as I can see. The Director of Industries at Cawnpore has instituted certain experiments with regard to tanning materials which seem rather promising, but I have no knowledge of anything else being done on a practical scale.

Do you think that the problems are numerous enough and the results sufficiently promising from the point of view of the interests of the country generally, to warrant the maintenance of a department of leather experts in India to undertake research work with regard to tanning extracts, to gather together information known about the different kinds of materials which can be used for tanning; to advise as to the best conditions under which tanning can be undertaken; and train a class of subordinate who will first be able to assist in tanning operations and afterwards possibly in management?—Yes.

Can you give us roughly any idea of the size of the department that you would think necessary to organise all these phases of leather work?—I think it ought to be begun on a moderate scale, and as the department justifies its existence to be gradually extended.

You have got a mental grasp of the problems that are before you. As to the accumulation of material and the knowledge and distribution of tanning materials you have to co-operate with the Forest Department. There is the development of tanning extracts by different processes, some in liquid and some in solid form. There is the application of these extracts to other tanning materials in various mixtures, and an enormous amount of experiment has to be done for getting different colours and grades of tanning. Lastly there is the question of finished leather. There are a very few people who are able to carry leather curing to a finished stage. Do you think there is room also for the extension of that?—I do.

As regards the training of subordinates and the training of technical research workers would you give us an idea of on what scale you would begin?—That is rather difficult.

You would not make a suggestion?—I would rather not.

You are quite certain it would be an advantage to the country if the Government were to invest money in a staff of the kind?—I do most certainly. I think, as regards the export of raw hides, if those hides were tanned before exporting it would be of great benefit to the country as a whole.

In suggesting that the export of raw hides should be curtailed, I suppose you do not mean that it should be curtailed artificially but by the setting up of demand in the country?—Not artificially but by the increasing demand for those raw hides by tanners in this country.

Would you like an organisation of that kind to be Imperial in character and devoting its attention to all provinces and distributing information to all provinces, or do you think it would be best for an organisation of that kind to be local?—I would prefer them to be local so as to be in closer touch with manufacturers.

If you think there are enough problems in this province alone for a Government department surely there would be an equivalent claim for Madras and Bombay?—Yes.

You will have enough for three departments of that kind?—The possibilities of extension of the leather trade seem to be very great.

Do you think these three should be amalgamated in one whole department and under one control, or would it be better if they are entirely independent?—I think they should be entirely separate establishments, probably under one central control.

You say the Government departments which use imported articles should publish lists of those articles with particulars of the quantities required and prices paid, and that price should include import duty. Do you mean exclusive of import duty?—For general information I should say inclusive of import duty. I want to get at the total cost of the article to Government.

The Government does not pay import duty. I think you want that the import duty should be specified?—Yes.

What I am asking you is this. You do not think it is necessarily right for Government to pay to you, for instance, for an article at a price that is the English price, plus the cost of transport, plus import duty?—If Government buys from a private importing firm in this country, that firm would charge the English price of the article, plus the cost of bringing it into this country.

In fact your price would be lower by 7½ per cent. than it would cost you to import the article privately?—Yes.

In another place you say, "It does not seem practicable for Government to grant certificates of quality as such a system would lend itself too readily to abuse. If, however, it were possible to impose and collect effective penalties for adulteration, etc" How could one test adulteration unless you have some standard of quality? An article sold may contain 4, 5 or even 10 per cent of some external substance. The law may permit 10 or 20 per cent. before adulteration can be said to begin?—I mean adulteration with intent to defraud.

There will have to be some standards laid down?—Yes, in the event of legislation.

Do you think it is practicable to have standards of quality for all articles?—Not in India, I am afraid.

And would it not be just as easy to grant certificates of quality if you had to test the quality of the articles?—I should say it would be extremely difficult, if not impossible, to keep the bulk of the article up to that test.

All these problems that we have before us are very simple theoretically. It is very easy to say that Government should prevent adulteration. What we have to do is to show the Government some practical scheme. You are not prepared to suggest some way in which Government should tackle this difficulty?—The practice is too universal in India to allow of any practical scheme for its prevention.

How could we collect penalties in case of adulteration unless we establish a complete system of examination?—I mean to imply that the practice is so universal that it is impossible to stop it at present.

The sentence as it stands rather contradicts itself?—Yes.

What is the reason—if you know the reason—for which freights on tanned articles are greater than the freights on raw hides?—I do not know the reason for the difference, but I know that it exists.

Hon'ble Sir F. H. Stewart.—How do you buy your hides?—We buy through the ordinary *arathdar* or commission agent. We have also our own buyers in Meerut and Agra.

Are these men experts?—Yes.

They guarantee the quality of the articles?—Their guarantees are worth nothing. We inspect all hides which come in and reject those which are not approved of.

You say "The exploitation of the Indian Forests would be much more efficient if it were controlled by a commercial firm of standing." Do you mean one firm?—Not the whole of it under one firm.

What you mean rather is that you want business knowledge and business methods for the distribution of forest products?—Yes.

You say that facilities should be granted for the establishment of tanneries in districts. What sort of facilities do you mean?—Facilities for the acquisition of land and with regard to water-supplies, and consideration in the matter of railway freights on raw materials and manufactured articles.

I understood from you just now that your personal experience of the trade is confined to Cawnpore?—Yes.

Are conditions the same in Bengal?—I do not know about the conditions in Bengal. I see no reason to suppose that they should differ from those existing here.

Mr. A. Chatterton.—Is cattle branding extensively practised?—Not very extensively. Bad flaying and warbles do more damage.

Is there much tanning done in the villages in this part of the country by the village tanners?—There is a good deal of native tanning.

What sort of leather do they turn out?—Very poor stuff.

You would discourage the native tanner?—Unless he radically modifies his methods. He is spoiling good material to make bad leather.

What is mainly made of the leather made by the native tanners?—Mainly well buckets and native shoes.

Is chrome tanning practised?—Only on a very small scale. We ourselves do no chrome tanning.

Do you think it is a suitable substitute for the village tanners' water buckets?—I think that chrome leather buckets would give very good results. I do not think they can compete with the native tanned water bucket as regards cost which is everything to the cultivator.

There is no skin tanning done here?—Very little. Most of the raw goat-skins from these provinces are exported to America.

As regards tanning extracts, have you any sources of tanning supply with which it would be particularly suitable to make experiments for the preparation of extracts? Are there any untapped sources of tanning at the present time?—So far as I can learn, very great potential supplies of tanning materials exist in the forests.

Do you know what they are?—The supplies of *dhawa* leaf for instance seem practically inexhaustible.

What is the percentage of tannin in *dhawa*?—About 15 per cent.

Have you any experience of the universal tanning material in Southern India, *avaram* bark?—No, it cannot be got here.

That occurs in enormous quantities in Southern India. It is an inferior kind of material for making extracts?—It may be. It is largely used for tanning hides for export in and around Madras.

And re-tanned afterwards?—Yes, mostly by the semi-chrome process. They are sufficiently tanned to allow of the semi-chrome process being used.

Do you think there will be a very large development of tanning in this country?—Yes.

Where will you find a market for this leather apart from the country market? Where would you export the leather to?—There will probably be a very large deman in Europe.

Many countries have a tariff in favour of raw hides but do not accept tanned leather?—Possibly, but is it not possible to cut off their supply of raw hides if they do not agree to take tanned leather?

As regards the improvement of native tanning, would it not be desirable to establish a training school in Cawnpore?—It is very difficult to get the Chamar to attend any sort of school.

Is there any demand for instruction in modern methods of tanning on the part of the educated classes? Do they attempt to enter the tanning trade?—No. The tanning trade is regarded as degrading and the preserve of the very low-caste Chamar.

As managers of tanning institutions?—No. I do not think there is any demand Muhammadans seem to be taking up the industry to a certain extent.

President.—Can you tell us whether chrome leather is used to any extent except for boots?—Its use is increasing in the boot trade.

And otherwise?—Only to a very limited extent in the making of water buckets.

What are the drawbacks of chrome leather in use? Take harness for instance.—The main drawback is that chrome leather requires a higher grade of skilled labour and a better class of raw hide for its production.

I mean about its quality afterwards in use, you have no experience of it?—Not as harness leather. I understand it is used only to a very limited extent even at home as harness leather. The harness manufacturer prefers the old-fashioned bark-tanned article.

Have you enough knowledge of the subject or experience of it to give us your impression whether chrome leather is really worth developing in this country to any extent?—I should encourage the development of vegetable tanning.

The Government will not be justified in encouraging the development of chrome tanning?—Not in its present stage. It might be taken up ultimately.

You are not sufficiently familiar with the subject to give an opinion on the point?—No.

Witness no. 19.

Hon'ble Mr. A. H. Silver.

The Hon'ble Mr. A. H. Silver, *Director of Industries, United Provinces.*

Written evidence.

I.—Financial aid to industrial enterprises.

Capital.

So far as my experience goes there is no real difficulty in finding capital for a sound scheme promoted by a sound business man who shows his own faith in his scheme by investing in it to the best of his ability. No large proposition for a new industry has come before me yet as Director of Industries, but in two cases where provision of capital was desirable for the extension of certain existing industries the capital has been forthcoming at once. There are certain existing enterprises where difficulty has been experienced, but this, in my opinion, is due to the fact that when the shares were issued only a comparatively small proportion of the share value was called up. Shares have been subscribed for in a wave of local enthusiasm and subsequent calls have not been met. In some cases there is an unreasonable expectation of early dividends. I would suggest that in floating industrial companies only fully paid up shares should be issued and that the promoters should estimate with the greatest care the amount of capital which is essential in the first instance fixing this as the minimum before the company goes to allotment. Other suggestions with regard to the removal of difficulties will be made in dealing with the question of finance.

The larger industrial companies in these provinces have drawn their capital mainly from Europeans originally resident in the province; but this is, in my opinion, largely due to the fact that they have for reasons of their own not encouraged investment by Indian shareholders. Middle class Indians following professional occupations, such as lawyers, doctors and the clerical staff of business concerns, seem to be the class most ready to invest their savings in public companies so far as I can judge by general impressions and without having referred to shareholder's lists. At present they readily invest in banks either as shareholders or as depositors and it requires only an increase of confidence before they employ their capital in industrial undertakings. The Indian business classes are generally astute traders and usually confine themselves to their own business as traders, not investing as a rule in shares of industrial companies. Rich landowners do not either, as a rule, invest capital in these undertakings.

Ginning factories and cotton presses are by their nature concerns which cannot be maintained in full-time employment but even allowing for this there are, I think, too many of them for the work offering. Unfortunately Indian industrial enterprise so far has been largely imitative rather than of a pioneer character and consequently where one concern has set up a factory and proved successful the tendency is for others to put up similar factories in the same locality regardless of the total amount of work offering. This has resulted in several districts in ginning factories and presses not finding sufficient work, leading to the formation of pools or combines where the work offering is carried out by one or more of the factories and the others remain idle, the whole of them, however, sharing in the profits. Naturally this does not tend to most efficient working in the interest of industry.

Government assistance.

A complete note on this subject has been drawn up by the Secretariat and will be submitted to the Commission by Government. I may mention here, however, that the most important direction excluding sugar (which is dealt with by the Agricultural department) in which Government has given financial aid is in connection with the oil pressing industry. Government provided the funds for the purchase of a plant for pressing cotton seed as it was believed that this industry held out good prospects of success. The result of the experiment was to establish the practicability of finding a market for cotton seed oil in the country and the value of the cake as a food material for cattle. At the conclusion of the Government experiment the factory was purchased by Messrs. Hope Bros. of Cawnpore and subsequently floated privately as a limited liability company. They re-arranged the plant in order that they might press other seeds besides cotton seed and so take advantage of the changing market for various oils, and their working has resulted in financial success. Practical experience showed that the original plant installed by

Government was not the most suitable for the conditions of these provinces and the owners applied to Government for financial assistance to aid them in modernising the plant. In response Government have undertaken to give this company a loan of Rs. 37,500 upon favourable terms and it may be added that the mere promise of Government support has had the effect of attracting private capital to this enterprise so that the company are now in a position to extend their original works while they propose establishing additional works in other centres.

Government has also assisted the oil-pressing industry by allotting a sum of Rs. 5,000 for the popularisation of certain oil-cakes as manures. The pressing of mahua seed has latterly proved a profitable undertaking, as new uses were found for the oil but difficulty was experienced in disposing of the cake which was new to the cultivator. The Government grant was devoted to exploiting this and it has resulted in establishing a demand for mahua cake.

Assistance was given by Government to Messrs. D. Waldie & Co., Chemical Manufacturers, in the shape of a subsidy of Rs. 200 per mensem for 10 months in order that they might experiment on commercial lines in the production of bichromate of potash, for the provincial requirement was important while its import from England was prohibited. At the same time Government were able to secure a very favourable rate of railway freight for the carriage of chrome ore from Baluchistan. These efforts have resulted in success as the firm are now making bichromate of potash and selling it at less than half the price quoted in England. They are at present working only on a small scale but will now extend their manufacture of this product.

In connection with the silk industry, Government placed a deputy collector who had special knowledge of this industry upon special duty for five years and established an experimental farm at Shahjahanpur. The experiments came to an end in April last and the results appear to have established that eri-silk (to which the experiments were confined) cannot be commercially exploited in this province. The possibility of establishing mulberry silk is, however, still being examined in consultation with the Imperial Silk Specialist.

The handloom weaving industry as a whole has received much indirect financial help from Government by the establishment of the Central Weaving Institute, district and peripatetic weaving schools and local demonstrations, while recently a central stores has been opened for the supply of yarn, bobbins, shuttles, reeds, healds, etc.

The small arts industries in which the province is rich have been assisted by the establishment of a central emporium to which Government have contributed Rs. 10,000 annually for the last two years also providing a recoverable advance of Rs. 5,000 for the purchase of stock. Its functions are described in the Secretariat note and need not be enlarged upon by me, but I may mention that special emphasis is laid on the desirability of establishing an export market.

Generally speaking I am averse from Government aid to either existing or new industries by means of—

(i) money grants-in-aid;

(ii) bounties and subsidies;

(iii) guaranteed dividends for a limited period;

(iv) supply of machinery and plant on the hire-purchase system.

I do not approve of loans without interest but in our present stage of development it may be desirable to grant loans with interest in certain cases although the necessity for this would be obviated if the means for supply of capital were improved as suggested in a subsequent paragraph.

Similarly, there may be cases at present where Government subscription of capital to a company on the same basis as public subscriptions might be deemed advisable, as for instance where Government is satisfied that the project is a sound one and the public merely require confidence in the undertaking before subscribing. This again is but a temporary phase.

With pioneer factories, guaranteed Government purchases of products for a limited period would, I consider, be of great value and is the best form of help which Government could afford.

I would decry Government control in almost every case. The only exception is that where Government is a part shareholder it might demand a seat upon the Board of Directors but their representative would have only the same powers as the other directors of the company.

Pioneer factories.

The only pioneer factory of which I have experience is the cotton seed oil pressing factory referred to above. Generally speaking, I am not in favour of Government pioneering industrial enterprises but where it is apparent that a new industry can be economically developed in India and it has been found impossible to attract private capital it might be desirable for Government to start a pioneer factory. I think it very unlikely, however, that when the conditions favouring the establishment of a new industry are so obvious, commercial capital would not be forthcoming to exploit it. There is at present a project for a Government pioneer factory for the manufacture of paper pulp: there is also a private project for the same purpose. The promoters of the latter company say that they have been hindered from getting capital for their enterprise because it became known that Government intended starting an independent pioneer factory. The examination of the Government project is not yet complete but if the final results of the examination are such as to make it obvious that a paper pulp factory upon the lines projected by Government is likely to be successful I think it highly probable that private capital would be forthcoming.

If and whenever the conditions are such that it has been deemed desirable that Government should pioneer an industry, the pioneer factory should be handed over to private capitalists as soon as possible which would in the ordinary course be as soon as they had proved its successful possibilities. A successful pioneering experiment should never be absorbed as a permanent Government enterprise unless it were desirable for State reasons or the factory were dealing with a raw material which formed a Government monopoly. For instance the manufacture of materials for munitions might reasonably remain in Government hands; while I regard it as desirable that a project like the Government turpentine distillery should remain in Government control even if its actual working were handed over to commercial enterprise. I do not think an undertaking working under the conditions which must obtain at such a factory could be completely handed over to private enterprise because the raw material, e.g., crude resin is a Government monopoly and there must be difficulty in coming to an arrangement with a private company as regards the purchase price of the crude resin. Crude resin as such is not a marketable article and the only form in which the Forest Department can find a market for it is in the form of turpentine and resin. There is no reason why a private company should not turn their crude resin into marketable products for them, but the department could not with advantage to the State allow a private company to determine what the price of the crude resin should be or what quantity should be dealt with.

In this connection reference may be made to the Government Harness and Saddlery Factory at Cawnpore. I am not sufficiently acquainted with its history to deal with the subject fully, but I know that it was started as a Government pioneer factory. I know also that to-day it is making exactly the same goods as are regularly made by private enterprise, that it competes for its raw materials in the same markets with private enterprise, and that it is a formidable competitor for the available labour. At the same time it employs a number of officers, non-commissioned officers and men in military pay whose places could obviously be filled by civilian substitutes.

Financing agencies.

I do not know that I can indicate any industries which are hampered by the conditions under which they are financed. Naturally those industries which cannot get accommodation from the presidency bank or the large joint stock companies have to pay a higher rate of interest for their accommodation and in that sense it may be said that most of the smaller industries have to pay a higher rate of interest than they should do if banking facilities were more elastic.

Generally speaking, the large joint stock banks will not advance money to industrial undertakings except against stocks or other equally liquid securities. Thus a small capitalist wishing to embark upon an industry in which he has to lay out the whole of his capital in buildings and plant cannot ordinarily get accommodation from the larger banks for the purchase of his stocks and discharge of working expenses and accordingly has to find other finance and pay a higher rate for his money. If it were possible to provide something in the nature of an industrial or trade bank, it would probably be of material assistance to industrial enterprise. Meanwhile I have information that one of the leading banks has organised an industrial trust which will be in a position to provide funds for the furtherance of large industrial undertakings—as they have not yet issued their conditions of business, I cannot say whether this will be of material assistance or not. Proposals have been made for the formation of a small industrial syndicate—the scheme was outlined at the last Provincial Industrial Congress held at Jhansi in October. The intention of this syndicate would be to form a company comprised only of Indian gentlemen of means whose names are well-known to the large banks and to call up, say, one-tenth only of the subscribed capital. The remaining nine-tenths representing un-called capital would be the security upon which the larger banks would advance money. This syndicate would examine schemes placed before them by the Director of Industries and if satisfied would back the note of the promoter. On this security the bank will advance the money required, recovering interest on same direct from the promoter. The remuneration of the syndicate would be an addition of, say, one per cent. to the

interest charged by the bank or by means of a deferred interest in the net profits of the undertaking. Such a syndicate if formed would be very useful in promoting small enterprises requiring up to, say, Rs. 50,000 capital.

Co-operative societies.

I do not come into direct touch with the working of co-operative societies, but their scope appears to me to lie mainly in the promotion of agriculture and in the organisation of existing cottage industries, such as handloom weaving, hosiery knitting, fancy needle work, etc.

Limits of Government assistance.

I do not think Government aid should be accorded to any enterprise if it can be shown that the said enterprise directly competes with an existing private enterprise in the same province and that present extension is likely to work harm to the existing enterprise. I would not consider the question of competition with private enterprise outside the province if it could be shown that our own province was economically at least as well situated for the industry as others. If by "external trade" is meant for instance the export of raw materials from India there should be no limitations of Government aid to new enterprise. If, on the other hand, "established external trade" relates to the import into India of goods made outside India, again I say that there should be no ban upon Government aid if required. Always provided in both cases that it can be shown that India is economically favourably situated for the manufacture of the goods in question.

Even this latter limitation might be waived if the new enterprise were intended to supply essentials to established industries, to existence and to self-defence, the supply of which might be liable to be cut off in the event of prolonged interruption of communications by sea.

II.—Technical aid to industries.

General.

Technical and scientific aid to industrial enterprise is provided by Government, United Provinces, by the following means:—

Two Government Technical Schools of Mechanics and Engineering, one Government School of Arts and Crafts, one Government School of Carpentry, and one Government School of Weaving: in addition to these there are seven district aided weaving schools with two peripatetic weaving schools, a Government Leather Working School, a Government Dyeing School, with a peripatetic dyeing class attached, and a Government School of Needle-work. These all naturally aid industrial enterprise. There is a technical laboratory attached to my office which deals with chemical enquiries and has afforded aid in many directions. We have also a Government glass expert and a Government metal pressing expert who visit the various factories in the province and give practical aid and advice where needed.

The dyeing industry has been helped by the investigations of the technical laboratory in the direction of substituting indigenous dyes for the imported dyes which they had hitherto been using. A certain amount of work has been done on tanning substances and the results communicated to the local tanning industry. A number of problems are being investigated at present in connection with the provision of sizing materials for use in cotton weaving—these when complete should be of value to the cotton-weaving industry. Work done in my laboratory is not of course pure research work; it is largely industrial—experimental, and a good deal of help has been afforded to local industries in connection with the day-to-day problems which arise. Only recently we have shown a large dealer in tallow how to refine his tallow and he is now setting up a plant for this purpose.

Ordinarily I would not make any charge for the loan of Government experts to private firms and companies so long as they were free to move about from place to place as occasion warranted—should a private firm or company require the loan of the expert for a prolonged period and Government could spare him they should at least pay his full salary.

If the expert were not paid there should be no restriction upon the publication of the result of research made by him while attached to a private business; but this condition should be made known clearly beforehand. If his services were paid for the result of research made by him should not be published except with the consent of the business concerned.

Demonstration factories.

I think a Government demonstration factory for the manufacture of bobbins would be useful, as private enterprise has hitherto failed to make a success of this and has become discouraged. Failing this, I would suggest a demonstration factory showing the advantage of employing modern wood-working machinery for the production of such articles as *charpai* legs, *hukah* stems, chair legs, etc. Such factories would almost certainly be taken over by private enterprise if they proved successful.

It may be necessary to start a Government demonstration factory in glass-making if, as our glass expert thinks, the existing glass factories have been working on wrong principles. He considers that for the class of trade we wish to do a tank furnace is essential—this necessarily deals with large quantities of metal at one time and I do not think it likely

that we shall get private enterprise to make the experiment. Our examination into this subject has not, however, proceeded sufficiently far to warrant a definite recommendation of this.

It may also be desirable to open a demonstration factory in metal-pressing in order to show the use of modern press tools and the possibility of producing economically the goods required in India. The trade is a new one and a demonstration factory if opened would devote its attention first to one section of the trade. After establishing that, it could proceed to other sections. It may, however, be found possible to get private enterprise to take this up when our enquiries have proceeded further.

Research abroad.

Hitherto I have not had occasion to refer to the Imperial Institute in connection with any of our problems. I wrote to them last year for some particulars with regard to flax retting and these were duly received. The main disadvantage is its distance, for as a rule the industrial problems which come before my department are such that they ought to be settled in India amidst the local conditions pertaining thereto. Apart from this there is of course also the loss in time and it would probably be necessary in connection with any problems which might be submitted to the Imperial Institute to refer back to India for additional information as work progressed, all involving a considerable loss of time. I can think of no advantages attached to the Imperial Institute which would counterbalance the disadvantages of distance.

There may be occasion where research on special subjects in the United Kingdom would prove advantageous as compared with research in India, but I cannot think of them. By all means let work proceed both in England and India if this can be arranged.

At our present stage of development the Advisory Council for Research in the United Kingdom could probably give assistance to Indian industries by acquainting them through Government with results achieved in industrial research or experiment in the United Kingdom. They could also be of use in supplying information as to whether certain problems have been tackled in England so that we might not for want of knowledge attempt to solve the same or similar problems in India.

My department has already, at the instance of the Board of Industries, referred a number of industrial research problems to colleges in these provinces: I attach a list of these indicating the class of work which we find necessary to be done.

I have reason to believe that the science professors have welcomed this opportunity of giving a practical bent to the work done in their laboratories. Not only does this introduce a fresh line of work to the science professors themselves but by reason of their assisting in this work the students have their attention turned to the practical industrial problems existing in their midst and this may tend to attract them towards industry—a most desirable end.

Surveys for industrial purposes.

My experience is too young to admit of my giving a definite answer to these questions, but I have certainly formed the impression that we have not sufficient information with regard to the products of the forest to admit of commercial exploitation. The regular returns of the Agricultural department appear to provide all the information which is needed and the reports of the Geological department contain sufficient information regarding the occurrence of minerals to admit of enquiries being followed up. Certain special information, such as the occurrence of suitable glass-making materials, needs to be supplemented, but this would presumably be undertaken as a special survey.

If the results of special surveys be made known without delay to Local Governments they would at once be dealt with in the Industries department who would place the particulars before the persons likely to be industrially interested. This should be supplemented by publication in the general press of information regarding the work done while the full report published as a monograph could be made available on purchase through the Government depôts.

III.—Assistance in marketing products.

Commercial museums.

I have no actual experience of commercial museums but if I may be allowed to generalise I should regard their work as passive rather than active and we require real active work to push the products of Indian industries. I do not think the average buyer visits a commercial museum in the ordinary course, except perhaps in its earlier stages as a matter of curiosity and the museum by its very nature can only appeal permanently to the local buyers. In a great port like Calcutta the museum naturally appeals to a wider buying public and I certainly think that a museum is rightly placed there. A large extension of commercial museums throughout the country would be necessary if a real attempt were to be made to bring home to all buyers a knowledge of the industrial products of India and I consider that the expense involved would be disproportionately high with regard to the benefits achieved.

If a live propaganda were to be developed in connection with the central commercial museum and conducted through the medium of the Industries departments of the different provinces its work would, I believe, be of considerable value.

Sales agencies.

We already have a central emporium in the United Provinces for the exploitation and sale of the products of the numerous small arts and crafts in the province. Its intention is not only to provide larger sales for these products but to standardise and improve the quality of work done. A note of its working will be submitted by Government. My experience indicates that this has already met a want; and as we begin to deal with markets abroad it should result in providing a steadier demand for these small products: a demand which up to the present has been largely dependent upon casual purchasers, such as tourists.

Exhibitions.

A commercial section for the display of commercial samples is now being provided. I do not think that India is ready for large scale industrial exhibitions at present and would not recommend, therefore, that Government should encourage such exhibitions meanwhile. Almost every district already has its local yearly fair and to most of these is now attached a small industrial exhibition which brings to the notice of the people the products of local industries—by "local" in this connection I mean provincial. It is one of our objects to gradually improve these exhibitions and although I do not urge the necessity of Government aid the provision of a small sum of money to be expended on the recommendation of the Board of Industries for assistance where necessary in organising industrial exhibitions might be useful. There is already a small grant to admit of weaving demonstrations at these fairs—as we advance further it may be possible to exhibit improved methods of work in connection with other small industries. My opinion, however, is that we should merely develop the local industrial exhibitions in connection with annual fairs meanwhile.

Trade representatives.

So far as industries are concerned I do not think any useful purpose would be served by appointing trade representatives abroad.

It might, of course, be desirable in some circumstances to have temporary commissions for special enquiries but I know of no present circumstances which would necessitate such a commission.

I do not think trade representatives in other provinces are necessary.

Government patronage.

The Government of India might publish for general information a list of all imported articles purchased during the preceding year which lists should be made available to the public by purchase. The list should exhibit the actual prices paid for these imports. Information as to samples, qualities, etc., should be made freely available to any manufacturers requiring them and a copy of the publication should be sent to all chambers of commerce with information that extra copies could be had on purchase.

I have not sufficient knowledge to criticise the working of the present rules relating to the purchase of stores by Government departments, but from my observation I do not think that indenting officers are sufficiently acquainted with the industrial resources of India. Consequently if the periodical returns of stores purchased from abroad which are required under the rules to be sent to Government of India were to be sent through the Director of Industries it might be possible to point out Indian sources of supply.

If the publication referred to by me in the paragraph above dealing with Government patronage were available, each Director of Industries would be able to examine it in detail and make suggestions. At present I have no knowledge as to the stores which are imported from England either by the United Provinces Government or by other Governments.

I may remark from my personal knowledge that there is possibly a tendency on the part of some indenting officers to dislike the responsibility entailed upon them by passing stores purchased in India. If the indents are sent home the India Office with a staff of expert buyers and passers is responsible for the quality of the goods indented. If the stores are purchased in India the indenting officer has to take upon himself a responsibility for passing stores for which he feels he is not thoroughly qualified. He may through this be unduly severe in demanding that a detailed specification be observed completely and thus cause irritation to the local manufacturer. On the other hand, he may through want of knowledge pass goods which ought not to have been passed and so risk subsequent censure. The tendency on the part of such an officer would be to send the indent home knowing that he would be safeguarded in any event. The obvious remedy is to provide a body of technical experts corresponding in class to those maintained by the India Office, and we should require experts who were so well qualified that they could not only say that certain goods were up to specification but could go further and definitely say in the case of goods which might not be in absolute accordance with the specification whether they were good enough for practical purposes.

This suggestion is capable of a good deal of amplification—it might conceivably lead to the formation of a buying department for India as a whole which would be able to advise whether

stores could be purchased in India or not. I make the suggestion here as a general basis for consideration.

Banking facilities.

I do not know that more banking facilities are needed for the actual marketing of indigenous products (I am not referring now to the manufacture of these products). As a rule as soon as the products are available there is no difficulty about money. The co-operative movement, of course, deals with the marketing of some products and other methods of organisation will doubtless be applied in due course in other directions. For instance to my knowledge a small syndicate has just been formed with the intention of organising the blanket making industry in a certain district—they will supply the weavers with yarn and take all the blankets. Dealing with the whole of the blankets of the district they will be able to instal a small finishing plant and thus put the blankets upon the market with a better finish than is at present possible. The carpet industry in Mirzapur has been organised in very much the same way and so far as our village industries go further organisation of this character should be encouraged. There is little chance of the worker getting hopelessly into debt if he is supplied with the raw material of his trade, e.g., yarn, and he is paid only for the work he has done.

IV.—Other forms of Government aid to industries.

Supply of raw materials.

Government should control the supply of raw materials only in cases where Government has a monopoly of those materials, e.g., in salt and in certain forest products such as crude resin, or when the raw materials are essential to the safety and welfare of the people.

Land policy.

Although I would hesitate to say that any check has been imposed on the industrial development of these provinces by the land policy of Government, I do know that intending manufacturers find the process of acquiring land very irksome, and if it were made clear that Government would aid in the acquisition of land it would probably act as a stimulus to industry. I have in mind now a manufacturing concern which wishes to change its location in order to expand its activities: they have fixed upon the site they want but even yet they have not discovered how many owners they have to negotiate with: they are already certain that it is not less than 10.

Having completed negotiations with all the owners of the desired land the would-be industrialist is even then not sure that his title is secure. If the Land Acquisition Act could be made use of by industrial companies or even private industrialists so long as their bonâ fides is established, it would, I believe, lead to greater industrial activity. At the same time it would be very cumbersome to employ the Act with its present limitations and I would suggest that the final authority for the leasing of land for industrial purposes be vested in the Local Government.

I would also suggest that municipal boards be instructed that land for industrial purposes should be leased on the most favourable terms possible. At present there is a tendency to exploit companies desiring to lease land for such purposes, oblivious of the indirect benefits which the establishment of industries confers.

V.—Training of labour and supervision.

General.

The larger industries themselves look after the training of their labourers with a view to improving their skill but incidentally they have found it to their advantage (to put it upon a material plane) to improve their domestic surroundings and some of the larger mill industries have erected modern settlements in which the worker is housed under sanitary conditions: the rental charged being such as would be impracticable for a private landlord to charge. In one case, that of the Cawnpore Woollen Mills, I know that the rental charged is based upon three per cent. upon the capital outlay. Healthy surroundings unquestionably improve the efficiency of the worker. Some of the factories also have schools for the children of the workers where the rudiments of education are taught and the lessons are conducted so as to give an industrial tendency to the mind: this is particularly the case in the factory of Messrs. Cooper, Allen & Co., where the children are taught something of the theory involved in leather manufacture.

Apart from the desirability of general improvement in the domestic surroundings of workers, which is of general application, the skill of the labourers can be improved by the gradual extension of technical schools. The two mechnical engineering schools have sent a fair number of apprentices to industrial workshops and they have been favourably reported upon. The one Government Weaving Institute deals almost entirely with the hand-loom industry; if the textile section at present at Roorkee is shifted to Cawnpore—as is proposed—the large cotton spinners of Cawnpore have undertaken to send selected workers for training in such technical classes as may be opened for teaching cotton preparing, carding and spinning. The Government Carpentry School of Bareilly is exercising a noticeable effect upon the general standard of workmanship in Bareilly and is an excellent example of the desirability of establishing a special technical school at a centre where there is a communal industry of this nature.

Apprenticeship system and industrial and other schools.

The students from the two mechanical engineering technical schools after finishing their course at the school have to undergo a two years apprenticeship in workshops. We believe this is a most valuable part of their training and I would extend the apprenticeship system to every technical school where such a course is practicable.

I have referred above to the advantages which have been observed at Bareilly from the establishment of the Government Carpentry School. The Gorakhpur Technical School is of too recent origin to admit of a report being made yet, but the Lucknow Technical School since the present course was instituted has turned out lads who have been well reported upon and it is expected that as the product of these schools come upon the market in larger numbers they will be capable of earning salaries of from Rs. 50 to Rs. 70 per mensem in established workshops while those with originality and initiative should form a good nucleus for the establishment of smaller industries requiring mechanical power. The School of Arts and Crafts has not yet turned out any trained students and it is impossible at present to say what will be their future. The Central Weaving Institute at Benares has, I am afraid, not achieved much practical result so far, and I am inclined to think it would be better placed if brought to Cawnpore, so that it should be in a more congenial atmosphere.

In connection with the district industrial schools which are mainly devoted to weaving, owing to wrong methods in the past they have not fulfilled their functions as I think they might have done, their prime object being to establish the use of the fly shuttle loom. The recently-formed peripatetic schools which deal with practical weavers only and give them a special course have already shown better results than the permanent district schools.

As I have indicated above, the system of apprenticeship following school training should be developed to the utmost extent Direct apprenticeship to the trade without a preliminary technical school training is, so far as I am aware, practically unknown at present.

Day-schools for short-time employés as already mentioned are maintained by some—indeed I may say most—of the large mills and factories and the general opinion is that they lead to a marked improvement in the quality of work. Night classes, I fear, are not capable of large development. We have evening classes in connection with the Gorakhpur and Lucknow schools, but my observations lead me to express the opinion that the pupils come for instruction in general literary education rather than for technical training. This evinces, of course, a laudable desire for self-improvement and would seem to indicate that night classes of this character might be given a wider trial, though I doubt whether such classes are properly attached to technical schools. At Bareilly the night classes are attended by the workers actively engaged in the cabinet-making trade—the instruction is of a thoroughly practical nature. These classes again exhibit a praiseworthy desire for self-improvement on the part of the workers. The hours of labour in Indian factories are such that the worker at the end of the day is, I consider, too exhausted to take advantage of evening classes, but I believe it would be worth while making an experiment to test this.

The arrangements at present in force in this province for the control of industrial schools are, I think, satisfactory. Nominally the Director of Industries is special. inspector to these schools. I do not like the term as I could not pretend to adequately inspect technical schools of so widely differing a character. I regard myself rather as an instrument for seeing that the class of training given at each of the schools is such as will fit into the industrial requirements of the province. The Director of Industries is in administrative control of the schools, but he deals with all matters of policy, engagement of instructional staff, and capital expenditure through the Director of Public Instruction. So far there has never been any clashing of interests nor will there be, in my opinion, so long as the respective officers in charge of these departments are in full sympathy with one another, as is fortunately the case here.

Training of supervising and technical staff.

The object of training in our technical schools is to provide men who should be capable of eventually taking up the posts of supervisors. They have the opportunity of acquiring skill in the particular branch to which they attach themselves after completing their apprenticeship and their further rise to the position of skilled managers must depend upon themselves.

I do not consider that any Government assistance is necessary to supervisors, managers, and technical experts of private firms to study conditions and methods in other countries.

Where an industry is assisted by loan or other means Government could, if desired, and should, if required, make it a condition that technical training should be given. For instance, if Government were to encourage by loan, by subsidy or by guaranteed purchase of products a new industry it would be highly desirable that facilities for training should be given.

Mechanical engineers.

There is to my knowledge a want of uniformity in the standard of examinations for mechanical engineers held in various provinces and I regard it as very desirable that measures should be adopted to make such tests uniform. The law relating to the use of boilers and prime movers should be administered imperially and not provincially.

VI.—General official administration and organization.

The organization of this province for the development of industries consists in a Department of Industries with a Secretary to Government as its head (combining this with Finance) a Director of Industries working immediately under his direction and a Board of Industries nominated by Government with advisory powers. Being a member of the provincial organization it would be hardly proper on my part to criticise it. Generally speaking, I may say, however, that I consider it meets the present situation.

The Board of Industries is in fact an Advisory Board—our present Board would possibly be improved if it could contain a larger proportion of business people personally engaged in the promotion of industries in this province. I do not think executive powers are needed. Any opinion expressed by the Board, representing as it does the highest authority available to Government on the subject of industries, should obviously be accepted as final.

I consider it essential that the Director of Industries should be a business man, if I may be allowed to express an opinion upon this point. Generally speaking, a business man possesses fairly expert knowledge of at least one subject, but even that I would not regard as essential provided his training were such that he had been in a position to acquire general knowledge of manufacturing conditions and of the marketing of products. I regard also the possession of knowledge of local conditions a highly desirable adjunct.

The relations which exist between the Board of Industries, the Director of Industries, and the provincial Government, as they obtain to-day in these provinces, are, I consider, satisfactory, so long as industry is not represented by a special Secretary.

An Imperial department of Industries might perform useful functions in the correlation of the activities of the various provinces as regards industries and by dealing with the larger questions which are Imperial in their character rather than provincial, such as, for instance, all matters connected with transport, industrial surveys, export, markets, etc. But each province must have its own provincial organization for the development of industries and the Director of Industries of that province should only correspond with the Imperial department through his Local Government. The interchange of views and periodical visits between the Directors of Industries of various provinces might be encouraged.

I might add in this connection that the Director of Industries in the ordinary course receives a great deal of assistance from local industrialists and that assistance might not be so freely given were the Director to be an Imperial officer while his relations with the Local Government would probably not be so cordial. This subject is one capable of considerable development and is of too wide a nature to admit of its being dealt with adequately in the form of a written opinion. If an Imperial department of Industries under a single head, were formed, care would have to be taken to see that he did not become a mere figure-head, but I am of opinion that the questions of an Imperial nature relating to industry are of sufficient importance to warrant the formation of an Imperial department. The Ministry of Commerce and Industry is of too wide a character to admit of proper attention being paid to the development of Indian industries and it must be remembered that in any case the interests of commerce and of industry are naturally opposed to one another in many directions.

VII.—Organization of technical and scientific departments of Government.

General.

The technical schools at work in these provinces have already been mentioned. In addition there is a small laboratory attached to the office of the Director of Industries which deals with the small local chemical problems arising from time to time, while we have recently secured the co-operation of the colleges of the province in helping with these investigations. We have also experts in metal-pressing and glass-making. I have no criticism to make regarding this organization but may say that when circumstances warrant it an enlargement of the laboratory, so that we might undertake experimental work upon a larger scale, would be desirable.

Imperial departments.

In addition to the provincial laboratory referred to above we could make good use of an Imperial Research Laboratory to deal with the problems which frequently arise in connection with the development of industries. There is much work to be done in connection with the development of our minerals, the exploitation of our forest products, the development of our oil-pressing industry and allied industries, the manufacture of chemicals, perfumes, essential oils, tanning extracts, etc. The lines for work might usefully be modelled upon those suggested by the Committee of the Privy Council for Scientific and Industrial Research in

their report recently published and which is summarised in the Chemical Trade Journal of 2nd September, 1916.

Such an Imperial laboratory should be recruited from the best men to be obtained in England or elsewhere and students from the science colleges should be encouraged by means of liberal post-graduate scholarships to proceed there for a course of special work. The laboratory should be directly subject to the Imperial department of Industries, assuming such department to be constituted and the head of the laboratory should have advisory powers only.

When an expert is loaned by the Imperial department to a Local Government he should be placed under the direct orders of the Director of Industries of the province.

Provincial departments.

Local Governments should engage their own experts and organise their own technical departments where the economic position of the province is such as to warrant the presumption that the industry can be profitably developed there or where the existing industry is sufficiently large to justify the employment of an expert or the organization of a special technical branch.

These experts and departments should, in my opinion, be placed under the direct control of the Director of Industries. Ordinarily the experts should be brought out on a 3 years' agreement. A liberal pay should be given to attract the best men and they should not be allowed to receive fees of any sort.

Technological institution.

Technical research institutes should be fitted into a general development scheme for the whole of India. Two such research institutes should meet our present needs, the Indian Institute of Science at Bangalore being one and another institute being formed in the north of India, but the classes of problems to be dealt with by each should be determined—they should not both deal with the same group of subjects. The Director of Industries should correspond direct with these institutions.

These two institutions should be under imperial control.

Co-ordination of research.

It is very desirable that measures should be taken to co-ordinate and prevent unnecessary overlapping of the research activities in various institutions. If an Imperial department of Industries were instituted the local Director of Industries would not send out problems to be dealt with locally until he had ascertained by reference to the Imperial department that work had not been already done elsewhere upon those particular problems.

I am not aware of any noticeable results of interest following from the Indian Science Congress and I am not sufficiently acquainted with its work and aims to make any suggestion. In the ordinary course the congress might be of use if subjects which are engaging the attention of the provincial technical laboratories were brought up for discussion.

Study of foreign methods.

Government technical and scientific experts should be encouraged to study conditions and methods in other countries by giving them fairly frequent opportunities for home leave. I have already suggested that the principals of our various technical institutions should be allowed to take 4 months' European leave every 4 years in order that they might keep themselves up to date in connection with the developments of technical training in England. Ordinarily I do not consider any further encouragement is needed as the average man is quite willing to employ a portion of his leave in keeping himself abreast with the developments in his own line even although this involves some expenditure from his own pocket.

Reference libraries.

I think that provincial libraries of scientific and reference works should be formed in connection with the provincial department of Industries. There is a small library attached to my office, but it is extremely limited in character. A number of enquiries are addressed to my office which necessitate reference to such works, and an industrial library is, in my opinion, of considerably more value to the general public than an agricultural library. I would advocate the spending of money upon technical and industrial libraries.

Colleges of commerce.

I do not consider that a college of commerce is necessary in this province, for I do not believe that it would assist industrial development. We have already a commerce degree in connection with our University: it would be interesting to have information as to the results.

VIII.—Government organization for the collection and distribution of commercial intelligence.

Commercial intelligence.

I am not sufficiently acquainted with the system of collecting and distributing commercial intelligence by the Director-General of Commercial Intelligence to make any useful suggestion. It is very seldom that I receive commercial intelligence from this officer; when it relates to orders of Government relating to prohibitions of export or import I usually receive the information long after I have seen it in the Press. It may be that this office

collects commercial intelligence which would be of value to us, and, if so, it should be passed on immediately. With a fully organised Imperial department of Industries I do not think that the work of the Director-General of Commercial Intelligence could be of much value to industries seeing that statistics area dealt with separately.

Industrial and trade journals.

The Indian Trade Journal is of use in providing extracts from miscellaneous journals in "tit-bits" forms which perhaps catch the eye of the busy man and enable him to look up the subject in the proper quarter. I also find it of use in presenting in complete form the proceedings of the various chambers of commerce in India, and occasionally in the enquiries column one comes across queries which can be dealt with by the Director of Industries.

A provincial industrial journal would, I believe, be of real use to persons actively engaged in industry, but I do not think we are ready yet to publish a periodical. We are endeavouring to meet the present need by issuing notes from time to time with regard to special industries—these are published in the Press.

I would propose issuing notes to the vernacular Press just as we are doing at present when the notes referred to above are issued. I do not think we should at present be justified in publishing a periodical journal in the vernacular.

Other Government publications

The issue of a note on the possibilities of the oil-pressing industry led to many enquiries and while one large existing oil pressing company has now received all the finance it needs to extend its operations largely by reason of the public interest which was awakened in this subject, other capitalists have expressed their intention of establishing oil-pressing works in this province. It was the note on this subject followed by subsequent correspondence with enquiries which was responsible for this. The issue of various notes on the use of indigenous dyes has brought to the notice of dyers possible substitutes for the various synthetic dyes formerly imported. The issue of a note calling attention to the bad flaying of hides and pointing out the advantages to be derived from better flaying has resulted in noticeable improvement in the condition of the hides received in the local tanneries. Publications of this character issued direct to persons likely to be interested and also made known by means of the Press have met their purpose. The publications of the Forest department and of the Geological department do not ordinarily circulate to so wide a public, nor is it perhaps necessary that they should do so, but when these publications contain matters of general importance and utility, as they often do, I would advocate the publication of abstracts containing this information in the form of a Press note.

A Government publication which contained particulars as to current market prices of goods exported and imported from the provinces and of the raw materials, chemicals, etc., used in the industries of the province, which in addition published extracts from technical journals relating to provincial industries would be of use. We constantly find small industrialists paying more for their raw materials or getting less for their finished goods than they should simply by reason of their ignorance of market conditions. They do not ordinarily have access to trade journals. Such a publication would, however, entail a good deal of work for it would be useless unless prices were kept right up to date.

IX.—Other forms of Government action and organization.

Certificates of quality.

I would be averse from issuing Government certificates of quality for any products Many of the industries and particularly the cottage industries already possess guilds, and I would encourage these guilds to keep their products up to a high standard of quality, if possible marking their products with some indication if they were of recognised standard. For instance, in the Mirzapur carpet industry complaints have been made that trade is injured by reason of unscrupulous competitors coming in from time to time and encouraging the manufacture and purchase of inferior grades of carpet. They profit for a short time by reason of the established quality of the district product and when the inferior quality becomes known and the inevitable effect follows in a general reduction of price they clear out. If it were possible to form a trade organization of carpet-makers who agreed upon definite standards of quality it would, I believe, be beneficial to the trade. In every case, however, this would have to be voluntary.

Prevention of adulteration.

The purity of food-stufis should, I consider, be regulated by law and penalties imposed for adulteration, the organization for purposes of inspection being provided by the Municipal Health Officers. There are other directions, of course, in which adulteration and sophistication are practised, such as, for instance, the damping of cotton, the loading of wool and of leather in order to increase weight, etc., but I do not see how it is possible to control these by means of law.

When it is known that a commodity is imported solely for purposes of adulteration, I would impose such an import duty upon that product as would make it impracticable to use it. Thus "White" and "Debloomed" mineral oils are imported from America and from Germany which are used solely for the adulteration of our vegetable oils and *ghi*. It is said that it is also used for hair oil; there are plenty of other oils which are just as suitable for

hair oil, but even if that were not so the extra cost of the hair oil by reason of the duty would be trifling and not to be considered in relation to the great good which would result from the cessation of adulteration of our vegetable oils.

Misdescription.

I have no suggestion to make in regard to prevention of misdescription of goods generally; I do not think any legal enactment would stop this.

Trade marks and trade names.

I have not sufficient information to offer a considered opinion but I think that action would, in the ordinary course, be taken by the original proprietors of a trade mark or description if it were infringed, and I have no reason to believe that the present Indian law is not capable of dealing with this. For instance I know that Messrs. Joseph Rodgers and Sons of Sheffield successfully prosecuted some Indian makers of scissors who stamped their name upon locally-made articles and I believe that Messrs. A. & F. Pears were able to stop some small makers of glycerine soap from selling it in a box which was palpably an imitation of their production and was labelled "Pearl Soap." On the other hand I notice matches being sold in the Indian bazars made in Japan but labelled "Ship brand" and bearing the pictorial representation of a ship although the "Ship brand" match is a well-known Swedish product. I have never heard that proprietors of registered marks or names have not been able to get justice by reason of defects in Indian law.

The Patent laws.

Under the present system one may register a patent in India even although it transgresses a patent previously registered. The Indian Patent office does not undertake the search of records and consequently an Indian patent is merely a certificate of registration. The organization should, in my opinion, provide for scrutiny of previous or existing patents before the patent applied for is granted. The English practice should be followed.

Registration of partnerships.

It is, I consider, desirable to introduce a system of registration or disclosure of partnerships.

Roads, railways and waterways.

I have no specific recommendations to make as I have not sufficiently considered the matter of possible railway extensions. But I may remark that the doubling of the East Indian Railway as far as Cawnpore is urgently needed. And in this connection I may add that provincial industries have had great difficulty in getting coal for some time past.

At various times I have been consulted with regard to railway freights and generally speaking, where there are good grounds for complaint, the railways have been found willing to amend the rate. It might be laid down as a policy that all Indian manufactures should be placed upon schedule rates at least as favourable as those applying to imported goods of similar description, while special attention should be given to the rates for raw materials.

For reasons given above I am not prepared to suggest any railway extension as being essential at the present time, but in this connection the possibilities of a wire ropeway from Kathgodam to Bhowali might be considered. The fruit industry is now being developed in the Kumaun hills and cheap transport is an essential if this is to expand. The railways have already promised that they will provide special vans when the industry warrants it.

I have no information on the subject, but the possibility of using canals for traffic to a greater extent than at present might be considered.

Shipping freights.

If railway and shipping companies would give a favourable rate of carriage for oil it would facilitate the development of our oil pressing industry for which India is economically so well situated. I believe that there are also special regulations with regard to the carriage of oil cake which make it difficult to develop an export trade in any surplus which we may have.

Hydro-electric power surveys.

A certain amount of work in developing hydro-electric power has, I believe, already been done by the Irrigation department, but it is very desirable that a systematic survey should be carried out to indicate where hydro-electric power might conveniently be developed and the quantity available. We have little knowledge of the subject at present and it might be possible to develop industries in connection with hydro-electric schemes.

Mining and prospecting rules.

We have no minerals worth speaking of in the sense of this question with the exception of perhaps saltpetre, and the nature of this industry is such that it could hardly be controlled as a public undertaking. We should very much like, however, to have a survey into the occurrence of glass-making materials in the province.

Forest department.

The questions relating to the Forest department presumably need not be dealt with by me. At the same time I would be allowed to say that I consider it highly desirable that a business department should be attached to the Forest department for the purpose of exploiting the various forest products and establishing saw mills with seasoning depôts.

Jail competition

I do not know of any present complaint with regard to competition by jail industries.

X.—General.

Q. 110.—My suggestions for the development of industries are, I think, all contained above.

Q. 111.—There is room, in my opinion, for many industries particularly in connection with our Forest and Agricultural departments. I allude to such industries as the manufacture of citric acid, lime juice, cream of tartar and tartaric acid (from tamarinds), the manufacture of starch from potatoes and rice, possibly the manufacture of glucose from whichever base offers the best medium—one possible base is molasses. Tanning extracts also should be made, varnish and paint factories, printing ink factories and linoleum factories would all be favourably situated in the United Provinces. Indeed this question would almost justify a special survey.

Q. 112.—Taking this question in its wider sense I would suggest that the use of spirit in industry and trade could be greatly enlarged if the regulations of the Excise department could be suitably modified. I believe that our resources would enable us to manufacture spirit at a price which would compete with any part of the world.

Q. 113.—The forest products offer one large group of raw materials for which there is a good case for investigation. The vegetable products alluded to above in response to question no. 111 (see second last paragraph) indicates another group. There are large deposits of *sajji matti* and of *reh* in these provinces which it may be found possible eventually to use economically. There are probably many sources of tannic acid available which have not hitherto been used but which might suitably be developed if the manufacture of tanning extracts were established. The tanning of hides and skins in the province ought to offer a large field for development. Soil fertilisers from bones, blood, etc. should be made locally. Paper pulp could be made from both wood and grass, and the properties of the clay available in the province ought to be investigated with a view to possible use in other directions than in brick making.

The following is the list of commercial problems involving chemical research or investigation supplied to the science departments of the various colleges in the United Provinces.

1. De-odorization and de-colourisation of vegetable oils, especially those derived from *mowha, neem*, cocoanut, *til* and cotton seed.

2. Preparation and examination of essential oils from rose, jasmine, *bela, khus, keora*, (screwpine), cassia flowers (Acacia farnesiana), lemon-grass, geranium, and *tulsi*.

3. Purification of animal fats.

4. Examination of various vegetable oils for the preparation of high class toilet soaps.

5. Preparation of citric and tartaric acids from vegetable products common to these parts.

6. Examination of *reh* from various localities for its alkali contents.

7. Preparation of glues and gelatines from bones and horns.

8. Examination of sand from various localities for its suitability for the manufacture of white glass.

9. Working out formulae for the production of glass of different colours.

10. Examination of various gums for their suitability for sizing yarn.

11. Preparation of medicinal lanolin from wool grease.

12. An investigation into the causes and extent of deterioration which Bengal coal undergoes on storing.

13. Preparation of extracts from natural dye-materials such as *al, majith tesu, sappan* wood.

14. Examination of spentwash from distilleries with a view to ascertaining if any waste products can be recovered from it.

15. Examination of new tanning materials.

Oral Evidence, 8th November, 1916.

President.—Could you tell us exactly how long you have been in charge of the office of the Director of Industries?—Since January 1915. Nearly two years.

Before that you were in business?—For 20 years at Cawnpore.

What was the special line of your business?—Woollen manufacture. I was in general and administrative charge. Could you also tell us how long the office of Director of Industries has been in existence in this province?—Rather over six years. Who were your predecessors?—Mr. Wilson was the original Director of Industries and on his leaving on account of ill-health Mr. Burt, Deputy Director of Agriculture, officiated for some time, i. e., over two years.

The answers you have given to your questions are largely based on your experience during the last two years as Director of Industries and on your previous experience of 20 years in business?—Yes. I might add also that in connection with the Chamber of Commerce I had been Vice-President and President for some years.

Have you any means of forming anything like a satisfactory conclusion as to the possibility of there being much hoarded wealth in this province?—I have not the means.

You know of the vague general statement made about hoarded wealth?—Yes.

Is there any way in which you could tell us that this statement is the outcome of actual observation in a precise way?—My own observation leads me to say that in these provinces there is no vast mass of hoarded wealth.

I understand that money seems to be always forthcoming in the handling and marketing of agricultural produce?—Yes.

Have you any means of forming an opinion as to whether in addition to the money that is used for handling agricultural produce, there is also a supply of capital that can be counted on to assist industrial development? Is there any surplus capital?—There is certainly surplus capital in the hands of European business enterprises and a good many Indian gentlemen of means would also be willing to find the money. In addition there is a trust in process of formation and almost ready to commence operations. Capital.

(At this point witness gave certain particulars in confidence with regard to the capitalisation and proposed sphere of operations of a large industrial trust which was in process of formation in connection with one of the leading Indian Banks.)

Could you form any idea as to whether a trust of this kind could utilise a crore of rupees within the province easily and fairly readily? I do not think it could.

Would a trust of that kind be willing to finance minor industries?—No, that is beyond their scope as defined to me. But I have other organizations in view for minor industries.

Will they have small branches in the district and taluk towns? Their intention is to deal with large schemes only. A smaller trust has been proposed among leading Indians. That would be entirely provincial, for the smaller industries, though not necessarily village industries.

How do they propose to get into touch with the people?—Will they have agents in fairly large villages?—I have outlined in my note a movement for the organising of the blanket weaving industry and that may be regarded as typical of the class of work that I wish them to do.

Would they be prepared to finance small works, for example, glass?—Glass work is one which will come under a third syndicate, also in course of formation.

Hon'ble Sir Fazulbhoy Currimbhoy.—How is the trust going to advance the money?—The proposed trust, when it works, will lend on land, buildings and plant.

Will it be worked on the co-operative system?—That will be the work of the third syndicate. The second and the first ones are merely financial.

Hon'ble Pandit M. M. Malaviya.—You have said that the trust will be willing to include influential Indians?—Yes, I have said that, in my opinion, it would.

Would they offer shares to Indians generally?—I cannot say definitely.

Will the trust be formed of men who do not reside in the country?—To my knowledge it is composed of people already resident here.

Would the trust be willing to offer the opportunity to Indians to subscribe half the capital ?—I should say ' yes. ' Still I am giving it merely as my opinion.

And would they be willing to put on the directorate half the number of its members from among Indian business men ?—That I cannot say.

Don't you think that a bank started with some Government aid would offer a better opportunity to Indian as well as to European firms in the matter of financial aid than close trusts like this ?—I do not think any difference will be made between Indians and Europeans.

Have you heard complaints that difficulty has been experienced by Indian firms in getting money from the Presidency Banks.—I do not think any difference is made between European and Indian firms. I know that European firms have also been refused money.

Are Indian shareholders allowed to take part in the business of concerns managed by Europeans to the same extent as Europeans ?—Decidedly. Indian shareholders have the same rights as European shareholders and it is open to them to take advantage of the same opportunities. I have not heard any complaint on this ground.

In view of the requirements of industrial development in India, don't you think, speaking as a Director of Industries, that you would encourage the formation of companies where equal opportunities will be given to Indians ?—Decidedly.

Hon'ble Sir F. H. Stewart.—Can you tell us if it is a fact that most of the capital of the proposed trust would have to be provided by Europeans ?—That statement has not been made to me.

Could you tell us a little more clearly about the second proposed syndicate?—It is outlined in the pages of my evidence.

Have you any idea of the capital suggested ?—The figure that is aimed at is ten lakhs. But I am afraid the scheme has not proceeded yet beyond the talking stage.

No definite arrangements have been made ?—No.

What is the object of this syndicate ?—They would take up works like glass works and other smaller manufactures as distinct from what are called village industries.

Would it also extend its help to develop smaller industries which are already in existence?—That is the class of work they would prefer.

And the third syndicate is quite a small one for the sake of helping the village industries ?—It is not a small thing nor is it designed with any philanthropic motive. It is a straightforward business proposition. The idea is that this syndicate by buying large quantities of yarn and also handling the whole product of the district in blankets will be able to put down finishing machinery and organise sales.

Is it a going concern ?—It is, in a sense, a going concern. The capital is ready and they have already started the purchase of blankets.

What is the capital of this syndicate ?—Rs. 50,000.

The idea at present is that the large trust might include all India, the second and the third being provincial?—Yes.

Sir D. J. Tata.—In answer to the Pandit's question about help from the Presidency Banks, are you aware of any Indian firms that have received help from the Presidency Banks ?—Yes.

With reference to the industrial bank that you suggest, what part should Government take in its establishment and promotion.? It would be very much on the lines of the British Trade Bank proposed by the Farringdon Committee.

You then propose that the State should provide some portion of its capital ?—Yes.

Dr. E. Hopkinson.—You spoke of there not being much Indian capital ?—Yes, so far as my observations go.

Is it all in the form of bank deposits ?—I should say largely ' Yes.'

There seems to be a considerable amount of money from Indian sources forthcoming for the handling of agricultural produce ? This is a matter directly dealt with by the Director of Land Records. The amount contributed from Indian sources is very small, but I am speaking only of the United Provinces.

With regard to the second and third trusts that you have referred to, has it been suggested that they should have Government aid?—They have not asked for Government aid.

Mr. A. Chatterton.—In these provinces apparently the development of rural industries has been left more in the hands of the Agricultural department than in the Department of Industries. What classes of rural industries ?

The preparation for themarket of various kinds of agricultural produce.—It is very difficult to draw a line. Sugar is dealt with by the Agricultural department and oil seeds by myself.

Who deals with cotton ?—Cotton is dealt with by me.

Is there no silk industry ?— Practically none.

Who deals with the question of pumping water for irrigation and well boring ?—The Agricultural department.

Has the question been considered in the Department of Industries " How Government should aid in the establishment of small industrial undertakings?" Have any proposals been submitted by you to Government ?—Matters of that class come before the Board of Industries who advise the Government.

Have you got any general scheme ?—Each case is dealt with on its own merits. There is no general policy.

Have you any system in these provinces, such as we have in Mysore where we have special rules for the assisting of private enterprise by the grant of loans on the hire-purchase system ?—We have nothing of that sort.

Have the promoters of these trusts you mentioned investigated the methods that are being pursued in the case of Madras and South India generally?—No.

The second trust, the bigger one, is that intended to finance and pioneer industries or simply help industries the working of which has been started and it is only a question of business management.—No differentiation has been made.

Do the promoters consult you ?—They are consulting me on all details and will act on my advice largely.

Do you propose that they should find funds for pioneering work ?—The term is too general to admit of a definite answer. If I were satisfied myself that the pioneer industry was a sound one, I would probably recommend their taking it up.

Will you take up the glass industry?—It is not a pioneer industry. We have already done a good deal of work in that line.

And successfully ?—Successfully as regards the production of goods.

There has been a considerable number of pioneer institutions under Indian management and they have stated that they are financially successful. Has it been proved in any cases that they are not ?—I have not attempted to do that. I have no actual experience on the point.

As Director of Industries, do you propose to rely entirely upon private sources to finance the development of the smaller industries in the province, or do you propose to ask Government for financial assistance under some system of takavi loans or loans guaranteed by Government ?—So long as I can get private capital I shall certainly not trouble Government. So far we are still in the experimental stage.

Hon'ble Sir Fazulbhoy Currimbhoy.—Do you happen to know that the Europeans in your province do not encourage investment by Indian shareholders ?— I do not.

Why are you averse from Government assistance to any industries ?— I think it tends better to the promotion of healthy enterprises if we can manage without Government assistance.

But there are certain industries in which people would not venture any money unless they have some confidence ?—I certainly think that every case should be considered on its merits.

Do you think that if the Government gives some aid, the Indians would be encouraged to start industries ?—Yes.

President.—In your written statement you refer to the Government Harness nd Saddlery Factory at Cawnpore. We have a similar complaint against this institution,

because it replaces private enterprise, but is it fair to read that statement as it stands without having it supplemented by some remark that this is a Government munition factory and that it has to be relied upon in times of emergency and disturbance to supply the army requirements?—In that case you would need to have a Government factory for almost every article that might be required.

It will not be necessary to establish a factory for every article, because some of them may be bought anywhere, but there are certain stages in the manufacture of munitions that must be carried out by Government. It may not be advisable to depend upon private enterprise when only one other private factory exists?—That point of view has never been placed before me. The matter has been referred to Government before by the Chamber of Commerce. The development of the place as a fortified area is quite recent and the term 'munition' I did not think covered the products of a harness factory which turns out merely leather equipment for the army.

Mr. A. Chatterton.—Have you before you the question of pioneering any new industries?—Yes, paper pulp. The question is before me. Personally my own opinion is that we can do it without Government aid.

Do such ideas come to you from some outside source or do they emanate from you in the first instance?—It may be either.

In the case of the paper pulp is it an outside idea?—It was the Forest Department's idea.

You are opposed to the Department of Industries itself carrying out any pioneer work?—I could not give a definite reply. Generally speaking I am opposed to our doing the pioneer work, of course there may be exceptions in which it may be desirable to do so.

What are the tests which enable you to determine that a particular industry may be pioneered?—Unless I were satisfied after personal examination and after receiving a report on the matter that it was a desirable industry I would not be disposed to recommend it. It is a very large question.

The question of pioneering industries is a very important one. A pioneer industry is a new industry as far as India is concerned. As soon as the conditions of success are established it is likely that rival establishments will be set up. The pioneer takes the risks and he is not likely to enjoy in many cases the extra large profits which a pioneer might anticipate if he had a monopoly?—I should hesitate to say that that was the case. The pioneer has the benefit of his experience and he has a valuable start. We have not any experience to guide us in the matter.

Hon'ble Sir R.N. Mookerjee.—You do not object to Government giving their aid when a good industry is started?—If it is found possible to do so I hope to manage without Government aid. Of course I am speaking only as regards this province. I may say that practically all my evidence relates only to the United Provinces.

You are hopeful that in future Indian capital would be forthcoming?—I am very hopeful.

Sir D. J. Tata.—I don't quite follow what you say in your written statement about crude resin and its purchase price?—The price of the crude resin is mainly composed of the cost of its carriage. The distances over which it is carried in the forest are very great and that governs the cost of the crude resin at the distillery.

Is the crude resin sold to the public?—No, there is no market.

Hon'ble Sir F. H. Stewart.—Do you think that the pioneer factories should be handed over to private enterprise as soon as possible?—Yes.

Would it not be better for the pioneer business to start and for Government to give it such assistance as might be necessary?—I prefer that to Government actually pioneering them.

Hon'ble Pandit M. M. Malaviya.—The object of the Government in desiring industrial development is twofold, to promote industrial progress in the country and secondly to utilise the raw materials?—Yes.

In the case of the pioneer factory is not Indian capital more likely to be drawn out if Government lends some assistance at the start?—Yes.

European capitalists do not need that encouragement but Indian capitalists do?—Yes.

You are aware that at Allahabad and Lucknow electric supply companies have been started where the Municipal Board has guaranteed interest for a certain number of years and Indian capital has come forward to support the project? Would it not be desirable for Government similarly to guarantee a certain rate of interest on some enterprises to encourage Indian capital to engage in industry?—I would not say that Government should in all cases do that. Of course Indian and other capital would be attracted more readily if Government guaranteed some return. The conditions of industrial enterprise differ very largely from a municipal undertaking of that sort.

Do you not think that Government might help carefully-considered enterprises by guaranteeing interest or advancing loans?—I am not prepared to go so far as to say that it is desirable. I will say that capital will certainly be attracted if Government offer some subsidy or guarantee.

When you think that the starting of industries would be promoted by Government aid being given in the first instance, is it not obviously desirable that Government should offer that aid?—Yes, if it has not been found possible to obtain private capital.

Can you tell us why it has taken the Department of Industries such a long time to decide whether this paper pulp manufacture should be taken up by Government? Is it not now nearly four years since the proposal was first made?—It may have been, I can only tell you that the project came into my hands perhaps 15 months ago and at that stage nothing had been done beyond the laboratory experiments.

Can you tell us what this delay is due to? Why has it taken so long a time to come to a conclusion?—I am afraid I could not explain.

Your department have long been satisfied that there is abundant raw material for making paper pulp?—As to the existence of the material, certainly.

Is not the rest mainly a question of obtaining machinery and skilled workmen to manufacture the pulp?—A great deal more than that. Before the thing came to me there may have been very good reasons for the delay. There is much to do besides laboratory experimentation. We had to send a large consignment of grass to England in order that the paper experts there might make an independent report upon it. There are many other points connected with it, for example, the suitability of the site selected, the labour problem, the quality and quantity of water available, and the last is one of the most important things. These things cannot be dealt with quickly. They take some time.

Can you tell us whether the proposition is likely to be settled soon, either to be rejected or accepted?—I should think very soon.

With regard to the Government factory at Cawnpore, do you not think that the time has come when the Government should hand it over to private enterprise?—I should say 'yes.' But, as I say, there may be military reasons which are not known to me.

Are not private firms in England and elsewhere asked to supply boots for the army?—Yes. But boots are not made in the Government factory at Cawnpore.

Limits of Government Assistance.

Mr. A. Chatterton.—Would you like to use the co-operative societies on behalf of industrial development? What is your policy?—I should like to work with the co-operative movement. I would take charge of the technical and industrial side and the co-operative movement would be in charge of the financial side.

What about the co-operative furniture workshop at Bareilly? Would you put that forward as a typical society?—I should hope not. I have nothing to do with it.

Hon'ble Pandit M. M. Malaviya.—Supposing the needs of a province are not met by existing enterprise, would you, merely out of the consideration that it would interfere with existing enterprise, debar other enterprises from coming into the field?—In my note I am speaking only of Government aid. I cannot interfere with private enterprise if it likes to start.

Take the case of the American Tobacco Company. Suppose the Government finds that the company is making huge profits and that there is room for more companies to be established, would you not advise Government to render the necessary help to establish them?—I would not.

Supposing a Japanese company is making huge profits, would you not like Government to help indigenous companies to compete against it?—If the Japanese company is supplying the goods at a reasonable rate, the country has the benefit to that extent and we could not possibly forbid the company from doing it. If, on the other hand, the company were making huge profits, it is to our advantage to put up competing enterprises. Government might assist indigenous enterprise to stand on its own legs against foreign enterprise.

Government should view sympathetically at any rate indigenous enterprises as compared with foreign enterprises.

Technical aid.

President.—How many expert assistants have you and in what particular lines?—There is one for glass making and another in metal pressing. In addition we have a technical chemist.

In each case you are putting your trust in a specialist?—I have to rely on their advice, of course checked by myself from the commercial point of view.

The metal pressing and glass experts are fairly senior men?—Yes. They have come quite recently.

They are engaged on short terms?—For three years.

Do you get the best advantages from this class of men who come to occupy temporary posts at an advanced age?—They are not quite the type of men we want. Men of a higher class, of the officer type, would be more suitable. They should be men of higher education. But our present men are doing quite useful work.

Do you find a full, time man necessary in all cases?—At present not. But the possibilities of the glass industry are such that we should have a whole time man.

Would you then favour the idea that experts of this superior kind should be brought out by the Government of India and their services made available to all Local Governments?—I have always been in favour of the idea.

Supposing you had any trouble with an expert, how would you get rid of him?—It is virtually impracticable.

You think that there are reasons for employing a better class of officers of the specialist kind and that they might be employed on long service?—Decidedly yes.

Would you welcome any system by which the Government of India would employ a staff of chemists ranging from junior chemists right up to the head of an Imperial department?—It would be of enormous value, and I have always been in favour of some such organization as that.

Hon'ble Pandit M. M. Malaviya.—You have told us of the existing technical schools of the province. Do you not think that there is room for many more technical schools in the province?—There is undoubtedly.

For a large province like this do you not need a technical school in every district?—As a general statement, yes. We are not dealing with the type of school.

Do you know that there are hundreds of technical schools in Japan?—Yes.

Don't you think that there is need for higher technical schools in the country for training men who would be able to take charge of factories, etc.?—Yes.

Are you in favour of the establishment of one higher technical school in each commissionership in this province?—I would, in the first place, investigate the industrial possibilities of the division. There may be certains divisions which may not be suited to particular industries.

And you are distinctly in favour of at least one higher technological institution for Northern India?—Yes. That would be mainly for research work. That is our present need.

I take it that in view of the great possibilities of industrial development in these provinces, you are in favour of providing facilities for research work at more centres than one?—Yes.

Would you not give discretion to Government to publish the results of researches conducted by Government experts, on behalf of private firms if that is likely to be beneficial to the general public, after making such compensation as may be necessary and reasonable to the private firm concerned?—I quite conceive that it may be desirable in certain cases.

For example in the case of the *khaki* dye, would you leave it to Government to publish the result of the research?—If the private enterprise has paid for it, I do not think it would be reasonable to make the result known to all at once.

Even if the price of the dye becomes exorbitant?—Of course Government should come to some definite understanding with regard to this, and if the party accepts, there will be no difficulty.

You have referred to the metal pressing industry. Which is the most convenient centre for it in your opinion?—The best centre for the kind of work that I refer to is Aligarh. It possesses certain advantages in this trade.

Would not Benares or Delhi be more suitable?—I think that Aligarh has superior advantages for this kind of work. Aligarh and Delhi are almost contiguous.

Do you publish the results of the researches which you have conducted?—They are published in the form of notes and also in the general press both in English and in the vernacular.

Don't you think it would be an advantage to have them published in the official Gazette?—That is a point which is worth consideration.

Hon'ble Sir F. H. Stewart.—Have you got any practical results from the problems that you have referred to the different colleges?—It is only quite recently that they were sent out. Some results have been sent in and we are now engaged in checking them. We have given them work to keep them going for a long time.

Do you expect useful results?—I expect useful results mainly from the work of the science professors. They are men of very high training and I consider that the knowledge they possess can be usefully employed in dealing with our industrial problems. At present there is danger of its being allowed to rust.

If a central institute were started, you would still send some of these problems to the colleges?—Yes. That would be another source of assistance.

Hon'ble Sir R. N. Mookerjee.—You said that an expert class of officer would be required for the development of industries. Don't you think that you also need men of the foremen type, such as blowers of glass, etc.?—In the case of the glass factory we certainly want a superior man but men of the type you mention would also be useful.

Dr. E. Hopkinson.—As to the schools that you refer to, can you tell me about their location?—They are spread all over the province. There is a school of arts and crafts at Lucknow, technical schools at Lucknow and Gorakhpur, a weaving institute at Benares, and a carpentry school at Bareilly. The dyeing school and the leather working school are at Cawnpore, and a school of needle work at Lucknow.

Where are the colleges to which you refer your problems?—They also are spread all over the province, e.g., at Meerut, Aligarh, Lucknow, Agra, Allahabad and Benares.

On what principle do you refer the problems to the several colleges?—One district has a reputation for one class of industry more than another. This is an experiment which is only three months old. Each college was given a list of subjects and they selected the class of work they could most suitably do.

And I take it from what you say that the professors of the different colleges are willing to do this work?—Those who have spoken to me have expressed their pleasure at being asked to do the work. In the ordinary course they spend most of their time in academic work and they have willingly agreed to handle applied problems.

Can you give some more information about the peripatetic weaving schools that you refer to?—This is an innovation of the current year. The peripatetic school proceeds to the village. Its sole object is to introduce the fly-shuttle loom by showing that it produces the goods more quickly than the old-fashioned throw-shuttle loom. They take the looms to the village and make exactly the same goods as the weavers of the district make and from the same yarn. The Collector takes an interest in it and as a start we have given the students a scholarship of Rs. 5 a month. The training lasts only for three months.

Why do you give this scholarship?—To encourage the men to come to the school. It is very difficult to make a start. We shall reach a time when we shall not have to offer these scholarships. Now we have to make a start with the scholarship.

How long ago did you begin?—We started in March of this year. The course is only for three months.

How many teachers have you?—There is the mistri who is a worker. He takes with him one practical weaver and six empty looms. Their work attracts curiosity and as soon as the object is known, we offer the local weavers an inducement by way of a scholarship of Rs. 5 a month in order to compensate them for any loss of earnings while undergoing training.

Do you receive many applications?—I have several on hand. The classes have been most successful. In the two first places visited they were so successful that we decided to stay for another three months. These two districts have now started schools themselves under our direction.

Who controls these schools, the District Boards?—They are controlled by ourselves.

How many looms are attached to each party?—Six altogether. Twelve men are working at a time

How long do they remain in one village?—Three months.

Do you consider that these classes might be multiplied?—Yes.

What are the arrangements for supplying the looms?—They are local. We get the assistance of the local people interested. The working part of the loom only costs Rs. 7-8-0.

Have you in contemplation the establishment of schools for other purposes than weaving?—I personally think that this type of school and teaching suits the village worker better than any other form of school.

Do you think that in certain villages people will take pride in producing an article that is really better than the factory-made one?—I think it is very likely to follow.

Will it raise the standard of production?—Already the men are making a finer sort of cloth.

Is anything like this going on in the Agricultural department?—I am not sufficiently acquainted with it to say; though this may be new to this province, it is not a new thing altogether.

Were your experts appointed under your Directorship? Did you apply for them?—I applied for the glass expert. I did not apply for the metal expert. It was before my time.

Were the appointments satisfactory?—We should have liked to have better men. They are not quite the men whom we want. The present method of appointment as regards experts is unsatisfactory.

Can you suggest other means?—I should not like to do so. I have my own views on the matter.

In the case of giving aid to industries are you in touch with them and are you able to handle all sorts of subjects?—Yes. For example I am in touch with every mill in Cawnpore. We are only concerned with the day-to-day problems as they arise and we are dealing only with the comparatively smaller industries.

Are you able to advise them as to specifications of machinery, etc?—I should assist if desired. Up to the present moment any consultations of this character are clearly understood to be confidential. I do not definitely advise applicants. I place the main points before them. They decide for themselves.

Are you able to advise as to the class of machinery?—It so happens that I have a fairly wide experience. Before coming out to India I was engaged with a large buying firm at home and I have a fairly wide knowledge of machinery and machinery products.

How do you manage to keep up to date?—The class of problems that I deal with are so simple that I can usually deal with them personally. I have many sources of information at my command. In the case of the Indian industrialists they are not usually aware as to where to go for a particular sort of information.

Do you regard yourself here as a sort of technical and business switch-board?—I bring the buyer and the seller together, and it would relieve me if we had a larger number of advisers.

You are only talking of the smaller industries?—Of course. The large firm would never dream of consulting me on all points though they consult me on certain points.

Are there competent consulting engineers in this province?—There are none here, but several in Calcutta.

Mr. A. Chatterton.—Is there any system of co-ordination of the activities of the various Directors of Industries?—There is none. I occasionally correspond with the Director of Madras.

Do you think it desirable to bring the different Directors more closely into touch?—I do think that would be useful.

How do you suggest that should be done?—I do not think it can be done except by some form of imperial organisation. You must have some co-ordinating authority.

Do you think it might be useful if the annual reports of the various departments in the provinces were more widely circulated and bulletins issued in a uniform series?—I think it would help. It is a very important matter.

Sir D. J. Tata.—Have you any means of publishing the results of your researches?—We publish a note and that is circulated to the people engaged in the industries, and to the Press.

Is there anything published in India which gives results in a regular way?—There are the reports of the Geological department. There is no journal that I know of which treats of industrial matters in the same way.

Do you think that something of the kind is desirable for work that pertains to industries?—I think an official journal would be of great value in preserving a permanent record. But a work of that kind would only be valuable when we had definite results to publish.

Hon'ble Pandit M. M. Malaviya.—Would you like to disclose the results of your research?—Undoubtedly. For example there is any amount of ordinary tallow to be had here but it is not fit for sizing and consequently cotton mills import tallow for sizing. We have done a certain amount of work upon this in our laboratory and we have now successfully demonstrated that our local tallow can be refined commercially and made fit for use in cotton mills. Now a man has bought or is buying the appliances which are needed to manufacture it on a commercial scale. No Government assistance was needed.

Has the result been published?—The best publication is the production of the tallow. I am quite willing to publish as soon as the man gets a start.

Could you not give the public a description of the way in which the thing was done?—Both Mr. Srivastava and myself recognize the desirability of publishing this and similar results had we got the necessary leisure and staff at our disposal. That is the main difficulty. We have not got the physical means.

Hon'ble Sir F. H. Stewart.—Could you indicate the reasons why bobbins manufacture has failed?—There were two efforts to my knowledge. One in Surat failed owing to defective business management. One in Calcutta failed because it was in a wrong location. These are my opinions only of course. We contemplate the manufacture of bobbins in a place where the wood is grown, where water power is available, and with specially trained labour.

What about distribution?—The reduced cost of manufacture would more than cover the freight.

Hon'ble Sir Fazulbhoy Currimbhoy.—Have you a knowledge of the Swadeshi Stores in Bombay?—Yes. I have some personal knowledge of it.

Commercial museums and sales agencies.

Don't you think that that class of shops will be very advantageous for Indian industries?—I am in favour of it.

Hon'ble Pandit M. M. Malaviya.—You say "If a live propaganda were to be developed in connection with the central commercial museum and conducted through the medium of the Industries departments of the different provinces, its work would, I believe, be of considerable value." Don't you think that you should have at least one commercial museum for each province?—I don't think so. I have said that the museum in Calcutta is rightly situated there. I don't think the time has come for further museums of that description.

Hon'ble Sir F. H. Stewart.—Who manages the central emporium in the United Provinces?—It comes under my control but it is actually managed by a firm of publicity agents whose standing is beyond question. They submit monthly figures to me. They have no interest in profits.

Do you think it would be a good thing to extend this to all the provinces?—I would extend it to all India generally.

What is the commercial section which is now provided as part of the emporium?—That is the display of commercial samples.

And your experience is that it brings buyers and sellers together?—The emporium is for bringnig together the individual buyer and the seller of the small art-wares of the province.

Sir D. J. Tata.—With regard to this emporium, does your experience suggest the advisability of establishing an emporium of a similar nature in each of the smaller industrial provinces?—I think that our experience is sufficient to warrant my saying that if there were other emporia for our small art industries they would be of use.

Would you advocate emporia for other provinces as well?—We would like to develop inter-provincial trade; but I should clearly differentiate. Our own goods must not be mixed up with those of other provinces.

President.—How long has this been in existence?—From October, 1915.

When you favour the multiplication of commercial museums have you realised the cost of the staff and the expense involved in marking the up-to-date prices?—I have expressed myself badly if I conveyed the impression that I was in favour of an extension of these museums. I intended to say that if you wanted to bring all the buyers and all the sellers together, a very large extension of commercial museums would be needed and that the cost would be prohibitive.

You really consider that commercial museums as exemplified in Calcutta are impracticable for the whole country?—Yes.

What have you to say about the difficulty in keeping the prices up to date?—I am averse to the prices being shown at all. No prices could be true, for in every case you have both a wholesale and retail price.

Exhibitions.

Sir D. J. Tata.—With regard to exhibitions, should they be merely popular in character or would you confine them to traders and manufacturers?—May I ask you what you mean by "popular" in this respect?

I am referring to a reply given to us the other day that these exhibitions were merely places where you met your friends and nothing resulted. If, instead of making them popular with merry-go-rounds and things of that sort, you make them just places where buyers could meet sellers and something of that kind, would it not be more useful?—In my evidence I have recommended that we should develop our local district fairs, and industrial exhibitions would be combined with them.

I take it that you think that the same object would be served by central emporia?—I also wish to encourage the local or district fairs. I do not know what practice prevails in Bombay. In this province there are local yearly fairs with which we are now combining industrial exhibitions.

You do not approve of travelling exhibitions?—That is a travelling exhibition virtually. A local fair is held here to-day, and next week at another place, and we hope to take advantage of these by sending exhibits to them all in due course.

Trade representatives.

With regard to trade representatives, would you be averse to the appointment of such representatives even in Asiatic markets?—I am dealing with the United Provinces only. At present we have practically no markets abroad. If a market of that sort were established I would reconsider the point. The United Provinces send little if anything to China and the Persian Gulf.

Government patronage.

Dr. E. Hopkinson.—You suggest that the actual prices for all imported articles should be published. That seems to me to be a large proposition. Take the particular case of a steam boiler. It is useless to give the price without complete specification.—There may be some exceptions. To publish the mere fact that you purchased so many yards of certain cloth would be of no value unless full particulars were attached, and even then prices would be of no value unless we also knew exactly what the cloth was.

Don't you think that the exceptions would be very numerous?—I would not absolutely specify that prices must be given. If you are interested in boilers you are empowered to write to Government or the department controlling the purchase and get from them the specification of the boilers which they purchased and the prices. When I say 'publish' I do not necessarily mean that all the information should be given in one publication.

President.—It has been suggested that this point might be covered by the publication each year of a statement in the form of a blue book of the actual purchases made by Government during the previous year and the prices paid for the articles purchased. A report of that kind issued once a year, it is suggested, might cover all the necessary information and the producers in this country would make it their business to study it.—That would cover the need.

Hon'ble Pandit M. M. Malaviya.—If such a list is published showing the articles used by the Government during the previous year, would you not think it also desirable to

publish a list of those articles which would be required in the coming year? There may be some articles purchased in the previous year which may not be required in the coming year?—That may be so. But how can we publish an estimate for the coming year.

I am only suggesting that some of the articles which were purchased last year may not be required for the coming year?—I should not have anything omitted.

Don't you think there may be some disadvantages in creating a buying department for India?—I have not sufficiently considered the difficulties. I have merely mentioned the desirability as it appeared to me.

Would one such department do for the whole of India?—I have not sufficiently considered it, but I do think that it will be necessary to have one controlling authority for India.

You want expert advice for only certain class of articles, but not for all articles which are purchased by Government? Supposing Government is purchasing paper from Indian mills, you do not want expert advice every year?—No We have the agency for it in the Controller of Stationery.

Land Acquisition Act.

Hon'ble Sir Fazulbhoy Currimbhoy.—Suppose I want to start a sugar factory and I want Government to give me 5,000 acres of land under certain conditions and acquire them for me, do you think that the Land Acquisition Act should be applied?—As sugar is an agricultural subject I cannot offer an opinion. I had only factories in my mind which would require a comparatively small area of land.

Hon'ble Pandit M. M. Malaviya.—In offering this opinion have you considered the injustice or hardship that is involved in acquiring land from people who are residing thereon or using it for private purposes?—I take it for granted that the authorities who examine the claims before acquiring the land would take that into consideration.

Would you not lay it down as a condition that no man should be deprived of his land for industrial purposes unless at least he is given some other land for raising his dwelling or for his other private use, as the case may be?—I would not like to fetter Government's hands. I trust in justice being done.

Do you know as a fact that at present there is no obligation on the part of the Government to buy land for people ousted from their dwellings in order to give them room to build houses on?—I am now considering only the acquisition of land for industrial purposes. Is it suggested that when a piece of land is acquired for a factory an injustice would be done to the owner of the land?

A hundred men may be ousted from their houses for a few acres?—I take it for granted that satisfactory conditions would be attached to the compulsory acquisition. The difficulty I wish to overcome is this. We have a concern in Cawnpore at this moment who want to expand their works, and are proceeding to acquire the necessary land. Although the total area of the land is small, they have to deal with 9 or 10 owners. They thought everything was settled when suddenly one man who owns a small plot in the centre says that he will not sell; in other words it is blackmail.

Is he not entitled to keep to his land? Would you allow any one to do the same thing with regard to yourselves?—If I receive a fair price.

And you are to judge as to whether the price is fair?—The circumstances would be taken into account in judging what the compensation should be.

Do you know that in England land must be found for a man who is ousted from his house?—No.

You would not confine your remarks to Government land or nazul where it may be available?—It may not apply. A particular industry may have to be carried on in a particular locality in which there is no Government or nazul land available.

In that case you would not mind how many dwellings have to be removed to make room for the expansion of an industry?—That is putting the case in rather a strong form.

I have known instances of a large number of people being ousted without any provision for their dwelling houses in town improvement schemes?—There should of course be proper conditions attached.

Would you agree that there should be some other land provided in exchange before a man is asked to give up his dwelling for an industrial purpose?—If he desires it.

Unless he consents, you will insist on some other land being provided for him before he is asked to give up his dwelling?—Yes.

President.—I should like to know generally whether in your judgement the inability to apply the Land Acquisition Act now for industrial purposes is or is not a serious bar to industrial development in the country?—I do not say it is a serious bar. I say it is a check upon it.

In your opinion it is not sufficiently serious for legislation?—It is not sufficiently serious to warrant any special legislation to which general exception might be taken.

Training of labour and supervision.

Hon'ble Pandit M. M. Malaviya.—You say "The Central Institute at Benares has, I am afraid, not achieved much practical result so far." Can you tell us why it has failed?—I cannot definitely tell why it has failed because if we knew we could put it right. Up to the present the students trained there have not entered into any established industry. They have been tried in mills and have failed, and they have not established businesses themselves.

Is the admission confined to students of the weaving class?—No.

You say "In connection with the district industrial schools which are mainly devoted to weaving, owing to wrong methods in the past, they have not fulfilled their functions as I think they might have done, their prime object being to establish the use of the fly shuttle loom." If you made the object more general, would they meet with a better fate?—I think they are not ready for that yet.

You speak about the system of apprenticeship following school training. By the words "following school training" do I understand you to mean that general elementary education should precede it?—I am speaking of "following technical school training."

Before students are sent to a technical school, would you not recommend that they should have had previous general elementary education?—Each technical school deals with that. The standard of admission varies with each school. As the Commission observed at Bareilly it is very low indeed. At the technical school, Lucknow, we are able to insist on a higher standard.

Would it be an advantage if, before they join technical schools, students have had a preliminary course in elementary instruction?—Yes, certainly, if it could be devised.

You do not see anything in the way of that being done except the provision of funds? Is not the desire for self-improvement widely increasing?—Yes.

Dr. E. Hopkinson.—With regard to the last paragraph of this section you speak of a standard of examination for mechanical engineers. Who prescribes that standard?—The Board of Examiners in each province. They are appointed *ad hoc* by the Local Government.

The law relating to steam boilers and prime movers is imperial?—Yes, but the rules are provincial.

Mr. A. Chatterton.—Are you in favour of literary and industrial education being carried on contemporaneously in the same school?—That is raising a very big question to which I have not given adequate consideration. As at present advised I consider they should be separate.

Official organisation.

Hon'ble Sir Fazulbhoy Currimbhoy.—Is the Board of Industries at present responsible to the Director of Industries?—It is responsible to Government.

Are you still for nomination and not election?—I think it must always be nominated.

At present the body is nominated and still you do not quite approve it as it is constituted?—I approve of the principle of nomination That is not the same thing as approving the actual nominees. I am speaking only about this province.

You want an Imperial Department of Industries?—I think it would be a desirable department.

Are the Directors of Industries of the different provinces to come under the Imperial Government or the Local Government?—I have given an opinion on that point. I am not sufficiently acquainted with the Government organisation itself to be quite sure how it could best be done. I believe in the desirability of an imperial department of industries, but the work of the Director of Industries must necessarily be provincial.

You say "The interchange of views and periodical visits between the Directors of Industries of various provinces might be encouraged." Don't you think that if there is an Imperial Department the Director of each province can get all the information as to what is being done in the other provinces. That will facilitate matters more?—Yes, if you have an imperial department.

One Director may have a policy of his own in his own province and may not like to give information to the other provinces; through the Imperial Department such difficulties could be obviated?—Yes.

Hon'ble Pandit M. M. Malaviya.—Do all the problems which the Director of Industries deals with come before the Board for collective consideration?—No. Only those which Government ask me to put before the Board.

You have no initiative in this matter? You have no power to decide what matters should be referred to the Board?—I do not think that I have ever had an occasion to decide yet whether I have powers or not. As a matter of course, in the usual practice, when a recommendation from me or a new proposal goes to Government, they may pass orders on it at once, or they may desire that it be referred to the Board of Industries.

Have the members of the Board power to bring forward any question for consideration before the Board?—They have certainly the power.

Are they informed of all the matters which are referred to you? For instance, a particular firm refers a question to you either of research or of the business aspects of a particular proposal. Are such proposals which are made to you communicated to the other members?—No.

They deal only with those matters which are referred to them by the order of Government?—That is so.

Don't you think that it would be better in the general interests of the development of industries if the members were informed of the proposals that come to you and if they received the collective consideration of the Board?—It would be impossible under the present constitution.

Do you think that an advance could be made by laying down that a certain class of questions should be referred to the Board for collective consideration?—Do I understand that you mean that the Director of Industries should postpone dealing with the problem until he takes their advice? Yes.

Where matters of principle are concerned?—Matters of principle invariably go to Government and I may say they are invariably referred to the Board.

Suppose a company asks for financial help. Would you deal with it finally?—I am not competent to deal with it. I send it to Government, who almost invariably refer it to the Board.

Then in practice the question of giving help to a company is not decided upon by the Government unless it has been referred to the Board?—Unless it so happens that the application was utterly impracticable, in which case the Government would pass orders themselves. Personally I do not pass any orders.

You advocate the creation of an Imperial Department of Industries. The main reason is that it will correlate the activities of the various provinces?—I have regarded that as the main work.

All our industrial questions must be dealt with by the provincial department?—No, for instance, the question of railway freight on goods going to the seaboard.

Could not representations made by the different Departments of Industries to the Railway Board or to the Commerce and Industry department serve the purpose?—The Railway Board has no power over tariff rates. They can make recommendations. Between the maximum and minimum rates the railways decide for themselves.

The maximum and minimum rates are fixed by the Railway Board?—That is, as a matter of policy, for the whole of India.

Do you contemplate that the Department of Industries should have greater powers in the matter of rates than the Railway Board?—Yes.

And you will give that power to the head of the department?—I assume that the head of the department would not have power vested in himself, but he would have an opportunity of placing the views of the industries much more powerfully before such authorities as exist who would control rates.

He would be a more powerful advocate of the views of the Departments of Industries of the provinces?—Yes.

He could not be the deciding authority?—No.

Don't you think that the object could be served by a more powerful representation of the views of the Departments of Industries to the Railway Board?—Take the United Provinces as an instance. Suppose they want to export certain goods from these provinces

to Bombay and they are given the special rate which they ask for, it may harm the Punjab industry; I do not know that, and might press this representation. If I had an imperial head to refer to, he would put me right at once.

Don't you think that the Railway Board have an opportunity of doing that, because the Railway Board exercise some control over all the railway in the country?—They do not control the rates. Maximum and minimum rates are laid down for the various classes of goods by the tariff committees.

Tariff committees work within the general limitations laid down by the Railway Board?—Yes.

And you do not propose that the head of the Department of Industries should have power to decide any question relating to tariffs?—No. Only as an advocate.

Do you think that is sufficient justification for creating a new imperial head?—That will not be his only function.

And the second thing that you want him to do is to deal with larger questions which are imperial in character, for instance matters of transport, industrial surveys, export markets, etc. Could not the heads of the Departments of Industries of the various provinces make the necessary representation to the Commerce and Industry Department to set such authority in motion, for instance in the matter of survey, as may be necessary—the Forest department or any other department? I want to understand why this cannot be done under the existing arrangements through the action of the provincial departments?—It seems to me that it is because the Ministry of Commerce and Industry—it may be on account of its being overburdened with work—has not got the time or the necessary qualifications to admit of tackling questions like that. They certainly do not at present.

You only expect the new department you want to be created to deal with *questions* which are imperial in character and to adjudicate between the different provinces?—I have not set out the functions in detail, nor have I given sufficent thought to them even now. But I am quite sure that there is a very large field for an Imperial Department of Industries and in that connection I would like to say that it must be remembered that commerce and industry are not natural allies always.

When you say that they are not natural allies, that their interests are naturally opposed to one another in many directions, I suppose you are speaking of men engaged in commerce and men engaged in industry? So far as Government is concerned, no department of Government can be opposed to any other department of Government?—Government is equally interested in the work of both. The Commerce department of the Government and the Industry department of the Government cannot be flying at each other's throats, and your remarks that the interest of the two are opposed to each other can hold good only in the case of private firms or individuals?—You lay more stress on the word 'opposed' than I intend. I mean conflicting.

The proposal to create a new Imperial Industries Department is a big proposal. We have one proposal for an Imperial Technical and Scientific department. Your proposal is different from it. I want to understand the reason for it?—I think I contemplated both.

Do you seriously contemplate that the interest of the Department of Commerce of the Government of India and the Department of Industries which you propose would conflict with each other, both representing Government, the object of both being to promote every branch of the administration?—If I may illustrate it, how are we to reconcile the interests of Messrs. Ralli Brothers who are keen on the export of our raw produce and the interests of the people of India who are keen on manufacturing goods in the country?—Here you have in your mind private firms and individuals who are differently interested in trade?—I have no private individuals in my mind.

Government as an exporter of raw materials could have no interest in conflict with the Government as a promoter of industries? It is absolutely unthinkable?—I do not suggest that the Government's endeavours are really conflicting. I know that Government are very anxious to promote the interets of both

The two departments are like two limbs of the body?—Yes. Industries under the present constitution do not receive sufficient attention, that is their representation is not strong enough.

You think then that, by the creation of an Imperial Department of Industries, industries would receive the attention that you think they should receive?—Yes, and the Provincial Directors of Industries would receive the guidance they are in need of.

Don't you think that Provincial Directors should be men who can act upon their own initiative and judgment?—They are not ordinary men? They must be selected for the

experience and business qualifications?—I refer you to the Civil List. All Directors of Industries excepting myself are civil servants.

You object then to a non-business man being placed at the head of Department of Industries?—I do not answer that.

You have said that you wanted a man with business experience to be at the head of the Department of Industries?—I have said that here.

Hon'ble Sir F. H. Stewart.—Can you tell me the constitution of the Board of Industries in this province?—Not from memory. There are twenty members. The Board comprises representatives of Government departments, such as Public Works Department, Forests, Education and Agriculture, representatives of science from the colleges, two nominees from the Upper India Chamber of Commerce, and individuals nominated by Government. The Chairman of the Board is the Director of Agriculture. He is not *ex-officio* Chairman; the appointment is personal.

Would you make any suggestion for the re-constitution of that Board?—As the matter is before our Government I would rather not touch it.

Dr. E. Hopkinson—Have you any assistants?—I have no trained assistant. I have five clerks in all. I have personally to deal with everything.

You cannot devolve anything at all?—Within the last ten days I have managed to get the temporary services of a retired Registrar of one of the Government Secretariats who I hope may be able to relieve me of some office routine work.

There is no office in connection with your department except the one here at Cawnpore?—No. My office is in a rented building.

It must be very difficult for people in remote places to get into touch with you?—It will explain matters if I mention that as part of our organisation we have over 100 honorary trade correspondents, that is, prominent local gentlemen who assist me in procuring and supplying information.

That organisation is taken advantage of?—Yes. It is purely honorary and gentlemen who are generally recognised as leaders take part in it.

Supposing you have had a free hand in developing your department, would you establish branch offices with assistant directors and so on?—Not in the present stage of our development, but later on we might.

You think you can cover the whole ground with success?—Yes.

Mr. A. Chatterton.—I should like to ask you this question. I take it that you would like a large increase in your staff?—Yes. I should like an increase in my staff.

Do you want the appointment of more expert advisers to you?—I think that was dealt with in a question from the President in which I said that where we had work for whole-time men I certainly would.

You are not in favour of having Deputy Directors?—We are not yet large enough for it.

But would not Deputy Directors lead to a large development itself?—That is true, and if the funds were available the appointment of two Deputy Directors dealing with different branches of industries in this province would be of very great value.

For instance, at present, you would not have enough work for a special district officer?—No.

If you had a special district officer analogous to the executive engineer in a district dealing with the industrial resources of the whole district, would it not lead to a very rapid and large increase in industrial matters?—I do not think that at the present stage of our development decentralisation of that kind would be helpful. It might be necessary at a considerably later stage of our growth. I would rather have Deputy Directors attached to the Director himself and acting on his orders and touring in the province, they might each be given one section of the province or each might be given a group of industries, but two would be ample. Whether there should be a group of subjects or a group of divisions, would depend largely on the character of the Deputy Director.

Do you think it worth one's while experimenting in this way taking a certain district which is industrially backward and placing a special officer under you in that district to develop the district?—I am willing to try an experiment that looks hopeful, but I cannot think of a particular indus ry which would necessitate it at the moment.

President.—I understand your proposal is for an Imperial Department of Industries under one head. Your idea is that that head should have more advisory and inspecting powers, that he will be in fact analogous to the Inspector-General of Forests?—Yes.

That he might be called the Inspector General of Industries or Industrial Adviser to Government or Commissioner of Industries?—That is what I had in my mind.

That he should have no executive powers within the provinces?—He would naturally be consulted by the provincial Government.

And that he would be advising the Government of India as to the general policy, and it would be his duty to see that that general policy was carried out throughout the provinces by the various Directors?—Yes.

That all executive acts were in general conformity to that policy?—Yes.

In other words, coming back to the analogy of the Forest Department, where they have a sanctioned working plan for forest development, the provincial conservators carry out that plan?—Yes.

The Directors of Industries in the provinces would carry out a similar sanctioned working plan?—If it were feasible it would be ideal.

Your idea is, if you had an Inspector-General of Industries (or whatever name you may wish to call him), the Government of India would be better provided with advice from the point of view of indigenous industries as opposed to the other interests that are now represented in Government by the Railway Board?—That is a separate Industries Department.

How many Directors of Industries are there in India?—Madras has a Director of Industries. The Punjab has agriculture and industries combined, so also have the Central Provinces. The United Provinces has a Director of Industries.

Is it within your knowledge true that there have been great differences of policy in the different provinces?—On broad lines of policy.

They have been following a policy in Madras which is different from the policy followed here?—Quite different.

And in some respects the policy followed in Madras is a policy that you would not agree with?—Yes.

In other words, you want some central authority that would bring together the good points of the various policies in the different provinces?—Yes

And then authoritatively state what shall be the determining policy?—Yes.

There are only four Directors of Industries now. Would it not be an advantage if you had an annual conference of these Directors of Industries with a view to getting into closer touch with one another and to correlating your industrial activities in the different provinces?—Decidedly it would be of advantage.

You think it would not be sufficient as an alternative to a more expensive piece of apparatus, namely the head of an Imperial Department?—I do not, though interchange of views may be useful.

The head of the Imperial Department of Industries would be a different individual and in addition to the head of the department of, say, chemistry or geology? They would all be separate heads?—Yes.

He would be responsible for a portion of the commercial intelligence?—The Commercial Intelligence Department would come under him. Statistics have already been separated from Commercial Intelligence. All information relating to the industries of the country would certainly be dealt with by the Industries Department.

Don't you think that it would be difficult ordinarily to find a business man, that is to say, a man experienced in business, who would be willing to accept a Government appointment either as Director of Industries or Industrial Commissioner to the Government of India?—I think you can get a suitable man provided you pay an adequate salary for the appointment.

The pay of the head of a department of the Government of India may vary from Rs. 2,000 to Rs. 3,000.—On that pay you would get men who have had a training somewhat akin to my own.

But not ordinarily with the same amount of experience—20 years' business experience?—I do not think they would come for less than Rs. 2,500.

Would you be able to attract business men with 15 to 20 years' experience on a salary of Rs. 3,000 a month?—Yes.

Because it is accompanied by other advantages, status, pension, etc?—Yes.

I suppose you would agree that it would be impossible to obtain what you would call a successful business man unless some accident in his career made him to come?—We certainly want a business man who has achieved success.

You would not like to be responsible for advising Government to accept an unsuccessful man?—No.

And you conceive the possibility of there being difficulties in filling up this post?—I think the field of supply is very limited.

Technical and scientific departments.

Hon'ble Pandit M. M. Malaviya.—In paragraph 2 of this section you say, "There is much work to be done in connection with the development of our minerals, the exploitation of our forest products, the development of our oil-pressing industry and allied industries, the manufacture of chemicals, perfumes, essential oils, and tanning extracts, etc." Taking that into account do you think that the development of the Forest Research Institute at Dehra Dun, by the addition of an industrial side to it would be a suitable means for providing for this?—For forest products.

You wish to provide for the development of minerals, for the exploitation of forest products, and the development of the oil-pressing industry?—Minerals and oils are not all forest products.

What about the manufacture of chemicals and of perfumes?—They are outside forest activities.

What would be the best centre for that kind of work?—I am not prepared to name a particular locality at present. I have said 'in the north of India.' It might be in this province.

Sir D. J. Tata.—You talk of an Imperial Research Laboratory and also of two institutes—one at Bangalore and one in the United Provinces. Will the laboratories be separate from or attached to the institutes?—Substitute the word 'institute' for laboratory. I do not contemplate a separate imperial laboratory.

These two institutions should be under imperial control and should be financed imperially, I presume?—Yes.

Hon'ble Pandit M. M. Malaviya.—You say that you do not think that a college of commerce is necessary in this province, because you think that will not assist industrial development. In view of the large export and import trade and the necessity of marketing our goods in the best way possible, and also in view of the necessity of training our young men to carry on banking business, don't you think that a college of commerce, giving instruction in banking and other subjects, will distinctly promote industrial development? At what age would those men be released from their training?—I again say that in our present stage I prefer to have men comparatively young, trained in the particular industry which they wish to enter.

The college of commerce does more than train assistants. Among other things, the college will give training in the management of banking?—He can learn by private study and evening classes. He should be in the particular industry or office at the age of 16 or 17.

Do you expect to turn out managers of banks by the training which you propose to give?—I have not first-hand acquaintance with banking methods and training, but I know that the usual thing is that the man enters a bank fairly young and he gets his theoretical qualifications in the way of supplementary training, while his practical training is going on all the time.

Don't you think that if he started with instruction in any trade or branches that he might take up, he would derive more advantage from the practical training which he is to receive?—I am quite confident that if you train these men in such a college you would not have openings for them. For instance, if I were to start and run a bank I would prefer a young man who has a matriculation certificate or a school final certificate coming to me at the age of 16 or 17 and applying himself to my business and learning the practical side of my business in the most valuable years of his life.

What is your business?—I am assuming for the moment banking.

Do you think that your firm or department would afford sufficient scope for giving him training in banking which would fit him to be a manager?—Supplemented by his own study and attendance at evening schools if such were provided.

You know there was a large number of banks started in India a few years ago. I refer to the People's Bank?—Yes.

Don't you think that if we had men who had received proper training under good teachers they would have been better able to manage such banks?—I am not acquainted with the fact as to whether they had any training or not.

Assume that they had been trained as such bank officers as you have described?—I should like to test that training first.

What body would you establish to test it?—Myself. I am the employer and I would like to personally test that man's knowledge.

Do you think that the majority of employers and business men have got the time and ability to test the banking capacity of their assistants?—I am talking now of the general aspect of the question. Are you now dealing with the bank? Personally if I were the banker I should most certainly test my applicant.

Do you mean to say that the majority of the persons engaged in business have the time and ability to test a man's knowledge of banking?—It is their primary duty to test an applicant before they employ him.

To train or to test him?—To test him. He would give him training in his own bank.

In the absence of such a system as the Scottish banking system or the English system, don't you think that it would be an advantage to have a college of commerce where some instruction in the principles and practice of banking could be given?—It could not replace it.

Apart from banking, in other matters dealing with commerce, with the marketing of goods, the transport of goods and the collecting of raw materials, don't you think that a college of commerce would give a training which would enable Indians to take more usefully to commerce than they can without it.—No. Most decidedly not.

In view of our large exports and imports would you give any training to Indians to deal with them?—Put him in an office dealing with these.

Supposing offices do not take them in—there are not offices enough managed by Indians which would take Indian youths in and give them the necessary commercial training?—It is a very wide supposition.

Are you aware that few firms are willing to take educated Indian youths to train them?—The trouble is this. They come in at an age in which the applicant for employment is over 20 or 21. He imagines he knows a great deal already, but in actual practice his knowledge is exceedingly small, and within my own experience I may say I have had difficulty of that sort.

In view of that difficulty, don't you think there would be an advantage in having such an institution as I suggest? We have in England the system that you have described the English system of apprentices working up in the office, and still the universities have recognised the value of imparting commercial education. Taking that fact into account don't you think that an institution like a college of commerce would help Indian industrial progress?—I am not an educational authority, but from what I know of the subject I think you will find that this is almost a departure in English educational matters—the college of commerce—and it is only because England, I think, has progressed sufficiently far to warrant the training of men and to find openings for them. My point is that our development has not advanced to the stage at which we want the college-trained youth entering with a very high degree of general education and taking a comparatively high place in the organisation he joins; that for some years to come the man who is going to be of most use to us will be the man who starts commercial life at the age of sixteen or seventeen approximately.

You don't think that if you had such trained young men they would promote business?—No.

You have said that money for marketing exports and imports of agricultural products is to a very small extent supplied by Indians. Don't you think that if commercial knowledge was more widely spread, Indians would be more willing to come forward to invest their capital in trade? If there was a little commercial education given in our school classes and colleges, would not Indians be more ready and willing to invest their money in

trade?—I think that is a matter which must be left to the natural growth of confidence. Confidence is the main thing and I do not think that it is so much a matter of college education.

Will not knowledge gained by education promote confidence?—Education will.

Many complaints have been brought to you regarding railway freights?—Not many. **Freights.**

You have not mentioned them. Will you kindly help us with a list of the complaints later on?—Yes. I can give the particulars of such complaints as have been received.

Hon'ble Sir Fazulbhoy Currimbhoy.—About the oilseed industry—seeds are sent from here to go to other countries and they come back as oil which is sold here?—Sometimes.

Our difficulty is that we are sending seeds abroad and oil is got from other countries and we do not get the benefit of that industry here?—Yes. It is disadvantageous.

Hon'ble Pandit M. M. Malaviya.—You say "The use of spirit in industry and trade could be greatly enlarged if the regulations of the Excise Department could be suitably modified." Has any action been taken by the Government in that direction?—Not to my knowledge. **General.**

What difficulty has arisen in the way of carrying on the manufacture of spirit?—The excise regulations are such that we cannot make use of spirit in industry. Our Government has taken that matter up.

If the Local Government is in favour of it, the Excise Department of the United Provinces cannot stand in the way?—The excise regulations are controlled imperially. The regulations forbid it, except under conditions which retard its commercial use.

WITNESS No. 20.

MR. J. P. SRIVASTAVA, M.Sc., (VICT.); A.M.S.T., *Assistant Technological Chemist, Department of Industries, United Provinces.*

WRITTEN EVIDENCE.

In this statement I shall confine my remarks to those matters only of which I have had special experience during the last five years in my official career as Assistant Technological Chemist under the United Provinces Government. These matters fall under the following heads:—

II.—Technical aid to industries.

VII.—Organization of technical and scientific departments of Government.

VIII.—Government organization for the collection and distribution of commercial intelligence.

I will not, however, attempt to answer all the questions under these but would prefer to give my views in a connected form, taking care that I keep within the limits of these questions.

II.—Technical aid to industries.

I, for one, strongly feel that the future of the industrial progress of India depends in a great measure on the manner in which technical and scientific aid is administered to its nascent or half-developed industries. It must be conceded that there has been something wanting in the spasmodic efforts made so far to afford scientific assistance to various industries. To take one example—much scientific work has been done in indigo under the auspices of the Bihar Planters' Association but this work has not been of a practical nature, and has not kept pace with the work done in Germany on synthetic indigo; hence the ousting of the former by the latter. Bihar planters are only just beginning to realise that to compete with the Germans, they must pay them back in their own coin. It is useless thinking that so long as synthetic indigo is not derived from the plant it cannot be held to be identical with the natural product and so the former must always be regarded as a base imitation of the latter. It should have been clear to all enthusiasts of natural indigo that so far as the dyer is concerned the difference between the natural and the synthetic product is only determined by the price and the form in which the dye is offered to him. The German manufacturer anticipated the points which would appeal to the dyer. He placed his article in the form of pastes of standard strengths so that the long and tedious process of grinding and the necessity of determining the indigotin contents of any particular sample were done away with. Both these factors meant a great saving of time and cost to the dyer. **Technical-aid-in general.** **Indigo.**

This matter was studied four years ago by Mr. Cole (Dyer, Cawnpore Woollen Mills Company) and myself with a view to ascertain by practical large-scale trials carried out at the Cawnpore Woollen Mills as to whether natural indigo possessed any advantages over the synthetic product so far as the quality and quantity of the outturn were concerned. Our results which were contributed with the permission of Sir Alexander McRobert to the Society of Dyers and Colourists, Bradford, showed that no special advantages were possessed by either product and that their use was governed by considerations merely of price and of whether they were available in a readily usable form. The attention of the Indigo Chemist might be drawn to both these points.

Natural indigo placed on the market in the form of standard paste would appeal most forcibly to the dyer. I have no experience of the methods of Indigo manufacture used in Bihar but I have seen and visited during the last 18 months some indigo concerns in the United Provinces and I was astonished at the wasteful and crude methods still employed. In one case I estimated that 15 per cent. of the total indigo was left behind in the "Beating vat." This loss is enormous and except when, as at present, the margin of profit is very great, it is difficult to see how an industry can hold its own under such wasteful conditions.

It is re-assuring to find that the importance of the indigo industry is being realised. The Indigo Conference at Delhi and the appointment of an Indigo Chemist at Pusa are steps in the right direction. It is to be hoped that full advantage will be taken of the opportunity now offered by the cessation of supplies of synthetic indigo and that the natural indigo industry will be established on such a basis that it will stand competition with the former when normal conditions are established. This can only be done if the requirements of the user are not lost sight of. The Indigo Chemist should, in my opinion, work in collaboration with a dyeing expert.

The announcement just cabled out by Reuter that the Secretary of State for India has appointed a representative committee of experts, interested both in the production and in the use of indigo, to go into the whole question of the resuscitation of the natural dye is a very hopeful one.

Sericulture.

Another industry to which much technical aid has been given by Government is sericulture. I have had considerable experience of eri silk which, it must be admitted, has not achieved the success which was once expected of it. According to agricultural experts, eri cocoons can be easily reared and sold at Rs. 120 per maund, at which price they leave a fair margin of profit to the cultivator. Eri cocoons cannot be reeled in the same manner as mulberry or tussar cocoons. They have to be spun in the fashion of waste silk. The Chhoi Silk Mills at Bombay went in for spinning eri, but they could not deliver the yarn (of 160/2 count) at less than Rs. 7-8 per lb. This price was prohibitive as the weaver could not sell ordinary eri silk cloth weighing about 5 oz. per yard (54" wide) at less than Rs. 3 per yard. Italian waste silk yarn of the same count could be had for Rs. 6 per lb. and the hand-loom weaver naturally liked to have this in preference to eri silk, which, besides being dearer, would not take the same lustre as spun silk. Eri silk was no doubt stronger than spun silk, but this was a point which did not appeal at first sight to the hand-weaver. Then there was difficulty in bleaching and dyeing eri silk. The high price at which eri yarn could be had, coupled with these drawbacks, made eri silk very unpopular with all weavers and even such as had started using it in the face of these drawbacks were forced to give it up. If eri cocoons can be delivered at Rs. 120 per maund of 82 lbs. there seems no reason why, if proper machinery is employed, eri yarn cannot be placed on the market at Rs. 4-8 to Rs. 5 per lb. According to my own experiments the loss in degumming eri cocoons does not exceed 30 per cent.; to this must be added the loss during spinning which at the very outside should not exceed 20 per cent. Thus 100 parts of cocoons should give 50 parts of yarn, or 2 lbs. of cocoons costing Rs. 3 would give 1 lb. of yarn. At this rate it does not seem impossible that eri yarn should be available for sale at Rs. 4-8 a lb. But the Chhoi Silk Mills could not do it as their machinery was not adapted to this particular class of work. From what the manager of the mills told me about two years ago I gathered that their loss both in degumming and spinning was enormous and that for want of a suitable appliance they had also considerable difficulty in reversing the cocoons which cost them much time and labour. All these factors naturally threw up the cost of production and they could not afford to sell the yarn even under the best conditions for less than Rs. 7 per lb. If the Agricultural department can assure the successful cultivation of eri cocoons it would, in my opinion, be well worth while entrusting the question of devising suitable machinery to some firm of some silk spinning machinery experts. The question of dyeing and bleaching eri silk has been fully studied in my laboratory and we are now in a position to offer much valuable advice on the matter. We have also found that eri silk can be made to take good lustre by a joint process of steaming, beetling, and polishing, but to do this on a commercial scale suitable machinery must be devised.

Eri silk yarn at Rs. 4-8 a lb. would be the cheapest silk yarn available and I am sure it would gladly be taken by all silk weavers in this country. Its extensive use would probably help to build up a large and profitable industry which would directly benefit the Agricultural classes. An eri silk spinning mill might well be started as a Government demonstration or more correctly pioneer factory.

Dye materials.

There is also obviously much work to be done on the exploitation of the natural tanning and dyeing materials indigenous to India.

The scientific work so far done on natural products of India suffers from one great defect. No attempt has been made to study the agricultural and botanical features of a raw material side by side with its chemical properties. A case in point is that of *majith*. It has been said in some quarters that the dye content of *majith* is so poor that it is useless having anything to do with it. In all such investigations *majith* is talked of as a standard article and it is tacitly assumed that it possesses a uniform composition irrespective of its source of origin, the age at which it was collected, and the time for which it has been stored prior to use. Our researches have shown that all these factors must be taken into consideration in judging the quality of any particular sample of *majith*. As a matter of fact widely varying qualities of *majith* have passed through our hands, and we have in most cases been able to explain the difference by one or more of the factors mentioned above. According to my experience *majith* can contain anything from ¼ to 5 per cent. dye principle on the total weight of the raw product. *Majith* with 5 per cent. alizarine in it would successfully compete with synthetic alizarine even under normal conditions. The chemist should study the dye material in collaboration with the agriculturist to find out under what conditions the dye contents is at its highest. Examination of a random sample is useless and very often misleading. The same might be said of a great many other dyeing and tanning materials. Professor A. G. Perkin of Leeds has done much valuable work on the chemical examination of Indian dye materials but, as in the case of other workers, his researches are not absolutely convincing because of the unreliability of the samples with which he worked.

Research abroad and in India.

This brings us to the question of the relative value of researches carried out in England and in India. I am clearly of opinion that all preliminary work on natural products must be done in India. The agricultural, botanical, and chemical peculiarities of any product must be studied side by side in this country, and it is only when these have been fully studied with successful results that the product should be passed on for expert examination in England with special reference to its commercial possibilities.

It would be very helpful to have in England a committee of scientists who can advise workers in this country. At present we have no facilities whatever for referring our difficulties to experts in England. We have to depend entirely on our own resources, as it is only too well-known that there is no such thing as a mutual exchange of ideas between scientists in this country. The advantages resulting from a freer co-operation between scientists in England and in this country will not by any means be one-sided. It will be to the good of both. Such a co-operation might be secured either through the Imperial Institute at London or through the Advisory Council for Research in the United Kingdom.

Amongst products which call for systematic investigation at the present moment I would mention the following:—

(1) Dye materials.

(2) Tanning materials.

(3) Substances containing essential oils.

(4) Sands for the production of glass.

(5) Oils and fats.

In the case of (1) and (2) the examination should proceed along lines already outlined by me and special attention might be paid to the preparation of extracts.

As regards (3) it is apparent that much work has to be done. The resources of India are exceptionally rich in odorous substances, which are practically unexploited so far.

India could easily supply a great many essential oils to Europe. As will appear from the following tables we have so far been only exporting a few of our perfume-yielding raw materials and importing large amounts of finished perfumes:—

Exports of perfume-yielding materials from India.

	Quantity, 1913-14.	Cwts., 1914-15.	Value, 1913-14.	In £ sterling, 1914-15.
Ajama	4,507	2,609	2 953	2,045
Ajwain	9,784	7,368	2 983	2,736
Aniseed	1,129	835	931	977
Assalia	505	170	418	133
Coriander	95,533	84 058	39 099	46,327
Cummin	19,026	13,554	29,338	29,698
Do. black	1,313	1,411	1,157	985
Fennel	15,256	4,223	11,348	3,446
Fenugreek	12,760	18,300	7 301	10,161
Sawa or dil	2,090	1,945	1,489	1,351
Other sorts	147	39	192	43
Total ...	162,050	134,512	97,20	93.903

Imports of perfumery (not being perfumed spirits).

1913-14 ... ... £33,471
1914-15 ... ... £22 251
} value.

The employment of improved methods of manufacture such as it is intended to do a the proposed factory at Kanauj would, in my opinion, easily enable us to command a ready sale for our products in Europe. A sample of oil of roses prepared in my laboratory by the enfleurage process was pronounced to be equal to the best French oil.

With the growing importance of the glass industry in these provinces, the need for a systematic chemical and geological examination of the sands occurring in the vicinity of the centres of glass industry is obvious.

Oils and fats constitute a vast and very important subject awaiting study. It is satisfactory to note that the Indian Institute of Science at Bangalore is proposing to open a special department for this subject.

VII.—The organisation of technical and scientific departments of Government.

I may perhaps be permitted to claim with pardonable pride that the Department of Industries in the United Provinces is one of the best organised in India. During the short time it has been in existence, it has done much valuable work for the assistance of industries. Signs are not wanting that this work is already beginning to bear fruit.

The enquiries which are received in the office of the Director of Industries, United Provinces, are of a very varied character but many of these are such as require no special research. The technical laboratory under my charge has been able to successfully deal with most enquiries of a chemical nature and the help so given has been greatly appreciated by all concerned.

Imperial departments.

It appears to me that in connection with the office of the Director of Industries a fairly well-equipped laboratory is a great desideratum. All enquiries of a straightforward character could be dealt with in this laboratory. It would, however, be advisable to have a special imperial department of expert technical chemists which would devote itself entirely to the solution of problems requiring special research. It should be open to the provincial departments of industries to refer all complicated matters to the imperial techno-chemical department which would arrange to have the problems worked out either in its own laboratories or by loaning its experts to the Local Government concerned. It is a little difficult for me to outline the exact constitution of the imperial techno-chemical department, but I would suggest its formation somewhat after the fashion of the department for the Geological Survey of India. This latter department is, I think, one of the best organised scientific departments in India.

It is to my mind unnecessary to have research departments under every local Government. These would only result in overlapping and confusion of work.

Co-ordination of research.

To prevent unnecessary overlapping of the research activities in Government technical and scientific departments, special technological institutes and university colleges, I would suggest the formation of an Advisory Council for Research such as the one recently formed in the United Kingdom. This Council should meet at least quarterly and supervise in a general manner the research activities all over India. In conjunction with this Advisory Council it would be advisable to have scientific societies where the results of researches can be read and discussed. At present there are no facilities in India for discussing scientific work. I understand the Society of Chemical Industry of Great Britain and Ireland is anxious to open out a branch in this country. I have welcomed the proposal but I do not yet see how it can be worked in practice when workers are scattered so far apart in this country. In connection with the Advisory Council advocated by me such a proposal could easily be made to take a practical shape.

The Indian Science Congress has done some useful work in bringing together scientists from different parts of the country and in creating a spirit of co-operation. Much however still remains to be done. So far the congress has not invited the co-operation of those engaged in industry and so the deliberations of the congress have been only of an academic character. It would be a move in the right direction to make the Science Congress a common meeting ground for scientists, technologists, and industrialists. The congress must not be an institution which suddenly jumps into existence once a year. It might meet once a year but it should be a permanent body living all the year round.

Too much importance cannot be attached to giving every encouragement to Government scientific and technical experts to study conditions and methods in other countries. They should, in my opinion, be made to spend in Europe at least six months after every five years of work in India. This is the only way in which they can keep abreast of the rapid advance which science is making. The expenditure involved in this innovation would be insignificant as compared with the advantages which would result from it.

VIII.—Government organisation for the collection and distribution of commercial intelligence.

I would strongly emphasize the desirability of publishing the results of all technical researches in publications like those issued by the Geological Department. I am not in favour of stray bulletins or notes. These soon get lost and there is no way of tracing them. A regular authoritative publication provided with a reliable index would soon make itself indispensable not only in India but in other countries as well.

NOTE.—*Mr. Srivastava accompanied the Hon'ble Mr. A. H. Silver, when the latter gave oral evidence and was not called upon to give oral evidence separately.*

WITNESS NO. 21.

DR. ZIA-UD-DIN AHMAD, *Aligarh.*

Dr. Zia-ud-din Ahmad.

WRITTEN EVIDENCE.

General relation between universities and industries.

I should like to draw the attention of the members to the relation between Universities and industries. The problem is covered under many questions and hence I answer it separately. In England there exists no co-operation between business men and University professors. In 1904 an attempt was made in Cambridge, but it did not prove successful. To my knowledge, Germany is the only country where full co-operation exists between the business men and University teachers, and it is one of the secrets of the industrial progress in Germany. Nearly all the epoch-making discoveries are made in England, and France, but Germany makes more use of them than England and France themselves. Every factory in Germany appoints one or more University professors, as its scientific advisers to whom the technical difficulties are referred The University professors give the minor problems to their pupils, who thus come in touch with the technical side of their science. In large factories, experimental laboratories are attached and they are usually in charge of the old pupils or their scientific advisers. By this arrangement the factories are in touch with the latest scientific discoveries and they are constantly making minor improvements by the aid of their experimental laboratories and the students on leaving the Universities are not ignorant of the industrial application of their sciences. It may also be mentioned by the way that scientific advisers are very well paid, and it is a good addition to their regular income. A system of this kind may gradually be introduced in India. The managers of the factories do not realise the importance of scientific advice and they will not be prepared to give any fee to the professors who will not constantly do the work, and consume the chemicals and apparatus without payment. As soon as we succeeded in interesting the professors on technical application of their sciences, we may follow the second stage by introducing a paper on technical application in the M. Sc. examinations. The Advisory Council or the Board of Industries may take initiation.

Financial aid to industrial enterprises.

Government Assistance.

Q. 4.—A number of factories and concerns were started in these provinces and they failed for one or more of the following reasons :—

(*a*) Want of business experience.

(*b*) Want of expert knowledge.

(*c*) Fraud.

Government assistance will create confidence and ensure the collection of capital.

Q. 5.—The methods of giving assistance depend upon the nature of the industry.

In case of industries not well established supply of machinery and expert advice will be very useful. I do not recommend a uniform fixed principle.

Q. 6.—I believe that the Government may nominate a Director.

Pioneer factories.

Q. 7.—Outside the Bombay Presidency capitalists are not enterprising enough to risk their money in a new industry but they are prepared to copy a flourishing modest factory. I therefore believe that the Government should pioneer factories.

Q. 8.—The Government should hand it over to private individuals when a new factory on the same lines is established and its managers prove that the Government factory was competing with their private factory, or when the Government may find suitable persons who are competent to run the factory and are willing to buy it.

Technical aid to industries.

Qs. 22, 23 and 24.—It is desirable to establish an Advisory Council for Research in India (independent of the Science Congress) which may be in touch with the Advisory Council for Research in the United Kingdom and similar organisations in other countries on one side, and Research Institutes and colleges on the other side.

This Advisory Council should be under the Imperial Government and be located in the town where a Research Institute exists. The proposed Council should for the time being give its advice free of charge and periodically publish problems for research work and their solutions.

A work of this kind in an unscientific way has been already undertaken by the Board of Industries, United Provinces. At present the indigo industry in these provinces is in a flourishing condition and a number of new factories have been revived. The managers of the factories had important problems some of which, to my knowledge, were referred to the professors of the M. A.-O. College who were not indigo experts. Such problems could have been referred to the Advisory Council with better results.

Assistance in marketing products.

Q. 30.—I believe that commercial emporiums similar to the one established at Cawnpore will be very useful and it is further desirable that in every emporium a small portion of the space be reserved for articles and catalogues sent by the emporea of other provinces.

Q. 38.—It is further desirable that the articles required for the Government Stores be also exhibited, and it is also desirable that the method and place of the purchases be also indicated if possible.

Training of labour and supervision.

Q. 50.—It is desirable that the industrial schools should be under a separate director to be called a Director of Technical Education but perhaps there are not sufficient technical schools to justify the creation of a new department. Under these circumstances, I believe that we follow the method of management of Rurki College and which I believe works admirably.

The big technical schools should be managed by a managing committee appointed by the Board of Industries not necessarily from its own members. The principal or the head master should be the secretary of this committee and the Director of Public Instruction and the Director of Industries should be *ex-officio* members and the report of each school should be submitted to the Board of Industries and published annually, and may be incorporated in the annual report of the Board of Industries. By this method the technical schools will be under the Board of Industries in which industrial and educational interests are well represented. I am not in favour of putting industrial schools entirely under the

ashnds of business men alone. In case of small industrial schools, where the committee hould largely consist of local persons with local knowledge, I suggest that the Collector, or Deputy Commissioner, or the District Board should be authorised to nominate a few members for the managing committee of the school. The Director of Public Instruction and the Director of Industries may be permitted to nominate their representatives.

Mechanical Engineers.

Q. 54.—It is desirable that in the various engineering colleges the same standard may be maintained. Leaving aside minor variations the standards of various examinations in Indian universities are the same; but the standard of engineering colleges is not the same. This difference, I believe, arises from the fact that they are not conducted on uniform principles. Some of the colleges are affiliated to the provincial universities and others are self-governing bodies. I think it is desirable that uniformity should be maintained by affiliating them to provincial universities. The affiliation of Roorkee College to the Allahabad University is under contemplation.

It is further desirable that subordinate examinations be removed from engineering colleges and included in technical schools. The affiliation of the engineering colleges to the universities will automatically establish a uniform standard as has already been done in other university examinations

General official administration and organisation.

Q. 56.—There is a Board of Industries which has in it representatives of various interests and I believe that it may be advantageously split up into two sub-boards—(*a*) technical education, (*b*) development of industries and furtherance of trade—which are two distinct branches.

Q. 57.—The board should have executive powers with budgetted funds.

Q. 60.—The director should be a business man and, if I may be permitted to say, like Mr. Silver who is an ideal man for the situation.

Organisation of technical and scientific departments of Government.

Qs 63 and 64.—I think it is desirable to have an Imperial Board of Industries to which every Provincial Board may send its representatives. The Board shall act as an Advisory Committee to the Imperial scientific and technical departments, whose head should have the same rank in the Government of India as the Director-General of Medical or Public Works Department.

The Advisory Council mentioned under No. 23 will also be under the same Imperial Scientific and Technical departments.

Technological Institutions.

Q. 71.—There are no doubt certain advantages in concentrating research work in one central institute but there are disadvantages as well and considering both of them I believe that it is desirable that there should be several technological institutes in different parts of the country all working under the Imperial scientific and technical departments.

The condition of life and local circumstances are so different in different parts of India that one central research institute will fail to cope with all the problems affecting industries of various provinces.

Q. 72.—The control should be Imperial.

Co-ordination of research.

Q. 74.—The co-ordination of research in different technological institutes and colleges and prevention of duplication of work will be done by the Advisory Committee mentioned in No. 23.

The Indian Science Congress is in its infancy and no noticeable results could be expected beyond bringing together scientific men working on different lines and under different conditions.

Q. 76.—The Indian Science Congress is established on the lines of the British Association and I do not think that it can be of much assistance in the industrial development of the country. One purpose I believe it can always serve with advantage. It can be made a medium of stimulating industrial and technical researches in schools and colleges.

Reference libraries.

Q. 78.—One of the very great difficulties in carrying out research work in India is the want of a reference library and it is very desirable that at least one library which may rank among the first class libraries of Europe be established in a suitable centre. The reference library may lend books not to individuals but to recognised libraries as is done in European countries.

Q. 79.—A reference library under the auspices of the Royal Asiatic Society of Bengal has been already established partially and it may be developed into a first class library.

Dr. Zia-ud-din Ahmad.

Colleges of commerce.

Q. 80.—The Allahabad University has established a Faculty of Commerce and it is highly desirable that a college of commerce be established at a suitable centre in these Provinces. This college may be established on the same lines as the Medical College, Lucknow.

Q. 81.—The commercial colleges will not directly develop the industry or trade but will produce men who will perform more efficiently the duties of managers of firms and assistants in banks and other concerns.

Other forms of Government action and organisation.

Q. 98.—The railway freight from Cawnpore and other manufacturing centres in the United Provinces should be on the same scale as freights from Bombay, Calcutta or Delhi.

(Dr. Zia-ud-din Ahmad did not give oral evidence.)

WITNESS No. 22.

Major B. D. Basu.

MAJOR B. D. BASU, I.M.S. *(retired), Allahabad,*

WRITTEN EVIDENCE.

Drug industry.

Qs. 112 and 113.—About two years ago, the Board of Agriculture of England issued a leaflet, which was also published as an article in their Journal for September 1914, on the Cultivation and Collection of Medicinal plants in England.

The article opened as follows :—

"The Cultivation and Collection of Medicinal Plants in England

By W. A. Whatmough, B.Sc.

* * * * * *

"During recent years the acreage devoted to drug cultivation in Britain has been more and more restricted by competition with wild foreign products. English drugs and essences have still a reputation which enables them to command a market at about four times the price of the continental article, but the cutting down of the costs consequent upon severe competition in the wholesale drug trade has been slowly but surely ousting British-grown drugs from the market. When this article was first projected it was intended to be an appeal to wholesale druggists and drug merchants to make some effort to prevent the extinction of drug cultivation in England The advent of a European War has completely changed the situation. Growers of medicinal plants are now being bombarded with enquiries for supplies, especially of Belladona leaves and root."

So far as I am aware, no attention has ever been paid to the cultivation of medicinal plants in this country.

The Executive Committee of the Calcutta International Exhibition for 1883-84, reported that "it must be admitted that our ignorance of the properties and uses of indigenous drugs is scarcely pardonable. It seems highly desirable, that the whole subject should be gone into with greater care than has yet been done, both with the view of weeding out the worthless from the good, and of preparing the way for a number of better class native drugs taking the place of some of the more expensive and imported medicines of Europe. It seems remarkable that so large an amount of aconite should be collected in Nepal and exported to Europe in order to be re-imported into India before it can find its way to the poor people who crowd around our dispensaries. Illustrations of a similar nature can be multiplied indefinitely. Atropa Bellodona, the deadly night-shade, for example, is a common weed on the Himalaya from Simla to Kashmir, yet every once of the drug used in India is imported from Europe, the Indian plant having entirely been overlooked."

Although more than three decades have elapsed since the above was written, things are no better now than what they were then.

In reply to questions 112 and 113, it is needless for me to say that India is very rich in plants of medicinal importance. Besides, owing to her climate in different parts of the country, India can easily grow plants of economic importance of almost all the countries of the world. It will be a very paying industry to cultivate medicinal plants in India.

But the first and perhaps the greatest difficulty that arises in the use of vegetable drugs is experienced in identifying the plants which yield them. As far back as 1189, in

the course of an article on the study of Indigenous Drugs published in the *Indian Medical Gazette* of Calcutta, which is an organ of the Indian Medical Service, I wrote :—

"Proper steps should be taken to identify the plants used medicinally by the people of this country. For this purpose the medicinal plants should be arranged and classified according to Hooker's Flora of British India. The Sanskrit and vernacular synonyms should also be given the importance they deserve. As far as possible the plants should be illustrated, as this will considerably help in their identification.

"The uses of these medicinal plants should be recorded. The uses to which they were put by the Hindu and the Greco-Arabic schools of practitioners, the supposed action attributed to them by the rustics and villagers, and the purposes for which they are employed by other nations should be considered."

For the proper study of drugs it is necessary to establish schools of pharmacy. At present there is no such institution in this country. Without such institutions it will not be possible to stimulate the drug industry in India.

I also suggest that facilities should be afforded to those who are willing to establish farms for the cultivation of medicinal plants.

It is necessary to establish scientific control over the cultivation of medicinal herbs and plants. Regarding the benefits of conducting a farm of this nature, Messrs. Burroughs, Welcome & Co., who have established such a one, write :—

"1. A drug may be treated or worked up immediately it has been collected.

"2. Herbs may be dried, if necessary, directly they are cut, before fermentation and other deteriorative changes have set in.

"3. Freedom is ensured from caprice on the part of collectors, who, in gathering wild herbs, are very difficult to control in the matter of adulteration, both accidental and intentional.

"4 Opportunity is provided to select and cultivate that particular strain of a plant which has been found by chemical and physiological tests to be most active, and which gives the most satisfactory preparations."

They should receive assistance from Government in acquiring land and the land should be rent and revenue-free. They should also receive expert opinion as to the proper method of growing the plants in different parts of the country.

There is another difficulty experienced in the preparation of medicines, as well as chemical analysis of medicinal plants due to the heavy duty that is imposed on alcohol. I suggest that alcohol should be made duty free for all purposes of industry, especially to those who are engaged in laboratory work and research.

There should be facilities for investigating the chemistry of plants in all those institutions which have properly equipped chemical laboratories and students should be encouraged to take up this work by the grant of scholarships.

India is rich in mineral and thermal springs. But these have not yet been chemically analysed. So mineral waters are imported in India from foreign countries. It is not difficult to create an industry in mineral waters if attention were directed to the analysis of the waters of the mineral and thermal springs of this country.

Antiseptic cotton, gauze and lint also can be prepared in this country.

(Major B. D. Basu did not give oral evidence.)

WITNESS No. 23.

THE HON'BLE MR. A. W. PIM, I.C.S., *Financial Secretary to the Government of the United Provinces.* *Hon'ble Mr. A. W. Pim.*

WRITTEN EVIDENCE.

NOTE.—*In a few matters these replies represent the views of the Local Government but unless this is expressly stated they are merely individual.*

Financial aid to industrial enterprises.

Qs. 4, 5.—Appendices I, I (*a*) and I(*b*) attached to this reply details with reference to the financial assistance either actually given to or under consideration with reference to Government assistance.

various industries. They include examples of all the methods of assistance detailed in question 5, with the exception of the last, and some of the applications for assistance from the glass industry have practically been requests for some system of guaranteed purchase. In addition to the cases detailed in the appendices assistance has been given towards the development of the mulberry silk industry through the agency of the Salvation Army in connection with its work among the criminal tribes. That assistance has taken the form of recurring grants aggregating Rs. 3,120 and of non-recurring grants of Rs. 1,040 for the purpose of some special machinery. The results as regards the prospect of the industry can as yet only be described as doubtful, but the whole question is being inquired into in consultation with the Imperial Silk Specialist. Hindus of the higher castes are not attracted by this industry as they object to having to kill the worms.

Speaking broadly the cases in which assistance has been given may be divided into two classes. The first is that of undertakings, such as the sugar factories in which the promoters of the undertaking do not propose to raise money from the public but only need Government assistance—financial and technical—to enable them to start work. Such cases have been dealt with by money grants in aid or by loans usually on full security. They are not likely to be numerous. The other, and in the future probably much more usual type of case, is that of concerns which need the assistance of Government not so on account of the actual money assistance given as because any form of Government subvention greatly assists them in raising money from other sources. In the special conditions of these provinces a comparatively small sum laid down by Government is of great assistance in inspiring confidence in would-be investors.

It must, I think, be recognised that, at any rate in this part of India, and in the absence of any properly organized industrial bank or equivalent organization, Government cannot altogether confine itself to providing technical education and advice for industries if any substantial industrial progress is to be made. It must assume some financial liability and the form which its assistance should take does not seem to matter very much so long as the financial liability is confined within definite limits and the method is acceptable to the promoters of the undertaking. All the forms of assistance detailed in question five are applicable under different conditions but probably the sixth method that of the provision of a part of the share capital of companies on the same base as public subscriptions—would be more effectual in inspiring confidence among investors than the application of similar sums of money in other ways. The liability of Government should, however, be definitely limited and for this reason the third method of giving assistance—that of guaranteed dividends—seems undesirable. Under that system the liability of Government might be greatly increased by new issues of capital and in other ways unless a very considerable degree of Government control over the enterprise were insisted on. A very serious difficulty remains and it would apply almost equally to assistance given by Government through an industrial bank or to loans given by any bank on Government guarantees. Financial assistance would be given because the prospects of any undertaking were considered to be promising. No Director of Industries can, however, estimate the prospects of every variety of undertaking and in many cases it would require the co-operation of several experts to judge of the prospects of any scheme. The large industrial banks in Europe all employ large staffs of competent experts for this special purpose and even if they have no expert in some particular branch they can usually obtain the services of consulting experts of high standing. Local Governments have no such staff of experts. If then financial assistance is given without proper expert inquiry the transaction is largely a gamble by Government and an encouragement to the outside public to gamble similarly. If the undertaking fails I do not see how Government can avoid a considerable degree of moral responsibility for the losses of other investors. It would seem to follow that Government has no right to give financial assistance for the purpose of encouraging outside investments in industries unless it is able to form a really sound estimate under expert advice as to the real prospects of the undertaking. Whether such experts should be Imperial or Provincial would have to be considered for each class of cases but experts should be available somewhere. If after such an investigation on cautious lines an undertaking failed and this would usually be through bad management—then the responsibility could not with any fairness be fastened on the Government.

Q. 6.—I do not see much advantage in attempting to secure continuous control by Government. The necessary staff is not available, the control would almost certainly be ineffective and would merely serve as an excuse for evading responsibility. The nominal reservation of drastic powers would not mean much in practice; I have, for example, not heard that the Government directors on the boards of guaranteed railways have made much use of the powers entrusted to them.

Pioneer factories.

Some stipulations could, however, be laid down as to staff and methods of management and two restrictions seem very desirable, firstly that Government sanction should be required for the purchase of expensive machinery, and secondly that for the purpose of restraining over capitalisation Government should be consulted before new issues of capital

are raised. There should also be a general power of inspection and of calling for accounts such as, for example, at present exists in the case of co-operative banks.

Qs. 7, 8.—The two important Government pioneer factories in this province are the existing resin factory at Bhowali and the defunct oil seed factory at Cawnpore. The Forest department will deal with the former and the history of the latter is given in Appendix I. Owing to the lack of industrial enterprise it is difficult to dispense altogether with such factories more especially in the case of products the raw material of which is closely connected with the working of some department of Government. Such factories are, however, in general bad tests of the commercial prospects of any industry and if a reliable and competent private agency can be secured by a reasonable degree of Government assistance, this method of pioneering seems decidedly preferable. The resin factory is a good instance of the difficulties in combining Government and private enterprise as the supply of the raw material must apparently remain in the hands of the Forest department.

As a general rule Government pioneering should cease when the undertaking has been sufficiently developed to know the value of the industry to be made over to private enterprise. The transfer may, however, not be desirable if the operations of the industry are likely to prejudice other public interests of importance and I should not care to suggest any cannon for general application. Every case must be treated on its merits.

Q. 10.—Appendix I (a) deals with the attempts made in this direction. As stated in my reply to question 5 there is a wide field for the operations of an industrial bank but the greatest obstacle in their working is the same as that alluded to in connection with financial assistance by Government, namely, the difficulty of securing proper experts to advise on applications for loans. The Director of Industries would probably be consulted by such a bank, but he cannot be an expert in every industry, and in the case of industries for which experts are not available loans would be an exceedingly risky business. A beginning has been made in this province in the direction of employing experts in special branches but an independent industrial bank should have experts of its own. Where it would get them is not clear and although Government experts would give all the assistance in their power, their point of view would possibly not be quite the same as that of the experts of an industrial bank on the continental model.

Co-operative societies.

Qs. 11, 12.—Appendices I and I(b) give instances of the application of co-operative principles to the assistance of industries more especially of the glass and weaving industries. Government has also joined with the Municipal Board of Benares in a joint guarantee for Rs. 8,000 for the extension of the operations of a co-operative dairy in Benares. A note by the Registrar of Co-operative Credit Societies is attached as Appendix II and deals with some experiments in detail. This province is rich in small industries to which co-operative principles seem applicable but as explained in the Registrar's note the advance made up to the present has been small and the difficulties are great.

Limits of Government assistance.

Q. 13.—It is difficult to lay down any general principles other than that as a rule. Government aid should be confined to pioneer enterprises either in some industry or in some special branch of that industry. This need not, however, be very narrowly interpreted and provided that there is no substantial competition either—and more especially—as regards the supply of the raw materials or in a lesser degree, as regards the marketing of the finished products it would seem fair to assist similar industries in different parts of the province. The tanning industry is an instance in point.

Q. 14.—Speaking broadly it would seem fair for Government to aid sound projects for the working up of indigenous materials with local labour, until it is clear whether the industry can stand on its own legs. Wide considerations arise, however, at once as regards international trade, tariffs, key industries, etc. I should not venture to suggest any general principles. It must largely be a matter of test and trial.

Technical aid to industries.

Research abroad.

Q. 22.—A note is attached as Appendix III giving the experience of the Opium Factory Superintendent of Researches carried out in India and in England. While the general aim should be to make India more and more independent as regards research the facilities for dealing with, for example, some kinds of industrial researches must be greater in England for a long time to come and the Advisory Council for research should be valuable in Referring any class of problems to the best authorities on that subject.

Surveys for industrial purposes.

Q. 25.—The departments concerned—Agricultural, Forests and Geological—should be able to deal adequately with this problem, but it has been suggested with reference to the Forest department that sylvicultural work has possibly had rather too much prominence as compared with investigation into the commercial possibilities of the Forest products. The tendency is a natural one and it might be advisable to counteract it by adding some officers with a commercial training to deal with this side of the activities of the department.

Assistance in marketing products.

Sales agencies.

Q. 30.—Recent developments in this direction will be dealt with by the Director of Industries. A note is attached as Appendix IV giving the history of an earlier attempt in connection with the Lucknow museum.

Exhibitions.

Qs. 31, 32.—This province has had one large industrial exhibition—that held in Allahabad in 1910. It is difficult to give an estimate of the results obtained from it, apart from its general educational effect, more especially in connection with the introduction of agricultural machinery; and the net cost was heavy. It would not seem advisable to hold similar exhibitions on this scale for a considerable time to come, but smaller local exhibitions—preferably in connection with local fairs—might be encouraged and assisted to some extent by Government and more especially by the Agricultural department. For the development of small local industries a permanent organisation, such as the emporium recently started at Cawnpore, would seem to be of more use.

Banking facilities.

Q. 39.—The small hand industries, such as weaving, hosiery, etc., labour under great difficulties as regards securing more than a merely local market for their outturn and when improved methods of production have been suggested, an objection constantly put forward has been that they would be unable to secure a market for any largely increased outturn. In this direction co-operation should have a wide sphere. As regards banking facilities for marketing raw products and more especially for the more important staples a system of financing which appears to work fairly well is already in existence. There is, however, very little accurate information available as to how the system really works in the lower stages nearer the producer, except that it is complicated by an extraordinary variety of cuts, commissions and exactions. Any suggestions for improvements would probably have to be preceded by a careful inquiry into the actual working of the present methods and such an inquiry would be by no means easy.

Other forms of Government aid to industries.

Supply of raw materials.

Q. 40.—This appears to be eminently a question to be settled after consideration of the special circumstances of each case. The most important case which has recently been under consideration suggests that one principle should be that the raw material should not be supplied at less than cost price. Any such arrangements are, however, indirect subsidies and it does not seem desirable to extend this form of assistance.

Land policy.

Q. 41.—Apart from the permanent settlement which prevails in the eastern districts of these provinces difficulties are placed in the way of acquiring land for industrial purposes by the existence of subordinate rights in land and more especially of tenant rights. It does not, however, seem advisable to place any restrictions on these most important rights in the interests of the extension of industries, at any rate not until the disadvantages have been much more clearly established than has been the case up to the present.

Q. 42.—There have been two important cases of this kind within recent years. The principle suggested by one case is that land should not be given for purposes of less value economically than its agricultural value. The other case has shown the necessity of making certain that the land asked for is really necessary to the industry and that its grant will not prejudice more important, though less obvious, industrial or other interests. The waste land still at the disposal of the Local Government in this province is, in any case, a very small area.

As regards *nazul* land in the neighbourhood of towns the existing *nazul* rules for leases appear to be fair and adequate, but if, as has lately been suggested, the statutory rules of 1894 are to apply to land leased for buildings, then no land whatever could be leased to a joint stock company without the sanction of the Secretary of State. That would be a most unworkable restriction on the development of industries.

Q. 43.—A note on the working of the Land Acquisition Act in this province is attached as Appendix V, and a further note on its application to the special case of Co-operative Societies is Appendix VI. As regards the acquisition of surface rights for ordinary industrial purposes, no case appears to have been made out for further restrictions on private rights in land in the interest of industries. As regards rights to minerals and the power of working them the law is very defective, more especially in the permanently settled area of the province.

Training of labour and supervision.

General.

Q. 44.—Appendix VII gives a short account of the technical schools and other schools of handicrafts established in these provinces. In addition to these there are schools for half-timers and for the children of workers in Cawnpore. Paragraphs 2—5 of the resolution of the Local Government attached as Appendix VIII sets out the lines on

which the Local Government has been working and other witnesses know more about the results. Matters are still very largely in the experimental stage and in spite of the unqualified condemnation of the present technical schools by Colonel (now General) Atkinson and Mr. Dawson the results as regards training of faculty are not unpromising though the cost is high. Apart from education the most important steps taken to improve the labourer's efficiency and skill have been the foundation of model villages for the housing of their employés.

Industrial schools.

Q. 50.—The co-operation of both the Educational and Industries departments is required for the control of these schools and for their adaptation to the industrial needs of the province. I think that technical schools and schools of handicrafts should be under the Department of Industries but that there should be an Educational officer on the committees of the more important schools, other than schools for special handicrafts, such as weaving, dyeing, or leather working, and that this department should be consulted for these schools in all matters of curriculum, organisation and teaching staff. Half-timer and similar schools should be under the Department of Education. Paragraphs 10—11 of Appendix VIII give the view of the Local Government as to the co-ordination of the various authorities connected with technical education.

Training of supervising and technical staffs.

Q. 51.—In the year 1910 a special class called the higher division of the department of technology was founded in the Thomason College, Roorkee, for the purpose of attracting students related to capitalists and manufacturers who, in the natural course of events, might expect to become managers of the business side of mills, factories and engineering firms. It was hoped that after obtaining the necessary practical experience they might also be fitted to manage the technical side also. Not a single applicant of the type specially provided for joined the class and it was closed in 1914 to be replaced by a class of the type suggested by Colonel Atkinson and Mr. Dawson as suited for turning out men of what they called the "improver" grade. The "textile" class at Roorkee is also intended to give a training of that grade and both are intended to be accompanied by the necessary period of practical training. The "textile" class will, it is hoped, be transferred to Cawnpore so that the students may work in an industrial atmosphere and receive a more complete practical training; but it is uncertain when financial conditions will permit of this transfer being carried out. It cannot, therefore, be said that much progress has been made in dealing with the problem of the higher grades of industrial training and the chief cause has been the very scanty openings for men trained on these lines. This is partly due to the fact that supervisors are in many factories mainly selected for their powers of attracting and retaining labour and partly because of the general idea that men of this type will not start from the ranks and learn the practical side of their business thoroughly.

A point which is not directly raised by any question but which is of great importance to the success of any attempts to train labour is the absence of any powers in Local Governments to raise the pay of any officers in charge of technical schools who have shown their value in those posts. Such men have a recognised commercial value and unless some liberty is given in regard to fixing their pay at a fair rate they will leave Government service on the expiry of their agreements. A case in point is that of Mr. Kinns, head of the Bareilly Carpentry School. The Local Government has made several attempts to raise his pay to a rate which it considered necessary for the purpose of retaining his services, but they have been refused. His departure from the school would be a misfortune to the industry in Bareilly.

General official administration and organisation.

Industrial development.

Qs. 56—61.—Appendix VIII and more especially paragraphs 9—11 explain the organisation which has been adopted in this province. Changes subsequently made in the composition of the Board of Industries are that the Director of Land Records and Agriculture replaced the Chief Engineer as president, Sir Alexander McRobert and three Indian commercial or industrial representatives of different parts of the province have been added. The criticism ordinarily made is that the Board is not sufficiently industrial and that it might in fact be a Board of Education. There is, I think, fairly general agreement that a Board of Industries is required to advise the Local Government on industrial and commercial matters. Its functions should be merely advisory, at any rate until more definite principles as regards financial assistance to industries and similar matters have been evolved.

Board of Industries.

Director of Industries.

A Director of Industries is essential and if a capable business man can be obtained he is best fitted for the post. The wider his experience the better and it is desirable that he should have a knowledge of local conditions.

Q. 62.—An Imperial Department of Industries does not appear to be necessary if by this is to be understood a department with executive powers and controlling to some extent the provincial Departments of Industries. Co-ordination is necessary between the activities of the different provinces but the Local Governments concerned should be able to secure this and there does not appear to be much room for an Imperial Director. An Imperial organisation is necessary for dealing with the wider questions of commerce and industry

including commercial intelligence and problems of an All-India or international character The view taken by the Local Government as to the character of such an organisation and the relation to be borne to it by the provincial Directors of Industries is explained in the note attached as Appendix IX.

A point of great importance to an inland province is the possibility of conflict between the interests of the great ports—linked as they are with those of the chief railway systems—and the interests of the producers in distant land-locked provinces. Very powerful exporting and distributing interests are concentrated in the ports and it is possible that they would not be inclined to favour the development inland of such local industries as might tend to reduce imports. The tendency of the railways might be to use their influence in the same direction because any decrease in imports would accentuate the difficulties under which they labour of filling their wagons for the return journey after conveying the raw produce of the inland provinces to the ports.

Some authority may, therefore, be required to see that inland industries get fair play, but an Imperial Director is hardly required for this purpose.

Organisation of technical and scientific departments of Government.

Imperial department.

Q. 64.—Appendix X gives an account of the efforts which have been made to found an institute of Chemical technology at Cawnpore. As matters developed it has become more evident how difficult it is to determine the scope and objects of an institution of this kind founded on a small scale. Local Governments can and should employ technical experts and might have technical colleges when industrial development has reached a stage in which men trained at such an institute would have fair prospects of getting employment. Imperial technical departments covering the same ground as provincial departments do not appear to be required. The organisation of scientific research and perhaps more especially of chemical research should, however, be under the Government of India as only in this way can unnecessary duplication be avoided and the large staff required be engaged and controlled. The head of the department would advise the Imperial Government. Different branches of work could be centralised in different parts of the country and the officers of the Imperial department could be lent to Local Governments who would arrange suitable accommodation for them. When so lent they should be subordinate to the Director of Industries or to the Director of Land Records and Agriculture according to the branch of science concerned. A general scheme of scientific research should be developed for the whole of India and if several institutes are found to be necessary each could deal with a group of related subjects. Local Governments could, as noted above, employ technical experts and arrange laboratory accommodation for Imperial experts lent to them. They could also probably arrange for some kinds of industrial analysis for which no organisation exists in this province (though the Chemical Examiner to Government is nominally entitled to take up work of this kind) and might need small research laboratories, partly for dealing with small local problems and partly for sifting problems intended for reference to the Imperial Department of Research. Universities should have some means of keeping in touch with the work of technological institutes so as to be able to stimulate the best of their students to take up work of this kind and so aid in the future scientific development of industries in India.

From some preliminary notes which have been sent to the Local Government it appears that in connection with these questions criticisms may be made on the present organisation of the Agricultural College at Cawnpore. This is, of course, primarily a matter to be dealt with by the Director of Land Records and Agriculture, but I am desired to ask that if such criticisms are made the Local Government may be given an opportunity of stating its views on the subject.

Study of foreign methods.

If suitable leave rules are framed for the scientific and technical experts of Government, it would probably be seldom necessary to make any further special arrangements for the study of conditions and methods in other countries. The Indian service leave rules which apply to a number of these officers are entirely unsuited to the conditions of their work. They might get six months' leave to Europe every five years.

Government organisation for the collection and distribution of commercial intelligence.

Commercial intelligence.

Q. 83.—As already noted Appendix IX gives the views of the Local Government on the organisation of the system of commercial intelligence, both as regards the Imperial and Provincial agencies required.

Other forms of Government action and organisation.

Certificates of quality.

Q. 89.—The only definite proposal of this kind which has been recently under consideration has been one for compulsory hall-marking of gold and silver plate. The inquiries made showed that compulsory hall-marking would be impossible in this province and that even voluntary hall-marking would hardly be workable without setting up an assay office. In other cases a system of certificates has been suggested either to be given by Government or by organising the trades themselves, but no definite proposals of this kind have as yet been worked out.

Hydro-electric power surveys.

Q. 102.—A syndicate has had a concession for some years for the development of hydro-electric power on a long stretch of the Jumna but nothing has yet been done owing to the difficulty of raising capital. The Public Works Department will submit a separate note on these subjects, but it may be said generally that very little has been done towards investigating the possibilities of hydro-electric power in this province and that further investigation is eminently desirable.

Forest department.

Qs. 105—108.—In connection with the questions concerning the Forest department, I am desired to say that the working of the department is a matter of very vital concern to the Local Government and one on which it does not always see eye to eye with the officers of the department. The Local Government would therefore be grateful for an opportunity to see the view which may be put forward and to express its opinion on them.

General.

Q. 112.—The chief complaints of this kind have been in connection with alcohol and with the use of the local saline deposits for extracting saltpetre and *sajji matti*. The Director of Land Records and Agriculture is familiar with the latter and as regards the former two notes by Mr. Gibb, the Excise Distillery Expert, have already been submitted to the Commission. The Director of Industries is also going into the question in connection with the perfume industry.

APPENDIX I.

Note giving a short history of, and the progress made by, industrial enterprises in the United Provinces which have been assisted by loans, guarantees or grants from Government.

THE COTTON SEED OIL AND CAKE INDUSTRY.

Paragraph 17 (a) of preliminary note.

1. ABOUT the year 1901, the Director of Land Records and Agriculture of this province suggested that machinery should be imported at Government expense for the purpose of making practical trials in order to determine whether a profitable industry in the crushing of Indian cotton seed could not be established. It was, however, decided that as the adaptability of machinery of European manufacture for Indian cotton seed had not then been demonstrated, such trials would be attended with a certain amount of risk, and that before any expense was incurred in importing machinery, experiments should be undertaken in de-linting, hulling and pressing Indian cotton seed in England, consignments of the seed being sent for the purpose, and the trials watched and ultimately reported upon by an expert. But the conclusion arrived at by the Board of Scientific Advice in the year 1903 was that all practical trials in connection with the cotton seed oil industry should be left to private enterprise.

2. About the same time, the Upper India Chamber of Commerce at Cawnpore were taking an especial interest in the question of the treatment of cotton seed, and a small consignment of the seed from this province was sent to America with the object of having it tested for the expression of oil, and to ascertain whether machinery could be devised for the effective de-linting of the seed, as the tenacity of the lint in Indian seed had been declared an insuperable obstacle to its use as a food for cattle. The results of the experiments which were conducted with the seed in America were considered so conclusively satisfactory that the Chamber urged upon Government the importation at State expense of a small experimental plant of the latest design, to test the manufacture on a working scale and the prospects of establishing the industry on a paying basis. The decision of the Board of Scientific Advice that circumstances did not warrant any initiative being taken by the State in this direction was communicated to the Chamber, who, however, on more than one occasion subsequently renewed its representation, although there was no change in the attitude of Government with regard to this question.

3. The cotton seed oil industry was considered by the Industrial Conference held at Naini Tal in August, 1907, and in paragraph 58 of their final resolutions, a copy of which was forwarded to the Government of India with this Government's letter no. 785, dated the 7th September, 1907, the Conference stated that the commercial possibility of such an industry was an urgent question and suggested that Government should import an experimental plant yielding an outturn sufficient to test the capacity of the market. They also suggested that the experiments should be conducted at Cawnpore independently of any existing ginning mills and should be arranged for by the Chamber of Commerce. As regards these suggestions, the Government of India were informed in paragraph 23 of the letter of the 7th September, 1907, referred to above, that the purchase of the plant involved action at once, and

that the Lieutenant-Governor had already made arrangements for the conduct of the experiment by the Upper India Chamber of Commerce. An officer was deputed to confer with the Chamber as to the arrangements to be made for carrying out the experiment, and it was finally decided to place the undertaking in the hands of Messrs. Begg, Sutherland and Company of Cawnpore, who were to conduct an experimental working and to provide the necessary scientific supervision to enable various processes of manufacture to be thoroughly investigated and tested on a practical scale. The terms of the arrangement with Messrs. Begg, Sutherland and Company were that Government would defray the cost of the plant laid down at the factory and its installation, as also the cost of all buildings, and would pay the firm a lump sum equivalent to an allowance of Rs. 500 a month as remuneraion for supervision and scientific control during the experimental working, and further would render them every assistance in connection with the disposal of the manufactured products and specially in the marketing of the oil cake. Messrs. Begg, Sutherland and Company were to provide a suitable site for the factory and accommodation for the raw material, stores and manufactured products, and generally to manage and conduct the business, and provide at their own expense the requisite scientific supervision including the use of laboratories and the necessary apparatus and chemicals; a proper system of accounts was also to be maintained, together with such technical and commercial records as the business required. The firm was also to provide funds for the purchase of the necessary raw material and for general working expenses, the sale-proceeds of the manufactured products to be first applied towards the recoupment of such outlay, any deficit being made good by Government, and it was arranged that the working capital should be advanced by the Bank of Bengal, and that Government would make good every six months whatever overdraft there might be on the account and would bear any eventual loss on the undertaking. When the factory had been established the attention of the military authorities in the province was drawn to its products and they and the Director of Land Records and Agriculture were asked to arrange to test the feeding values of the cotton cake produced at the factory, and to consider the question of adopting the cake for feeding the cattle belonging to their departments. The factory was closed down in February, 1911, in view of the orders of the Secretary of State in paragraph 7 of his despatch no. 50 (Revenue), dated the 29th July, 1910, prohibiting State interference in the way of pioneering new industries, and the buildings and machinery were put up to public auction. The total Government expenditure on the experiment amounted to Rs. 1,74,611 and the total loss to Government on the undertaking was Rs. 38,219. The conclusions arrived at by Messrs. Begg, Sutherland and Company from the operations of the factory were that in normal seasons a crusher having a factory at Cawnpore could depend upon obtaining supplies of first quality seed at Re. 1-12-0 to Rs. 2 per maund; from such seed he should be able to obtain an extraction of 12½ per cent. crude and 11 per cent. of refined oil, and should be able to calculate upon obtaining for his produce the following prices per maund at the factory excluding packing:—Rs. 12-8-0 for crude oil, Rs. 15 for refined oil, Re. 1-8-0 for cake and Rs 2 for soap stock, that is, the residues from the process of refining the oil which formerly had to be thrown away; and his working expenses, inclusive of management charges, interest on capital at 6 per cent. and depreciation at 5 per cent. on machinery and 2½ per cent. on buildings should not exceed eight annas per maund of seed treated assuming an 11 months' working of 26 days per month at 22 hours per day. To meet the case of seasons when either the price of cotton seed was abnormally high or the quality was unusually inferior owing to crop damage Messrs. Begg, Sutherland and Company considered that it might be advisable to instal a set of subsidiary presses and pumps of such a type as would enable other varieties of oil seed to be handled when the treatment of cotton seed did not offer a profitable return. On the whole therefore, although the experiment resulted in a financial loss, among the practical results obtained were the establishing of cotton seed oil in a sound position among the edible oils of the country; the value of the cake as food for cattle was also proved and it was adopted as a standard food for Government animals; it was also demonstrated that, given normal prices for seed, the industry could be carried on as a profitable auxiliary to cotton-ginning and pressing, and many other important problems connected with the storage of seed and cake, etc. were solved.

4. This factory was bought by the firm of Messrs. Hope Brothers of Cawnpore. One of the partners of this firm, a Mr. C. M. deSouza had been in charge of the factory from its very commencement and thoroughly understood the manufacture and marketing of cotton seed products. In this Government's letter no. 1139, dated the 1st June, 1915, addressed to the Government of India in the Finance Department, it was represented that the energy and enthusiasm which Messrs. Hope Brothers had thrown into their new enterprise had rapidly transformed a State experiment into a sound business concern, and that in considering the report of the committee appointed by the Lieutenant-Governor towards the end of the year 1914 to investigate the possibilities of aiding and expanding Indian industries owing to the conditions created by the War, it had come to the notice of Government that the firm were not only doing well but were also contemplating the extension and renovation of their plant and machinery. The Director of Industries of this province was accordingly ordered to visit Messrs. Hope Brothers and to report on their progress and the prospects of still further extending an industry which

was considered to offer exceptional opportunities in the province. The Director of Industries reported that by dint of altering and adding to the original plant and taking advantage of past experience the firm had succeeded in establishing the business on a sound footing. At the same time it had become increasingly obvious that the Anglo-American style of press originally installed by Government was not the most suitable for the work, and that if full advantage was to be taken of the existing opening, cold-pressing machinery of a more modern type, such as the Premier press manufactured by Messrs. Rose, Downs and Thomson of Hull, must be installed in place of the existing plant. Not only would this machinery altogether obviate the expenditure on press cloths, which amounted in 1914 to over three annas per maund of seed treated and to from nine annas to Re. 1-8-0 per maund of oil obtained, but it would also at once bring within the reach of the industry the much higher profits obtainable from cold-pressing methods. Unfortunately, however, the establishment of their existing plant upon a paying basis had depleted the firm's resources, while the heavy fall in the prices of the commodities with which they dealt which took place at the outbreak of War had destroyed for the immediate future all prospects of their being able to accumulate the funds which they required, nor was there any hope that a business which had strained its resources to the uttermost in emerging from the experimental stage could at this time raise the required additional capital in the open market.

The Government of India were, therefore, informed that in view of the fact that the firm had taken over an important pioneer venture which the Local Government had for reasons of higher policy been compelled to abandon, and had been successfully developing an industry of the highest potential importance to the province, the Lieutenant-Governor was prepared, subject to their approval, to make the firm an advance of the additional capital required from the provincial advance and loan account, and their sanction was asked to the grant of a loan of Rs. 37,500 at a 5 per cent. rate of interest on the following conditions:—

(1) The security taken would be a separate first mortgage on the machinery to be purchased with the loan, and two approved names. A further mortgage would also be taken on the existing buildings, machinery and plant which were valued in the firm's balance sheet at Rs. 88,888, an estimate which the Director of Industries did not consider excessive.

(2) No capital would be repaid for the first five years and thereafter repayment would take place at the rate of Rs. 1,500 per annum.

(3) The firm would accept and train pupils and apprentices recommended by the Local Government.

It was added that the Lieutenant-Governor was confident that the enterprise in question was not only a sound business proposition, but also of the highest importance to a large section of the agricultural population of the province, and he considered that there was no way in which Government could better stimulate that extension of the oil-pressing industry which was so imperatively required, than by giving financial assistance to a pioneer firm of proved business capacity whose record gave an assurance that such assistance would be employed to the best advantage. The grant of the loan was sanctioned by the Government of India on the first and third of the conditions suggested by the Local Government and on the further condition that the loan must be fully repaid with principal and interest within ten years from the date on which it was taken. These terms have been accepted by the firm, and as soon as the necessary deeds in connection with the loan, which are being prepared in consultation with the legal advisers of the Government, have been duly executed, the money will be paid over to the firm.

The mere promise of Government support in this case has had the effect of attracting private capital to this enterprise and a group of capitalists have undertaken to provide further finance as needed, up to 6 lakhs of rupees, which will enable this concern (it is now the Premier Oil Mills Company, Limited) to greatly extend its present works and build others.

5. As subsidiary to the cases mentioned in the two preceding paragraphs the following further assistance has been given to this industry. In October last the provincial Board of Industries discussed a note on the possibilities of the oil-pressing industry in the province. The chief obstacle appeared to be the finding of suitable markets for the press cake, but it was ascertained that the Agricultural Department were doing all in their power to popularize the use of oil-cake, both for cattle-feeding and for manurial purposes, and the Board finally recommended that Government should allot a sum of Rs. 5,000 in order to enable the Agricultural Department to dispose of Mohwa oil cake to new users for experimental purposes at a nominal rate. An allotment of this amount was accordingly placed at the disposal of the department for the purpose mentioned in November last and as a result of the distributions made the oil mills find the present demand exceeding the supply.

THE POULTRY INDUSTRY.

6. During the years 1908 and 1909 the Local Government had an arrangement with the Rampur State for a joint poultry farm at Rampur, both Government and the Darbar contributing to the cost. The Government contribution was Rs. 6,700 and a sum of Rs. 10,664 was provided by the State. With effect from the 1st January, 1910, however, it was decided to establish the experiment on a basis independent of the Rampur State, and to remove the farm to Haldwani where it would be carried on by Colonel Ward as partner with Government.

The arrangement was to be for a period of three years in the first instance. No definite deed of agreement was entered into between Government and Colonel Ward, but the position was that the latter held the land on which the farm stood on a long lease, while Government contributed a sum of Rs. 1,600 towards the initial outlay on the farm, and made a grant of Rs. 500 for working expenses from January to March, 1910, together with an annual contribution of Rs. 3,550 towards upkeep, receiving a half share in the profits and bearing half the loss. Colonel Ward was unwilling to continue the experiment after the expiry of the period of three years originally agreed upon, and the farm was finally closed in March 1913 upon Colonel Ward's departure for England, the land and buildings being purchased from Colonel Ward by the Tarai and Bhabar Government Estates on behalf of Government for a sum of Rs. 15,000, and the poultry sold off and distributed in such ways as were likely to lead to the greatest permanent advantage to the province. Much success cannot be claimed for this experiment, which, however, was not undertaken as a commercial enterprise, but with the object of assisting poultry breeding in the province by maintaining a stock of the most suitable breeds of fowls which could be made available to the public, and part of the expenditure was devoted to ascertaining the breeds most likely to succeed. The selection of Haldwani as a site for the farm was also unfortunate as large numbers of the birds appear to have died from disease.

7. In October, 1914, a scheme was received from Mr. A. E. Slater of the American Presbyterian Mission for the establishment by the mission of a poultry farm on business lines at Etah. The objects were to promote and encourage the poultry industry amongst the large Christian population of the district by the distribution of stock and eggs and the development of a hardy cross-bred fowl, to inaugurate at a later date a co-operative association for the collection and disposal of produce, and to supply the public with utility birds of such breeds as were adapted to the province. The initial outlay was estimated at Rs. 7,000 and the annual upkeep at Rs. 2,070, and Mr. Slater asked that Government would sanction a non-recurring grant of Rs. 3,500 towards the initial cost and also make a fixed maintenance grant of Rs. 1,200 per annum for a period of five years. The scheme was approved by Government and a non-recurring grant of Rs. 3,500 with an annual recurring grant of Rs. 500 was sanctioned in February, 1915, and six months later further non-recurring grant of Rs. 200 was given to complete the wire fencing at the farm. A very considerable measure of success has been attained at this poultry farm. Mr. Slater is an expert in poultry-rearing, and being at the head of a missionary establishment in the district, he can control the operations of a number of small breeders. His primary object is in fact to provide a means of livelihood for the Christian converts. By introducing cross-bred fowls he has been able to increase the size of the village eggs and to obtain a good market for them among Europeans. This year he secured the contract for supplying the Agra hotels with fowls and eggs, and also made a profitable arrangement for supplying the Simla trade during the past summer; and he hopes to extend operations next year to Delhi. He is obtaining good prices for the produce and is believed to be succeeding in establishing a sound commercial business which should prove of considerable advantage both to the consumer and to the fowl-keeper, his operations having already extended to over forty-five villages. Further, a very considerable interest is now being taken in poultry-breeding in this province, numbers of enquiries constantly being received by the Agricultural Department on subjects connected with the care and breeding of poultry, and as there is no expert on he subject attached to the department, and its officers are unable to give the required information and advice, Mr. Slater has kindly undertaken to reply to much of this correspondence.

MANUFACTURE OF BICHROMATE OF POTASH.

8. Towards the end of the year 1914 the question of the local manufacture of the chief chemicals used in the mills of the province was taken up. Bichromate of potash is a chemical of vital importance to khaki dyeing, tanning, glass-making and a number of other industries, and owing to prohibition of the export of chrome from Great Britain on account of the war great difficulty was experienced by a large number of manufacturers, especially those engaged upon large contracts for khaki cloth for Government, for want of this chemical. Messrs. D. Waldie and Company of Cawnpore accordingly undertook the experimental manufacture of bichromate from chrome ore obtained from Quetta, and satisfied themselves that so far as laboratory experiments went the manufacture of this chemical on a profitable basis was feasible, but in attempting to manufacture on a commercial scale they

failed, chiefly because the manager could not give the continuous supervision which was needed, while though they built more than one furnace specially for the purposes of the experiment, none proved efficient enough, and they ceased their experiments. In October, 1915, however, it was reported to Government that the firm were prepared to renew their experiments in the manufacture of bichromate on a commercial scale and were engaging a qualified assistant specially to attend to this experimental branch of their business; they were willing to take the risk of being able to sell the product at a profit, but, as a set-off against the losses they had already experienced and to help them through the initial stages, they asked for a Government grant of Rs. 200 a month towards the cost of the special assistant for a period of ten months, by which time they estimated that the experimental production should be fully established. A Government grant of Rs. 200 a month for a period of ten months was accordingly sanctioned with effect from the 1st December, 1915, on the condition that the firm satisfied the provincial Director of Industries from time to time that experimental manufacture was actually in progress. The firm have engaged an assistant chemist and have constructed a special reverberatory furnace which is now running night and day, and have another under construction. One of the principal difficulties, as previously mentioned, has been the construction of a suitable furnace, and they have also had some trouble in securing good furnace coal, having tried various qualities in order to find the most suitable, but they are now satisfied with their furnace results and excellent progress has been made. The experimental work is now complete in so far as it has achieved its object of showing that the firm can manufacture the bichromate on a commercial scale at a reasonable rate. They have secured a good yield on the raw materials used, but their manufacture costs, exclusive of the costs of raw material, are still high; the reduction of these costs is a matter of time and experiment, and they consider that the rate of output can be greatly improved as the staff and labour employed gain in experience. Meanwhile they have already commenced supplying to users in the United Provinces at a price less than half that commanded by imported bichrome at present.

THE INDIGO INDUSTRY.

9. During the revenue year 1914-15 certain advances were given out for the revival of indigo cultivation, among which were (1) a sum of Rs. 5,000 to Mr. W. C. Macgregor, manager of the Amethi Raj in the Sultanpur district, and (2) a sum of Rs. 5,300 to Munshi Ali Sajjad. In April last Mr. Macgregor reported that in June and July of the previous year he had put 500 bighas under indigo which gave a very good crop and a cutting in October from which 15 maunds of indigo were manufactured; this was an *extra* return from the land and the crop was still in the ground and would be ready for manufacture in July, 1916. In addition to this he had arranged for a further cultivation of about 1,000 bighas and was quite satisfied that the Government loan had enabled him to achieve good results.

The result of Munshi Ali Sajjad's year's working would also appear to have been satisfactory. The area sown was 332 acres, which gave an outturn of 30 maunds of indigo. The indigo has not yet been sold, but it is expected that some Rs. 15,000 at Rs. 500 per maund will be realized as offers of Rs. 490 have already been made.

THE HAND-LOOM INDUSTRY.

10. In July, 1908, the Registrar of Co-operative Societies referred the question of the grant of loans by Government to two co-operative societies of hand-loom weavers which had been formed in the towns of Sandila in the Hardoi district and Tanda in the Fyzabad district. The immediate objects of these societies were the establishment of a co-operative store for the sale of yarn, and the grant of loans to weavers for the purchase of yarn and improved looms and their accessories; it was also proposed eventually to take orders for cloth and to accept cloth made by the members of the society on commission sale. The societies were constituted on a share-capital basis. Each member was to take one share of Rs. 10 for each loom owned by him, and the amount could be paid up at once or by monthly instalments of four annas. Profits were to be disposed of as follows:—25 per cent. to reserve, the remainder to be applied first to pay a fixed dividend of 10 per cent. on a paid-up capital; and, secondly, a dividend of 10 per cent. on purchases, any balance being added to the reserve for the time being. It was stated that in Tanda a strong committee of the weavers had been formed and most of the prominent *Julahas* had joined the society; 139 shares had been disposed of. In Sandila the arrangements were in the hands of a *rais* of the town, M. Kabul Ahmad, who had great influence among the weavers and had formed a committee of them to help him; 107 shares had been sold. Many of the Tanda weavers were in good circumstances and it was expected that the value of about 100 shares would be paid up at once, so that the society would have some Rs. 1,000 with which to start work. The Sandila weavers, on the other hand, were poor and would nearly all of them pay up the value of their shares by instalments. It was calculated that each society would require about Rs. 5,000 to enable it to start work on a scale sufficient to arouse public interest and so secure success, and it was suggested that Government should advance this amount. The Registrar considered that the rule prevailing in the case of rural societies that the advance should be only equal to the amount of capital actually subscribed by the members of a society unduly hampered poor societies if strictly adopted, and would not meet

the case of the Sandila and Tanda societies. It seemed to him sufficient qualification for a Government grant if the society to whom it was given consists of persons who had become convinced of the benefits of co-operation and were prepared to make some sacrifice on their own part. These conditions were present in the case of the two societies mentioned, and there was every reason to hope that good use would be made of the grant. One of the chief functions of the societies would be to popularize improved hand-looms and appliances and their establishment should have a good effect in widening the views of the weaving class and rendering them more ready to adapt themselves to new conditions. The Registrar therefore proposed that Rs. 5,000 should be lent to each of these societies, the rate of interest to be 5 per cent. per annum and the principal to be repayable in each case after a lapse of three years by ten annual instalments of Rs. 500. The proposals, which were referred to the Government of India with the recommendation that the loans should be given as an experiment, were sent on to the Secretary of State for orders. In his despatch no. 59 (Revenue), dated the 28th May, 1909, the Secretary of State sanctioned the proposals purely as an experimental measure. He suggested, however, that in the case of the Sandila society, in view of the small contributions which it was proposed to require from the members the Government loan should be limited for the time being to Rs. 3,000, and that its increase beyond that amount to Rs. 5,000 as a maximum should be contingent on the subscribers having paid up instalments due from them. In intimating this sanction the Government of India asked that the progress of the two societies in question should be specially noticed in the annual report on the working of the co-operative credit societies in this province.

In December, 1909, the Registrar of Co-operative Societies reported that a society on the lines originally proposed was inaugurated on the 17th September, 1909, in Sandila with the Rs. 3,000 advanced by Government and a sum of Rs. 2,500 deposits, received through the Registrar, from private persons; a loan department was opened and also a store for the supply of yarn. Some difficulty was experienced at first in inducing the weavers to come forward, but this was surmounted by the help of M. Kabul Ahmad, owing to whose business capacity and energy the yarn store made a very good start (the sales for November amounted to over Rs. 1,900), members being enthusiastic at the result achieved in delivering them from dependence on the *mahajan* for their supplies. There was thus every prospect of ultimate success. In Tanda, however, the difficulties encountered were much greater. A considerable number of the rich *Julahas* in the town were themselves dealers in yarn and employers of hired labour on their looms, and profited, or imagined they did so, from the state of poverty and dependence in which the poorer *Julahas* were submerged. When the scheme was first started many of these expressed a wish to join the society, but probably they did not understand the full scope of the scheme, or if they did, they intended while openly supporting it, to prevent its success being ever such as to compete seriously with themselves. It was therefore held, after consultation with the district authorities, that the proposed scheme of a large society for the sale of yarn and granting of loans would have little prospect of success. The richer *Julahas*, even if induced to come in, would not really work in the interests of the society, while if they were excluded the depressed classes would not have the enterprise or capacity to manage it themselves in face of the opposition and competition which would be encountered. It was accordingly decided to attack the problem from a different side and to attempt to form small credit societies among the poorer weavers of the different quarters of the town. Such small societies—so small that they could be efficiently managed by the members themselves—had been highly successful among weavers and artizans in other towns, and there seemed no reason why they should not be equally successful in Tanda. It was proposed to fix the value of the shares at Rs. 9 each, payable by instalments of one or two annas monthly, so that no one need be precluded from joining on account of poverty. By means of these small societies it was hoped to improve the economic condition of the poorer weavers and to teach them the advantages of co-operation. In course of time they would possibly advance a step further and combine to form their own central bank and to start a store for the supply of yarn. Meanwhile it was proposed that with the advance sanctioned by the Secretary of State the Registrar of Co-operative Societies should himself perform the function of a central bank, distribute the money to the small societies, and control the use they made of it. He therefore asked for permission to proceed in Tanda on the above lines, and suggested that since there would be, as in the case of Sandila, no share capital paid up at the initiation of the society, the amount of the advance for Tanda should be restricted to Rs. 3,000. These proposals were sanctioned by the Local Government.

The annual reports of the Registrar of Co-operative Societies show the progress made by these societies. In the report for 1910-11 it was stated that, in addition to the Government advance of Rs. 3,000 at 5 per cent., the Sandila society had obtained more capital by deposits at 7 per cent. There were 129 members who subscribed monthly instalments towards shares at the rate of four annas per loom and the amount of share capital held by them was Rs. 550. Admissions had been most carefully made and loans cautiously advanced, and the result was that though over Rs. 5,000 was outstanding in loans none of it was in arrears. The yarn store had become a most popular institution

Sales during the year amounted to Rs. 36,233. The society was worked by a committee of the weavers themselves, but M. Kabul Ahmad was always at hand to give them the benefit of his valuable advice. The net profit of the loan department for the year was Rs 421 and that of the yarn store Rs. 97. In order to encourage others to join the society and the members to make all their purchases at the store it was decided to take a few rupees from the profits of the loan department and to declare a dividend of two pies in the rupee on the purchases of members. In Tanda 17 small *muhallawar* societies were formed with 385 members and a capital of over Rs 6,000; they worked perfectly during the year and the establishment of a central bank facilitated the extension of the system. Loans were advanced for the purchase of yarn and the payment of old debts, but the main feature of the business was the giving of advances on the pledge of pieces of cloth at three-fourths of their price.

In 1911-12 it was reported that the Sandila society was in a flourishing condition; there were 154 members and nearly Rs. 46,000 worth of yarn was sold. The total profits of the year amounted to Rs. 552 and a bonus of two pies per rupee was paid on the purchases of members. The benefits of the society were much appreciated by the weavers. The Tanda societies were also in a flourishing condition, the number of societies having risen to 21 with 541 members. The capital had increased and while loans were advanced for all necessary objects the bulk of it was devoted to the purchase of yarn and the trade in cloth; 19 members also purchased and worked Serampur looms.

In 1912-13 it was reported that the yarn store at Sandila was in a sound position and had proved a success. The sale of yarn during the year exceeded Rs. 55,000, the number of members rose to 209, and the society distributed a bonus of two pies per rupee on sales besides a small dividend. The Tanda societies were not specifically mentioned. In 1913 14 it was reported that the Sandila society and yarn store continued to flourish, profits being higher than in the previous year. The society had nearly 300 members and the question of splitting it up into smaller and more easily managed units was under consideration. There was also a school for the training of pupils in the use of improved hand-looms and fly-shuttle looms were being gradually, though slowly, adopted by the Sandila weavers. The Tanda societies were placed on a sounder basis during the year and enquiries were being made with a view to secure better co-ordination between these societies and the local weaving school.

In 1914-15 it was reported that the year had been a very trying one for the weaving handicraft owing to the effects of the war, but that on the whole the Sandila business was satisfactory. The Tanda societies were not specifically mentioned.

THE SUGAR INDUSTRY.

11. On the 7th February, 1912, the Lieutenant-Governor held a sugar conference at Lucknow to consider the improvement of the sugar industry in the province. As a result of the conference the Local Government issued a resolution showing the action desirable, not only to arrest the decline in and facilitate the expansion of the area under sugarcane, but also to encourage the propagation of the most valuable kinds of cane, and the extension of the crop in regions where at present it was little grown. The Government of India recognized that more than half the cane produced in India was grown in the United Provinces, and as the sugar industry was more vital to this province than to any other, they recommended to the Secretary of State the appointment of an expert sugar engineer for three seasons in order to make special enquiries into the agricultural and chemical aspects of the industry, and to work under the Government of this province with a view to improving indigenous methods with small plant. Mr. Hulme was accordingly appointed as sugar engineer and was available for consultation by persons engaged in the sugar industry. His services proved of such great value that it became necessary to ask the Government of India for an extension of his period of employment for another two seasons and a still further extension has just been sanctioned. In this Government's letter no. 43-C., dated the 25th March, 1912, the Government of India were addressed with regard to a Government grant of Rs. 30,000 towards a sugar factory owned by Raja Rai Lalta Prasad Bahadur in Pilibhit. It was explained that the factory was in its third year of working, and that its operations were being watched with keen interest throughout Rohilkhand as the first central factory in the province instituted and managed by Indian enterprise. The success of the factory would have a very material effect in hastening the development of sugar production in the province, while its failure would confirm the idea then prevalent that a sugar factory working with cane was too complicated to be managed with any hope of success by an Indian firm. The Raja had incurred considerable loss during the previous two years owing to the failure of his machinery to give the outturn anticipated and owing to breakdowns at critical periods of working; he had also been handicapped by the incompetence of his engineering staff. The chief cause of his ill-success was, however, not so much the inefficiency of his employés as the initial mistakes made in the installation of his machinery. A properly installed factory would employ only a small number of men, but the Raja's machinery was so badly put together that many of the operations had to be done by hand, with the result that his

labour bill was very heavy. Mr. Hulme after visiting the factory reported that re-arrangements and re-placements of machinery were indispensible if the factory was to be put into efficient working order, and he estimated the cost involved at Rs. 60,000. Although the Raja's enterprise had not so far been a commercial success it had proved entremely instructive, as it had been at one time stated that the main difficulties of a central factory would be found in the supply of cane while in the present case no such difficulty had in fact been experienced. All the cane needed to work the factory was brought in by the tenants of the Raja's own estate; indeed the factory was overwhelmed with cane and the difficulty was to work it off.

The cultivators appeared extremely pleased at being relieved from the labour of making *gur* at a time when their oxen were required for preparing the ground for sugarcane, and above all at being freed from the Khandsari and his methods. This experience, which the Lieutenant-Governor regarded as of the utmost value, coincided with that of planters in the east of the province, and there appeared to be no doubt that given a fair price, cultivators generally would eventually grow as much sugarcane as a factory could handle wherever a factory was started. This would, subject of course to a certain limit, mean an increase in cultivation proportionate to the extension of sugar factories. It, therefore, appear desirable to the Lieutenant-Governor, both from the point of view of sugar cultivation and as an object lesson to other sugar manufacturers, that this factory should receive assistance from Government, provided only that Government did not associate itself with the factory as a commercial venture, and that public interests could be shown to be directly served by such assistance. His Honour accordingly recommended that support should be given in the form of a grant of Rs. 30,000 on these two grounds, and also on the conditions first that it could and would be used in place of an official demonstration factory and second, that Government should obtain and would be given facilities for using it as a training ground for sugar engineers and boilers. Apprentices would be sent to the factory from the technical schools to learn sugar working and thus provide a supply of trained men ready to work in new factories as they sprang up.

This would be a great step forward, as the lack of men with experience of sugar machinery constituted one of the most difficult features of the existing situation. A demonstration factory, combined with an institution for training sugar engineers and boilers would, if initiated by Government, involve a very considerable outlay, and the Lieutenant-Governor considered that the opportunity then presentiug itself for securing those advantages without such outlay should not be missed, more especially as those advantages would be accompanied, in the probable event of the factory proving a commercial success, by a general stimulus to the industry in the province.

The proposed grant was sanctioned by the Government of India in April 1912.

The grant was made on the condition that firm expended a larger sum in introducing the requisite machinery into their factory. The new machinery was installed in 1913 and since then the factory has had three successful years and may now be regarded as an assured success. As a result of the prosperous season of 1914-15 the firm devoted the sum of £ 5,000 from the profits of the year to the purchase of additional machinery, and this year owing to the high price of sugar the factory has had another very satisfactory season. The sugar turned out sells at the same price as Khandsari sugar and is taken by orthodox Hindus. The prices realized this year for their first sugar have been as high as Rs. 17 per maund and the molasses have been selling unusually well. The staff being at present entirely Indian, the expenses of working are low and the machinery, much of which has been carefully selected by Mr. Hulme, is in first class order, and a good extraction is obtained. Under these circumstances there can be no question of the success of the enterprise but as it is privately owned and no dividends are declared, figures as to profits realized cannot be given. It is, however, now established that given a certain amount of initial advice and expert supervision, a central factory can be successfully run by Indians, and although no new factory has been started a certain number of projects have been mooted, some of which will very possibly materialize.

Two young men who desired a training in sugar engineering have been sent to the factory this year, and one of them applied on the ground that he wished to open a factory in another part of the province.

12. In this Government's letter no. 1661, dated the 23rd August, 1912, the Government of India in the Department of Revenue and Agriculture were addressed with regard to the grant of a loan under the Agriculturists' Loans Act, 1884, towards the establishment of a central sugar factory in the Gorakhpur district. It was explained that Messrs. J. Macdonald, G. R. Macdonald and Farquhar Mackinnon, the proprietors of the Babhnauli indigo concern situated in pargana Sidhua Jobna in the Gorakhpur district, had approached Government with a request for a loan of Rs. 5 lakhs on the security of the estate to enable them to start a central sugar factory. The Lieutenant-Governor had had occasion to observe [with some misgiving the effects of the extending imports of sugar on the agriculture of those

tracts of the province where the production of sugar or *gur* was an important factor in rural economy. A decline in the area under cane must seriously affect the general prosperity of such tracts, and there was reason to believe that such a decline was threatened in the eastern districts of the province. The situation was at that time particularly acute in Gorakhpur since the shrinking of the area under cane was in that district to coincide with the stoppage of poppy cultivation. This tract was peculiarly adapted to the growth of sugarcane, and *gur* was produced so cheaply that the *gur* working factories of the province, including Rosa, drew their raw material from Gorakhpur or Behar. In the year 1912 the price of *gur* fell so low that it hardly paid to crush the cane and much was left standing. In the eastern districts the cultivator had not the Punjab *gur* market to fall back on, and with poppy going or gone and *gur* almost unsaleable his prospects of paying his rent at existing rates was most precarious. Cane was, however, quite able to replace the poppy, provided it could find a local market in central factories. Without some such development a severe set-back to cane cultivation seemed inevitable, and it was difficult to see how rents could stand. To encourage the growth of such central factories one striking success was required to secure every prospect of capital flowing in for similar enterprises. The proposal put forward by Messrs. Macdonald and Mackinnon therefore appeared to the Lieutenant-Governor both opportune and deserving of support. The Babhnauli concern was situated in the east of the Gorakhpur district some 17 miles from Kasia. A new railway line was under construction and would pass within a mile of the proposed central factory. The factory had excellent farm buildings and a fine stock of cattle and was well equipped with agricultural machinery. It lay in the *bhat* tract which is remarkable for its retention of moisture, irrigation was rarely required, and in any case a safe supply of water existed for emergencies while the soil was rich in lime constituents, so that the two chief requisites for cane cultivation were already available. The potentialities of the estate had been exhaustively examined by the sugar engineer and the Director of Agriculture, and the former officer reported that the estate was eminently adapted to supply a factory of the size proposed, i.e., one which could turn out 3,000 tons of sugar in 100 days, and that the land available for cane cultivation was of high productive value and more than sufficient in extent to produce the required quantity after allowing for rotation crops and fallowing. With these conclusions the local authorities were in full agreement and they considered that a sugar factory at Babhnauli would start with exceptionally good chances of success. The organization of the cane supply, which had proved a stumbling-block in the Behar factories, would here present no difficulty. The estate was managed by European planters who could put down good canes with the best cultivation and supply their tenants with good seed. Cane would reach the factory at the proper stage of ripeness and the usual losses by inversion would thus be eliminated. The indigo business had brought the management into close relations with the neighbouring tenants and arrangements could thus be made to secure the cutting of cane at the proper date and for growing canes with the early or late ripening habit. Further, owing to the local cheapness of cane no other part of the province offered an equal chance of success. The proprietors of the concern originally estimated the cost of erecting the factory with the most modern machinery at Rs. 5 lakhs and asked for a loan of that amount. The sugar expert, however, estimated the cost at approximately Rs. 8½ lakhs, in addition to Rs. 2½ lakhs for working capital and Rs. 20,000 for pumping machinery. In view of this estimate the proprietors asked for an immediate loan of Rs. 5 lakhs with a possible further advance of Rs. 2½ lakhs, at 5 per cent. interest. Subsequently, however, they asked definitely for a loan of Rs. 7 lakhs. The property which they proposed to hypothecate to this loan had been carefully valued by the Director of Land Records and Agriculture and by the district authorities; and the Board of Revenue agreed with the local officers that at a safe computation the property, excluding land held on occupancy tenures and on lease, which was nominally non-transferable, could be valued at Rs. 10½ lakhs. The sanction of the Government of India was accordingly asked to the grant of a loan of Rs. 7 lakhs under the Agriculturists' Loans Act, 1884, to the proprietors of the Babhnauli indigo concern for the purpose of starting a sugar factory in the Gorakhpur district, interest being at the reduced rate of 5 per cent. and the loan repayable by equal yearly instalments spread over 20 years and beginning two years after the grant of the loan. The Government of India sanctioned the loan, but considered that it was doubtful whether the Agriculturists' Loans Act was intended for loans of this nature, and directed that the loan should be cashed under the head of Miscellaneous and be made from the provincial loan account. They also suggested that the loan should be subject to conditions for assistance in demonstration and training in improved methods of manufacture such as had been accepted in the case of the Pilibhit Sugar Factory mentioned in the preceding paragraph. Meanwhile the proprietors of the concern had formed themselves into a company incorporated in England under the name of the United Provinces Sugar Company, Limited.

Their first working season was a short one, as they were unable to get up their heavy machinery owing to breaks in the railway lines. Their second season (1914-15) should have been a much better one, but they had various difficulties to contend with; the machinery was designed by an expert sugar-maker with Java experience and was not altogether suited for working the canes of this province, and extraction was not so

high as might reasonably be expected. Last year, however, the factory worked without a hitch. New plant had been put down, and a Mr. MacGlashan, who had had wide experience of sugar manufacture in India, had been appointed manager, the rusult of the change in management being most satisfactory The first two seasons the company had Chinese pan-boilers, but last season they worked entirely with Indian pan-boilers. They had made a sugar of good class which was selling well. It had the colour and size of grain of the sugar made in Indian refineries and Indians liked it. Unfortunately, however, the whole of the area from which cane was procured suffered severely from last year's floods and the factory experienced a shortage of cane. The company are now endeavouring to place the business on a strictly commercial basis, and are taking steps to transfer themselves from England to India, as this will save them a large sum in home charges; while with the directors in India changes can be authorized at once without reference to England and the accounts be audited quickly in this country. Given one good year, which they have never had yet, the company should in fact achieve very marked success now that the initial difficulties have been overcome.

The silk industry.

13. In November 1910 the Director of Land Records and Agriculture was asked to investigate the feasibility of silk worm-rearing with a view to establishing the production of silk in the province upon a commercial basis. The Director reported that, after examining the possibilities of eri and mulberry silk, he considered the rearing of eri silk worms to be more suitable to village conditions, though it could not be developed as a cottage industry owing to the necessity for giving the worms a house to themselves. At the time of this report Munshi Akhtar Muhammad Khan, Deputy Collector, Shahjahanpur, was engaged in experimenting with the rearing of eri silk worms, and it was decided to recommend the placing of this officer on special duty for the purpose of ascertaining the commercial prospects of sericulture in the province, and he was asked to submit detailed proposals. On receipt of these the Government of India were addressed, with the request that the deputation recommended be sanctioned. On the 5th May, 1911, the Local Government authorized the carrying out of the scheme which had been forwarded for the establishment of a model sericultural farm at Shahjahanpur, and it was agreed that the business side should be managed by the deputy collector as a private venture for his own profit or loss. An establishment of two clerks and two peons was provided with effect from the 1st May, 1911, and the experiment was sanctioned for a period of two years, which was subsequently extended by one year, as it was evident that the experimental work had not continued long enough to allow of definite conclusions being arrived at. A report on the work which had been done at the farm was received in July, 1913, and as it appeared that there was a possibility of ultimate success Government sanctioned the continuance of the experiment for another year to the 30th April, 1915, on the understanding that the industry should be placed on such a footing that it could continue to exist when the special officer's services were withdrawn. It was finally decided to continue the experiment up to the end of a period of five years and the experimental farm was closed down on the 30th April, 1916. It cannot be said that the experiments proved a commercial success. The total quantity of eri cocoons likely to be available during the year 1915 was estimated at 70 maunds only, while the total quantity produced by cultivators in the province and purchased by the farm during the three years ending the 31st March, 1914, was less than nine maunds. A market has not been found either for the cocoons or for the cloth. The largest silk mills in India decline to have anything to do with eri silk cocoons, because they contain portions of the chrysalides, and the Benares silk weavers likewise decline to take up this silk. The spinning of eri silk presents special features owing to the fact that the filament is not laid by the worm in one continuous length, but in a number of short lengths of a few yards only, so that it cannot be thrown or reeled as with mulberry or other silks and has to be treated as silk waste. It does not lend itself satisfactorily to hand-spinning owing to the difficulty of keeping the yarn even. It has also been found impracticable to acclimatize the worms to the plains so that the supply of seed would have to be renewed yearly from outside the province, thus making it very difficult to introduce eri silk culture as a village industry, apart from the fact that the price hitherto obtainable for the silk cloth has been such that it would not pay the cultivator to take up the production of the cocoons.

The central emporium at Cawnpore.

14. On the 1st October, 1915, a central emporium or dépôt was opened at Cawnpore for the display and sale of the smaller manufactures of the villages and towns of the province, particularly artware and such small wares as brass, embroidery, woodwork, pottery, printed cloths, mats, cutlery, etc. The emporium is being managed by a business firm and the operations are conducted under the supervision of the Director of Industries. The intention is that it should be a focus for the many small industries of the province, and aim at the maintenance of a proper and uniform standard of work and the regularization of supply and demand. It is also hoped that it will be a means of reaching wider markets in Europe, America and elsewhere. Sums of Rs. 10,000 were allotted last year

and this year for the management of the business, including the compilation of illustrated price list and a considerable amount of advertising, while a recoverable advance of Rs. 5,000 was also made for the collection and purchase of reliable specimens and stock. The emporium has made an excellent start and has already been of considerable help to many of the minor industries. It was anticipated that several months would elapse before the representation of such industries might be regarded as comparatively complete, but with the assistance of more than 100 Indian gentlemen who are working as Honorary Trade Correspondents in the various districts, that stage has now been practically reached. An illustrated art catalogue has just been published and an effort will be made to secure wider markets. While the collection of representative goods from all parts of the province has been proceeding, the emporium has been opened to the public and the local sales have exceeded expectations. The interest taken by the public of Cawnpore and by visitors has been remarkable, and the fact that all the goods are warranted to be of standard quality and are marked with fixed prices has proved a considerable attraction. The results achieved are most promising and there is reasonable ground to believe that in the near future the goods represented in the emporium will begin to move out to new fields. Orders have already been filled for sample consignments to London and South Africa and a profit of some Rs. 700 was made for the period ending the 31st March, 1916.

The glass industry.

15. In their Revenue and Agriculture department, letter no. 1463/87—2, dated the 21st December, 1915, the Government of India sanctioned the grant to the new Firozabad Bangle-makers' Society of a loan of Rs. 2,000 from Government on condition that the remainder of the capital required, viz. Rs. 8,000, was raised from a district or central co-operative bank or by private philanthropic effort. The primary object of this society is to enable the local *shishgars* to avail themselves of the present unique opportunity for capturing the import trade in bangles, which amounted last year to £483,555 worth from Austria alone, and when the Hon'ble Raja Kushalpal Singh, Chairman of the Municipal Board of Firozabad, through whom the society is being supervised, was informed of the Government of India's orders, he intimated his willingness to guarantee the loan of the balance to the society from a district or central bank and orders were issued for the payment of the Government loan.

16. The Local Government has also been in correspondence with the Government of India regarding the grant of a loan of Rs. 20,000 on easy terms to a Mr. Ishwar Das Varshnei to assist him in establishing a glass working factory at Bijhoi in the Moradabad district. Mr. Varshnei has had considerable experience of this industry, having been lessee of the Talagaon Glass Works for seven years, while he has more recently taken over the Upper India Glass Works at Ambala. The Government of India have made certain enquiries about this proposal, which were considered at the last meeting of the Board of Industries of this province, held on the 14th September, 1916, and the Government of India will be further addressed.

APPENDIX I *(a)*.

Supplementary note on assistance to industries.

1. Mr. Rustomjee of Cawnpore reported that he was desirous of investing Rs. 15,000 to Rs. 20,000 in the establishment of a factory for making paints and varnishes, which would, he pointed out, be a new development for these provinces, and asked Government to help him with a grant or subsidy of Rs. 5,000. The application was placed before the Board of Industries, who recommended that Government should guarantee a profit of 8 per cent: per annum for the first three years upon the capital invested, subject to a total guarantee of Rs. 5,000. The Director of Industries was then asked what particular qualifications or experience Mr. Rustomjee had for running a factory of this type and whether he could give any estimate as to his prospects of commercial success; also whether it was a fact that he could put Rs. 15,000 or Rs. 20,000 into the business. The applicant has since asked the Director of Industries to suspend his application as he with others is now engaged in a larger scheme for which it is not anticipated any financial aid from Government will be sought, although it is probable that they will ask for technical assistance. Paragraph 17 *(a)* of preliminary note.

2. The Director of the Gorakhpur Training Factory, Limited, applied to Government for a loan of Rs. 7,500 at a reasonable rate of interest. The balance sheet of this company for the year ending the 30th June, 1915, showed that the total loss on the year's trading was Rs. 5,044. The company appear to have done scarcely any work during that year owing to want of working capital. If the shareholders would meet the calls on their shares this difficulty might be overcome, but they lack the confidence to do so. The factory is, however, said to be well equipped and the manager is reasonably qualified, while the Directors believe that a measure of financial assistance from Government would have the effect of restoring confidence. The factory is at present devoting special attention to

the production of varnished or "patent" leather, which was formerly imported mainly from Germany, and they are also prepared to take up the tanning of goat skins for export if they can obtain the necessary capital. The Director of Industries considers that a loan by Government or even a direct subsidy would be justified on the ground that the factory is undertaking pioneer work, and he was accordingly asked to obtain the views of the Board of Industries in the matter. At their meeting of the 14th September the Board resolved that Government be recommended to grant a loan of Rs. 5,000 to the company.

3. The Director of Industries has reported that the perfume manufacturers at Kanauj are prepared to combine to form a limited liability company with the capital of Rs. 30,000 and to put up a central model factory where spirit perfumes can be made and improvements shown in the methods of distilling essential oils. The main concessions asked for by the manufacturers are—

(i) the provision of rectified spirit free of duty,

(ii) a guarantee by Government of interest on the capital for the first five years.

These proposals were placed before the Board of Industries at their last meeting and in the meantime the Local Government has sanctioned the issue of 100 gallons of spirit duty-free to the Director of Industries for experimental purposes in connection with the perfume industry. The Board have asked for certain further information before making a definite recommendation.

4. A sum of Rs. 5,000 has been reserved in the current year for assistance to minor industries, such as pencil-making and button-making, and the Director of Industries has been asked to work out suitable schemes for the allotment of the money. He reports that so far no practicable proposal has been made to him by would-be manufacturers.

5. In order to assist village dyers to overcome the difficulties experienced by them owing to the shortage of dyestuffs in this country, Government recently sanctioned a recoverable advance of Rs. 10,000 for the purchase, at the late auction of dyestuffs *ex* SS. *Barenfels* at Calcutta, of a certain quantity of dyes on behalf of the Government Dyeing School at Cawnpore from where it was intended that they should subsequently be distributed to village consumers. Approximately half of this sum was utilized in the purchase of dyes at the auction, and the balance is being used in the purchase of other dyes from England.

6. The Director of Industries has been endeavouring to work out a scheme for financing, through the Bank of Bengal with the help of a Government guarantee, small deserving concerns which are intrinsically sound but in need of additional capital for new machinery or extended working expenses, and to which the presidency banks do not care to lend money, especially under present conditions, owing to the smallness of the amounts required and a bank's inability to gauge the actual position and prospects of the business or to watch or supervise its progress. The small banks are equally unwilling to assist as they expect higher returns than these concerns are likely to be able to afford The loan required would be from Rs. 10,000 to Rs. 50,000 in each case. Government would satisfy itself that prospects were favourable and the promoters honest, and the bank would then accept the security offered by the borrowers, which in the ordinary course would be quite sufficient to cover the loan, plus a Government guarantee of the amount of the loan. The Local Government would arrange to keep in touch with the undertaking and could at any moment call upon the bank to foreclose, if thought necessary, merely by withdrawing the Government guarantee. The points of the scheme are that no actual money is in ordinary cases needed from Government, that loans would only be given when the applicant could provide a total security exceeding the amount of the loan, and that advances would only be made when examination showed reasonable prospects of a commercial success. Finally, should loss result, it would be less than if Government had itself undertaken the experiment. Before working out the scheme in detail it was decided to obtain the views of the Government of India as to the chances of such suggestions being accepted by them, but when this was about to be done the Director of Industries asked that the matter might be deferred, as he had in view another means of financing these small enterprises. He had consulted one or two leading Indian gentlemen and was trying to form amongst them an Industrial Development Syndicate; they had assured him that they would carry the scheme through, but he found it difficult to induce them to make a start. The Director then tried to persuade a large firm of financiers in Calcutta to extend their operations to the United Provinces; he furnished the firm with some concrete proposals, but is doubtful whether loans of Rs. 20,000 to Rs. 50,000 each would be sufficient to attract them. They have since intimated that they did not care to handle the business. He also reported that another large firm was digesting a scheme which he had put before them for a syndicate dealing with the United Provinces only, but he did not think it would mature before the cold weather.

APPENDIX I *(b)*.

Paragraph 17 *(b)* of preliminary note.

In August, 1908, the Government of India were addressed with regard to a proposal to make advances for the encouragement of the weaving industry. It was explained that among other recommendations of the Industrial Conference of 1907, it was suggested that action should be taken for the improvement of this industry, and schools were started at Tanda, Moradabad and Saharanpur under the supervision of local committees. These schools, it was explained, were doing good work and pupils would shortly be passed out of them. When this occurred it would be essential for the success of the scheme that these students should be encouraged to set up looms in their own homes, but as the great majority were not in a position to do this without assistance, the Local Government therefore desired to make over to the school committees a small sum of money as a recoverable advance to be distributed by them as loans to the weavers. The amount required would not exceed Rs. 5,000 and the repayment of the money would be sufficiently secured as the looms given to the weavers would remain the property of the committees until the last instalment had been paid. As, however, the advances were of a novel character the sanction of the Government of India was asked and obtained to the proposal. Orders were then issued to the Director of Land Records and Agriculture placing a sum of Rs. 800; or approximately half the proposed amount, at the disposal of each of these school committees, and it was said that they should be encouraged to add as much from money raised in the district; that all sums intended for distribution as advances, whether obtained from Government or locally should be placed in a loan account which should be kept quite separate from the income and expenditure accounts of the schools; that instalments repaid might be used for further loans and Government would give further assistance if necessary at a later period on a consideration of the sums repaid and of further requirements; that interest at roughly 6¼ per cent. should be charged on these loans and the amount being added to the principal, the whole should be recovered in equal instalments—thus for a loom costing Rs. 30 the advance might be put at Rs. 32 and recovered in, say, 16 instalments; that agreements should be made with the recipients that the looms would remain the property of the committees until the last instalment had been paid and that they would be taken back on arrears accruing, with forfeiture of last payments. It was added that the loans however must not be given indiscriminately, as there were cases in which an advance was not necessary; for example, a landholder who had sent a student to a school might fairly be expected to provide a loom for him, and that in particular the committees should see that advances were given only to competent men, as it would be a bad object-lesson if the weavers provided with looms were unable to make them pay. Draft forms of accounts to be maintained at the schools were also approved. In March, 1909, the transfer of the weaving school at Saharanpur to Deoband was sanctioned and an advance of Rs. 500 was made to the new school for the grant of loans to passed pupils for the purchase of looms.

2. In August, 1913, the difficulty experienced by weavers on leaving the weaving schools in continuing their work owing to the high price of cotton yarn was brought to the notice of Government. It was reported that in the cases of the Shahjahanpur and Tanda weaving schools it was not necessary to supply cotton yarn as it could be purchased locally, that the Bara Banki and Deoband schools already supplied yarn to students, and that the Sandila Weavers' Co-operative Society had a yarn store attached to the credit branch which was working successfully. The Moradabad school was thus the only institution which had no facilities of its own but it desired to undertake the supply of yarn to passed students, and a non-recurring grant of Rs. 500 was accordingly sanctioned to the school in order to enable the school committee to lay in a stock of yarn for this purpose, the receipts supplying the necessary funds for the purchase of yarn for the following year. The committee were instructed to distribute the yarn at cost price and only to ex-students.

3. In January, 1915, non-recurring grants of Rs. 400 each were sanctioned for the weaving schools at Muzaffarnagar and Shahjahanpur to enable the school committees to stock yarn and spare parts of fly-shuttle looms for sale to ex-students. The committees were instructed to sell these articles at cost price, the receipts being credited to a special fund to provide for the purchase of further stocks.

4. In April, 1916, the Director of Industries of this province forwarded for the consideration of Government a scheme for the establishment of a central weaving supply stores for the benefit of the hand-loom weavers of the province. He stated that experience seemed to show that the extension of the use of the fly-shuttle hand-loom had been retarded to a marked degree by the difficulty experienced in obtaining accessories and renewals when required, and by the high prices charged for these when supplied; in certain cases, too, the renewals had been unsatisfactory, with the consequence that the fly-shuttle loom had been unjustly condemned. The need for a central supply store for the supply of fly-shuttle loom accessories was plain, and such a store would also be of great use to all weavers of the province, both throw-shuttle and fly-shuttle, if it also stocked and supplied yarn, for in many districts it had been found that excessive prices had been charged for

yarn, and even in the district-aided weaving schools attention had had to be drawn repeatedly to this feature. He therefore proposed that a central weaving supply stores should be opened at Benares in connection with the Government Central Weaving Institute, the object being to supply fly-shuttle sleys and accessories, the former of which it was proposed to have made by the Government Carpentry School at Bareilly, or under their direction and also to supply yarn primarily to all district-aided weaving schools and secondarily to all weavers either direct or through the weaving schools. One of the results of the establishment of the suggested stores would be, it was hoped, to bring the individual weavers into closer touch with the district-aided schools, and a second result should be the ensuring of yarn being made available to weavers at fair prices. The Director considered that developments of the scheme which might be reasonably looked for at a later stage were the provision of sized warps and the dyeing of yarn. Warps used by the village weavers were all at present hand sized resulting in very irregular sizing as the quantity to be put upon the warp could not be efficiently regulated; moreover, it was almost impracticable to size by this method warps of more than 50 yards in length while it cost scarcely any more for labour to make a warp 300 or 400 yards long with proper machinery. Experiments had been made on hand-looms with mill-sized warps and the result was most satisfactory. Mills had undertaken to supply sized ball warps prepared to any design, and these would be of great assistance to the village weaver, reducing his cost of production. The existence of the proposed stores would also almost certainly lead to the establishment of arrangements for dyeing yarn to order which would be a very desirable development. Dyeing in small lots which must be the practice when the individual weaver has to make his own arrangements for dyeing must necessarily involve a waste of dyes and chemicals, for the small dyer was unable to make full use of standing baths; neither was he able, generally speaking, to use his colours to the best advantage or to fix them properly upon the fibre, and the combined disadvantage resulted in the dyeing costing two or three times the amount it should have cost. It was proposed to utilize the services of the Government Dyeing School at Cawnpore in the earlier stages to meet the demand from the central supply store for dyed yarn; the linking-up of self-contained arrangements for dyeing would follow later. To start the scheme all that was required was a recoverable advance of Rs. 3,000; the running expenses would be trifling as the clerk in charge of the stores at the Central Weaving Institute would take charge of the accounts and the store would be under the supervision of the Principal of the Institute. On the other hand, the recurring grant of Rs. 3,000 which the Institute received for materials and spare parts might be reduced to Rs. 1,000 for the purchase of spare parts only, the woven productions of the Institute providing the funds for the purchase of materials from the supply store. The adoption of this system would be of benefit to the students as it would synchronise with the introduction of factory methods in the actual costing of the productions of the loom, and would necessitate the keeping of the accounts in such a manner that the margin of gross profit on the woven goods after paying for the cost of yarn could be seen at a glance. A very small percentage therefore would need to be added to the purchase prices of all yarn and loom accessories stocked in the central supply store to cover contingencies. The scheme was approved by Government and a recoverable advance of Rs. 3,000 was sanctioned for starting it.

APPENDIX II.

Possibilities of co-operative societies in connection with the organisation of Provincial industries.

Existing non-agricultural co-operative societies may be divided into credit and non-credit societies. Of the credit societies the few which have limited liability are of no importance from the industrial point of view, being mainly provident societies for the benefit of officials, such as clerks of offices and the staffs of the postal and telegraph departments. In one or two cases their object is the financing of distributive trade. The societies which have unlimited liability form the bulk of the credit societies. These number about 165 and are almost entirely situated in towns. They are for the most part of a mixed constitution and consist of petty traders and shop-keepers with no community of industrial or even commercial interest. There are, however, a certain number of these societies which rest on a basis of common industrial occupation. Thus, there are societies of cotton, silk and blanket weavers, of calico printers, of dyers, of tanners and shoe-makers, of butchers, of saltpetre-makers, of carpenters and durrie-makers and other similar industries. But these societies have in the great majority of cases confined themselves to the provision of cheaper credit and have not aimed at the improvement of the methods or conditions of the industry concerned. It is indeed a maxim of co-operative practice that the organization for distribution and production should be distinct from the credit society which cannot properly undertake business of a semi-speculative nature. These credit societies have undoubtedly done good work in the direction of emancipating the artisan from his economic servitude to the middleman and money-lender, often combined in the same person, who is sometimes also the purveyor of the artisan's raw material. But this class of society has shown little progress in the last two or three years. It has proved very difficult to infuse a co-operative spirit or impart co-operative instruction. The members have often no strong communal bond; it is difficult to get them to attend general meetings or to hold regular committee meetings. Enquiries in open committee regarding the utilization of loans are apt to be resented from a fear that trade secrets will be disclosed to competitors. Moreover, we have not yet succeeded in evolving a satisfactory system for the fixation of repayment instalments. A member may take a loan and improve his business: the money has been absorbed in his working capital and he cannot repay in a short time, though he has made an excellent use of the money. The society moreover is afraid to tie up its money for a lengthy period—more specially as it has no effective means of ascertaining whether the capital has been laid out wisely or has been wasted. It is, therefore, afraid to grant renewals and has to class as arrears sums which an industrial bank in touch with its constituents would not class as such. The society has also far less permanency than the agricultural society. In artisan or trading communities the individual is far more migratory, and it is not unusual for a heavily indebted artisan or small trader to decamp in order to seek his fortunes elsewhere, leaving no trace behind him. His example is sometimes followed by others and the society collapses. These are the general difficulties which beset the development of urban credit co-operation for the small artisan and trader, and they have naturally been accentuated by the War. It is hardly necessary in this note to point out that the continued slackness in trade, the high prices of food, of raw material and often of the implements of the artisan's craft have combined to depress the smaller and unorganized industries to the point, in some cases, of ruin. The fabulous prices of dyes have paralysed the calico printing and dyeing trades and have affected the weaver of all classes of fabric severely. Generally speaking, our experience with this class of credit society would appear to indicate that the prospects of successful development are faint—in the case of societies organized on a basis of a common craft—unless the craft itself can be organized on co-operative lines and a corporate craft spirit and interest be thus called into being.

Of non credit societies there are only at present two of industrial importance: the Bareilly carpenters' workshop and the Sandila yarn store. The former is a society for manufacture and sale whose members consist of the local journeymen carpenters, and the latter is a separate sale society organized to provide the Sandila weaver with good and cheap yarn for cash at as low prices as possible. Both these societies will be dealt with later in detail.

During the last two or three years the energies of the co-operative department have been mainly concentrated on the organization of agricultural societies to the comparative neglect of industrial possibilities. There has consequently been no systematic survey from the co-operative point of view of such possibilities and the information available, save in respect of existing experiments, is scanty. The concentration on the agricultural side of co-operation has been deliberate and inevitable. The central financing institutions found that the non-agricultural society gave unsatisfactory financial results with a maximum of attention and risk. The village agricultural society was far more successful and satisfactory to deal with, while it required far less detailed supervision. The need of cheaper agricultural credit was acute and the field practically inexhaustible; indeed the fringe only has yet been touched. The small Government staff has had more than it could do to keep abreast of the development of agricultural co-operation, and has therefore not been in a position to supply the lacuna, indeed from the co-operative point of view we got better and more important results for the supervision available from the village agricultural society.

Mr. Chatterjee, who was till recently Registrar of Co-operative Societies, published in 1908 a survey of the industries of the United Provinces which in almost all instances suggests the part which co-operation might play in the development of the industries he describes. Except that these notes are in some instances somewhat out of date there is little that I can add, save where we have had actual experience with the working of co-operative societies in connection with the industries in question. There is little doubt that there is hardly any industry which would not gain by the introduction of co-operation in some form among its workers, because co-operation, even, if it be only in the shape of co-operation for credit, usually leads to combination for more purely industrial purposes, and because such combination by raising the standard of comfort and life for the worker will improve the standard of production from the point of view of the industry. A high standard can hardly be expected from an artisan, specially if his be an artistic craft, whom the condition of his trade keep at the bare level of subsistence. I append some notes on the industrial societies in connection with which there is already some co-operative organization, suggesting developments where possible.

In Allahabad the non-agricultural societies are almost all of the type where it is difficult to see how the industries and trades concerned can be helped by co-operative methods otherwise than by the provision of credit—which they are already getting.

* In Benares there are six silk weavers' societies, three tanners' and shoe-makers' societies, two durrie-makers' societies and societies for furniture-makers, *khaskhas* tatti makers, and saltpetre manufacturers. These societies all started well, but most of them have deteriorated and some of them have almost failed. A considerable number of the silk weavers have sought the shelter of the Insolvency Act and most of their societies are in an unsatisfactory

condition, though two or three of them may survive. Two of the tanners' and shoe-makers' societies and the two durrie societies are still doing fairly well.

A full account of the silk weaving industry of Benares and its allied trades—gold and silver wire, *kalabatun*, etc. will be found in Mr. Chatterjee's notes. The weavers are at present entirely in the hands of the middlemen who supply them with silk and their other materials and sell the finished articles to wholesale dealers. Co-operation has done nothing so far, but lend them money. The middleman regulates the price of their raw materials and of their finished products and has exploited them to such an extent that improvement in workmanship or enterprise in design cannot be looked for under present conditions. The main ways in which they could be assisted co-operatively is by the creation of a co-operative store for the supply of their raw materials at fair prices and by a marketing association to get into touch with the purchasing public. Under present conditions such developments would not be easy, because of the slackness of the market for the silk fabrics, specially the more elaborate and costly of them, and because of the failure of the silk weavers' association which is still in process of liquidation.

The tanners societies' chief need is improvement in tanning methods. Efforts have been made to induce the members of these societies to send some of their youths to the tanning school, but have not proved successful. The defects in tanning methods are described on page 103 of Mr. Chatterjee's notes. The shoe-makers' societies might also be benefited by co operative organization for sale. This might also be applied to the saltpetre societies. The carpet-makers' chief need is improvement in dyeing methods and much could be done by co-operative organization for the supply of dyes of a better quality and lower price, and for the similar supply of yarn on the Sandila yarn store model. The activities of the peripatetic dyeing school may also improve matters.

All these artisans are of a remarkably conservative caste and nothing short of unmistakeable ocular demonstration convinces them of the expensiveness and inferiority of their hereditary methods.

I have indicated the co-operative methods by which they might improve their production and its return—but it, by no means, follows that the methods indicated are immediately practicable. These societies were organized for credit in the hope that the lesson of combination on these simple lines might lead to co-operative developments in their actual industries. This hope has not been fulfilled and a natural doubt arises whether, if they cannot attain the comparatively rudimentary forms of combination demanded by a credit society, they can be expected to succeed in the more complicated and speculative types of organization required for productive and distributive co-operation. The causes of their failure to make greater progress are, however, to a great extent, external, and it is quite possible that some of the developments suggested should be successful with adequate propaganda and supervision and with some measure of State encouragement in the initial stages.

Cotton weaving at Tanda.

In Mr. Chatterjee's note will be found a detailed description of the Tanda weaving industry. The population of the town consists almost entirely of these weavers, dyers, and cloth printers. Since that description was written all these trades have been considerably depressed. Tanda exports cotton cloths to the Nepal Tarai, Basti, Gorakhpur, Bahraich and some other parts of Oudh. Manufacture of *jamdani* (a costly cotton cloth of fine fabric) still continues, but the demand has fallen still further. *Dhoties, saries*, striped and checked cloths, towels, dusters and bedsheets are also manufactured, besides a large industry in *pagries, dhoties* and *saries*. Towels, dusters and bedsheets are at present mainly sold in the Fyzabad district. The demand for these articles is increasing and the Tanda article is very cheap and good value for the money, and there is little doubt that with proper sale organization these articles would command a large market. Here again the weavers are very conservative as a class and notwithstanding the weaving school which has been there established, there has been little success in the introduction of modern methods of weaving and improved looms. They are entirely out of touch with the outside cloth market and their poverty has subjected them to the money-lender. The system is largely one of master weavers who employ journeymen weavers on small pay. The *julaha* of Tanda is a somewhat narrow-minded Muhammadan and dislikes sending his children to a school which is attended by members of other communities.

The obvious directions in which improvements are to be looked for were: firstly: cheap credit; secondly, the introduction of improved looms and methods of weaving, with constant demonstration of their superiority; thirdly, organization for marketing which should bring the weaver into contact with his customers and their changing tastes and with the conditions of the outside cloth market; fourthly, the improvement of primary education and attempts to induce the bigger men among the weavers to send their sons to be trained in the larger weaving mills of India—and as a corollary to the last the establishment of small factories.

As regards cheap credit considerable success has been attained in the establishment of co-operative credit societies among the weavers. There are now twenty such societies, but they do not reach more than a small proportion of the weaving population. The Tanda weaver has been in an extremely depressed condition during the last two years, and there has been much distress and a certain amount of migration, but repayments in these societies have in the circumstances been surprisingly good and the societies have undoubtedly kept a good many men's head above water. The bulk of their number are, however, improvident people who prefer the long suffering patience of the *mahajan* to the punctual repayment required by a co-operative society notwithstanding the inevitable prospect of ruin under the usurious rates of interest which the former ultimately exacts.

As regards the introduction of improved looms and methods—a weaving school is in existence in Tanda and some of the weavers' sons are being taught to work the fly-shuttle and other improved looms; but though some success has been achieved in this direction no great impression has been made on the general body of weavers.

It is not my province to suggest improvements in the methods adopted in this connection, but perhaps something might be done by holding more frequent demonstrations and competitions between the new and old looms, and by giving prizes for such competitions: possibly some public-spirited gentlemen might be induced to present these looms to selected weavers. Some of the members of the societies use the improved looms and are turning out good work, but their use is not yet general.

Organization for sale, etc.—The ordinary weaver is entirely out of touch with the outside cloth market. He usually disposes of his cloth as soon as it is finished in a hurry to a local cloth merchant or middleman. The bulk of the profit goes to these dealers and the producer is too depressed to exhibit enterprise or spirit. A co-operative sale organization might do much to improve the manufacture.

The most obvious step in this direction would seem to be the establishment of a specially Muhammadan school for the *julaha* weaver. This might ultimately lead to the young weaver going out into the world to learn the methods of the larger industrial centres. Such men would be capable of starting a small factory, specially as the local weaving school could lend them technical aid. Perhaps the most immediately practical step would be the establishment of a co-operative yarn store. At present the weaver has great difficulty in obtaining decent yarn at a fair price. He very often has to obtain it as a loan and the price is regulated accordingly—which absorbs almost the whole margin of profit. Even where he is a member of a co-operative society and can borrow on fair terms the difficulty of securing good yarn still remains.

In Sandila a yarn store of this type has been successfully organized in connection with the weavers' credit society and provided competent management is obtainable it should be equally successful in Tanda. The central bank's manager is a capable man and might be able to manage such a store.

The other centre in this province where co-operation has been applied to the weaving industry is Sandila in the Hardoi district. Here again we are faced by declining prosperity and much depression among the weaver community. Many of them have deserted their craft and become domestic servants and Munshi Kabul Ahmad, the manager of Sandila central bank, says that the weaver is now generally no better off than the ordinary labourer; in some cases rather worse off. The Sandila weaver is as prejudiced and conservative as the Tanda weaver in his attitude towards improved implements and he is, not unnaturally, so unenterprising that he prefers a small fixed wage to piece work even when the latter offers prospects of much more profit.

Sandila has a population of over 1,000 hand-loom weavers and the industry manufactures rough cloth for the surrounding countryside. Their chief needs were clearly cheaper capital and good raw material at better prices. In 1909 a co-operative society was started. As the weavers lived in scattered quarters of the town, the society was based on limited liability unlike Tanda where the small and numerous societies are of the ordinary unlimited urban type. The society has two branches financially quite distinct. One is a credit society and the other is a yarn store supplying members for cash. The combined society's membership rose from 92 in 1909 to 255 in 1913-14. Since then there has been a slight decline in membership. It has a working capital of Rs. 21,500, the reserve fund is above Rs. 5,000 and in the past year it made Rs. 2,000 in profits. The yarn store sold about Rs. 55,000 worth of yarn to its members during the past year. It lends money at the usual agricultural rate 15 per cent. The society has a small loan from Government of Rs. 3,000 at 5 per cent. payable by instalments. The yarn store sells to non-members as well as members but eventually will, it is intended, confine its sale to members. The society has, I think, done real good to its members. The manager, Khan Saheb Munshi Kabul Ahmad, is now visiting the larger commerical centres with a view to arranging for the supply of yarn at bottom wholesale prices and eliminating the middle man.

The schemes which may be suggested for the improvement of the industry on co-operative lines are: firstly, an association for the joint sale and purchase of finished cloth. It is also suggested that a shed might be erected which might be used in the morning by the members of the society for warping and sizing and in the evening as a market for the sale of the finished product; secondly, a further development might be a hand-loom factory managed by the same co-operative society.

As regards the first suggestion the need of such an organization has already been suggested in connection with Tanda. The society would get into touch with its market and supply patterns to the members. The cloth manufactured according to the patterns would be purchased by the society which would sell cloth in the open market and distribute bonus to its members in proportion to its purchases from them. Munshi Kabul Ahmad thinks that the profits would be large enough to cover the business risk, and that the scheme would aid introduction of the improved loom. The scheme would require an expert valuer who might be nominated by the financing agent and would sit on the committee which purchases from the members.

As regards the shed proposal the society would fix a rate for the use of the shed by its members. The combined market would enable members to sell their cloth at better prices, would give purchasers a better selection and would raise the standard of workmanship by competition.

A hand-loom factory.—It is suggested that, should the first scheme be found to work, a hand-loom factory might be established by the society. Its objects would be to demonstrate the use of improved machinery and employ its members who are of the journeymen type, to improve the quality of manufacture and to collectively purchase and use looms and other machinery which are beyond the means of individual members. Members only would be employed, approved patterns manufactured and time saving appliances would be used. Labour saving machines might be hired out to members and looms of different types used nd possibly hired out. The factory might ultimately develope into a power loom factora.

As regards the first part of the scheme no help will be required from the Government but a grant-in-aid for the erection of the shed described would be very helpful.

As regards the second part of the scheme considerable capital would be required for the equipment and building of the factory. The assistance of Government in the shape of a loan for equipment and possibly a grant for, or towards, the building would be necessary.

I have in these notes ignored the question as to whether the hand-loom industry is doomed to extinction before the progress of the power loom. There appears to be good authority for doubting whether its disappearance is inevitable and in the meanwhile there would seem reason to endeavour to make conditions as tolerable as possible to the weaver during the period of transition. There is also the possibility that by fostering the hand weaving trade we may lead up to the establishment of a system of small factories which might bridge the way to the extension of the power-loom industry in a less centralized form.

In another co-operative centre, Jahangirabad in the Bulandshahr district, there is an interesting industry—calico printing. The work is good and used to command an extended market. There are about 125 workmen printers mainly employed by small firms. The patterns are imprinted from wooden blocks prepared by the local carpenters. Both coarse cloth and finer fabrics are used for this printing, some of the cloths being locally manufactured. The printing, carpentering and weaving industries are thus to some extent interdependent. The methods of manufacture are described in Mr. Chatterjee's notes. The main articles manufactured are bed covers, curtains, floor and ceiling cloths, *toshaks*, *lihafs*, handkerchiefs, etc. In craft some of the designs are very good. The industry has been hard hit by the war, and it is at present in a state of practical stagnation. Many of the chipis are out of employment. This is mainly due to the enormous rise in colouring material, *al* and *majith* which used to be procurable at Rs. 4 and Rs. 7 a maund are now hardly to be bought for Rs. 40 a maund. Moreover the demand for the more elaborate fabrics has naturally fallen off. In Mr. Chatterjee's note on page 74 are given the lines of possible development for this industry. Co-operative association may perhaps play a part in bringing the producer into more direct touch with consumer; but the industry would first have to be revived. There is little prospect at present of introducing co-operative production. Here again there is a good field for the Peripatetic Dyeing school from Cawnpore. In the immediate future the industry might be helped by co-operative methods in the following ways:—

(1) By organising a co-operative credit society for the artisans. This would probably have to be on a limited liability basis in view of local conditions. Large capital would be required and should reach the individual members at a rate not exceeding 12 per cent. and, if possible, at 10 per cent.

(2) By organising a co-operative purchase and sale association. I think both these projects are feasible with some financial help from the Government. This might be given partly as a subsidy and partly in the form of cheap capital.

The Furniture Industry in Bareilly.

Bareilly is an important furniture manufacturing centre. There is a large number of carpenters in the town, but practically none manage their own business or have any command of capital. The industry is therefore in the hands of local capitalists who are not themselves carpenters. The craftsmen work under a contract system by which they are given advances by the *entrepreneur* and in turn supply ready-made articles or work as ourneymen on terms imposed by the employer. The furniture firms use the provision of Act XII of 1859 (the Breach of Contract Act) in order to keep control over their workers. The conditions under which the carpenters work are distinctly oppressing and depressing and the profits are almost entirely absorbed by the middlemen. The system of advances is demoralising both to the employer and the employé. The former is tempted to sweat his workman and the latter to cheat his employer.

The standard of work turned out is accordingly stationary or on the down grade, since the workman who cannot emerge from the margin of subsistence is naturally slipshod, clumsy and unenterprising in his craft. With these conditions in view a carpenters' society called the co-operative furniture workshop, was registered in April, 1913. The Principal of the Government Carpentry school at Bareilly is one of the co-opted directors of the workshop and much is looked for from his advice on technical methods and suggestions for better and more artistic designs. The society does a small loan business, but is only subsidiarily a credit society. It was early realized that it was not cheap credit that the carpenters chiefly needed so much as improved conditions under which to work. Thus, the primary object of the society is joint production and sale with a view to enabling the carpenter to earn the profits of his work and to improve his status by emancipating him from his economic dependence. It was felt that when the carpenter became his own master the standard of his outturn would materially improve. It was also hoped that the society would bring the industry into practical contract with the carpentry school. The workshop is financed by the District Co-operative Bank at 9 per cent. At the end of last year this loan amounted to Rs. 28,500, while the society had a share capital of Rs. 1,260. A large proportion of this capital is sunk in the building and in stock, both finished articles and raw material.

There is no system of advances; members are paid daily wages for piece work. Raw materials are purchased by the society and stocked in its building. The finished article is sold to the public by the society at prices fixed by the directors. Furniture is made to order and specification, but there is also a considerable outturn of standard lines of cheap furniture which is stocked on the premises. One of the chief difficulties in the society's working is the marketing problem. With all its members working daily on the premises the production is difficult to regulate with the demand, and there is apt to be an accumulation of stock. Non-co-operative firms can adjust the number of their employés to the volume of orders coming in. The management costs are also necessarily heavier than in the ordinary furniture firm. Thus, the workshop has to keep a manager, an assistant manager (who is a carpenter foreman), an accountant, a stock-keeper and a few coolies. The establishment and contingencies alone amount to about Rs. 2,000 yearly. Profits are therefore smaller than those earned by the capitalist firms which impose terms on its employés more favourable to itself. Last year the society's profits only amounted to Rs. 571, but it paid 10 per cent. on its shares and 6¼ per cent. bonus on the wages earned by the members. It has not been able to make much provision for bad debts or for depreciation of a large accumulated stock of finished goods. It is not of course necessary that the society should make a large profit so long as it enables its members to earn good money, but provisions for these purposes are required. I do not think that co-operation can help the furniture industry in Bareilly by more effectual methods than it is at present doing.

One concession is suggested by the honorary manager of the Bareilly Bank which may commend itself to the Government, and this is the supply of wood from the Government forests at rates slightly cheaper than those paid by the contractors. This would of course mean unfair competition with the local furniture trade but in view of the handicap imposed by local conditions on a co-operatively managed furniture industry the concession would do little more than enable the workshop to compete on equal terms. The workshop consumes only 3,000 cubic feet of timber a year, so the financial sacrifice involved would be small.

Since, as has been above suggested, the only prospect of raising the standard of craftmanship—at present very low—in the industry seems to be to enable the worker to attain some independence and earn a decent return on his labour, the concession may be justifiable. It is also possible that Government might consider the question of assisting the society in the matter of capital it has had to sink in its land and building, the interest on

which naturally absorbs a large proportion of its profits. The capital so sunk amounts to about Rs. 8,000.

There is a society of blanket weavers at Najibabad which has lately much improved its position owing to the exceptional demand for its products. This society purchased a carding machine which has, however, been allowed to get out of order. The provision of credit has here produced promising results. I am shortly visiting Najibabad and will ascertain what developments are possible.

R. W. D. WILLOUGHBY,
Registrar, Co-operative Societies,
United Provinces.

APPENDIX III.

Paragraph 19(c) of preliminary note.

As far as my experience enables me to form an opinion on the relative merits o conducting researches in India and England, I am in favour of conducting researches in India as far as possible, provided that duly qualified men are available and that adequate provision of apparatus and materials for research work can be made.

It does not seem to me that there is any insuperable difficulty in complying with these two conditions but it is essential that they should be established. They will no doubt mean increased expenditure yet in the long run such expenditure is likely to be well repaid by the improvement of existing arts and manufactures and the stimulus that will be given to private research and the eventual creation of an artizan population.

My reasons for advocating the carrying out of research work in India are briefly as follows:—

(1) Methods should be adapted to the countries in which they are to be used. The evolution of such methods would best be accomplished by men able to acquaint themselves at first hand with the environment and conditions prevailing in the selected sphere of action.

Example. Failure.—The Imperial Institute some years ago endeavoured to devise a new method of extracting the alkaloids of opium by means of toluene.

The agent selected, toluene, was unsuitable for use in the hot climate of the Gangetic plains. The method had to be abandoned as the toluene was extremely disagreeable and to some extent injurious to work with on a large scale. There were other defects which might have been overcome in time.

Example. Success.—The Pencil Factory, Russa Road, Calcutta, was suffering under a severe handicap as it could only obtain a certain kind of clay required for some of its processes by import from Europe. Research in India resulted in the discovery of a suitable clay in the country. This enabled the factory to continue its work.

(2) The climatic conditions of the plains of India where most of the big industries and arts will have to be carried on are so different to those of Europe that even methods of analysis require modification when used here. Methods devised in cold or temperate climates are often unsuited in some detail to this climate. Hence it would be best to carry out research work here.

Example.—The purification of morphine. This had long been a problem to the opium factory. A machine which may briefly be described as a digester was obtained from England but it was designed to be used with benzol. Benzol of the right kind was and is not obtainable in India nor can it be procured from England as its export is prohibited.

Experimental work at the factory resulted in the discovery that alcohol could efficiently be substituted for benzol. This was done with good results. Alcohol is better suited to the Indian climate where the use of benzol is attended with some risk. The use of alcohol in preference to benzol would not have struck a man not working in India.

(3) The creation of research laboratories in India would in time create among the Indian people that regard for the study of natural science and chemistry so useful in promoting arts and manufactures, which I think a long residence among them compels me to say is at present noticeable by its rarity.

(4) The benefit to agriculturists who might require an analysis of the soil of their holdings or of advice in respect to manures or of manufacturers who wished a speedy analysis for some process connected with their work, would be great.

In my opinion there would be considerably more benefit derived than accrues now, by having a research institution in close touch with the people for whom it is working, and I am for this and the other reasons given above in favour of research work being done in India.

Such institutions should be affiliated with institutions in England so as to admit of mutual assistance.

G. A. LEVETT-YEATS,
Opium Factory Superintendent.

APPENDIX IV.

Paragraph 16(d) of preliminary note.

The Lucknow Provincial Museum was established with the object of collecting specimens of art and manufactures of Oudh (and of India generally), and was used as an exhibition of agricultural implements and machinery and of specimens of local arts, etc. Its development in this direction was hastened by the orders of the Government of India, and it was definitely laid down that the main object of the museum was the exhibition of specimens of industrial arts of the province. An agency for the sale of art productions to the public was also opened with a view to make indigenous industries known to Europeans and others and to encourage provincial art industries. It was closed in 1891 as some of the customers did not pay for what they had bought. Subsequently the artware dépôt was reopened in October 1897 and showed a good record of work on the whole. The progressive growth of the museum in its various sections and the consequent strain on the working staff, however, constrained the committee of management to reflect whether they were justified in maintaining the dépôt at the public expense for the benefit of private manufacturers, and they decided to abolish it. This was done in 1909-10. The collection of specimens wad transferred to the School of Arts and Crafts (when it was opened) and otherwise disposes of in accordance with the orders of this Government.

APPENDIX V.

Paragraph 16(f) of preliminary note.

As far as can be judged from the cases which have come to the notice of the Local Government, the existing Land Acquisition Act goes far enough as regards compulsory acquisition for industrial purposes of the surface land in any area, but as will be explained by the Director of Land Records and Agriculture there is a body of opinion in favour of permitting the use of the Land Acquisition Act for the purpose of acquiring land for factories which, in the opinion of the Local Government, will benefit the neighbourhood. The case, however, is different with regard to powers of acquisition for the purpose of working minerals. The facts and the legal position in this province are that in permanently settled districts Government apparently neither owns nor has any right to work mines or minerals; while although in temporarily settled districts, and in the case of waste-lands other than areas which have been specifically granted by Government under *sanad*, Government has retained the ownership of minerals and mines, the fact of being the owner does not give Government the right to work such mines or minerals so as to disturb the surface, unless it has specifically reserved to itself such right. The question of the rights of Government in the lands of grantees depends upon the terms of their *sanads*; but in such cases the fact of Government having failed to reserve expressly to itself the right to mines or minerals in any land does not mean that Government has given up its title to such minerals if it existed before, as such title can only be transferred by express terms or by words comprehensive enough to include minerals; at the same time it is improbable that in any *sanad* where the ownership of mines or minerals is retained by Government any right to work them to the disturbance of the surface is reserved.

In respect therefore of permanently settled estates and granted lands (where Government has expressly or impliedly parted with the ownership of mines or minerals) nothing can apparently be done, unless legislation is undertaken to secure to Government the power of acquiring compulsorily the right to trespass and otherwise interfere with the surface in order to find out whether there are minerals, and a further power to acquire the minerals and the right to work them without acquiring in addition full surface rights; while in the case of temporarily settled lands, waste-lands and granted lands (where Government owns the minerals, but has no right to trespass or disturb surface for working them), the defective powers of Government in this respect could only be remedied by legislation conferring power to exercise such right subject to the payment of compensation. Legislation conferring these powers should also confer on Government the right to delegate its powers. In order to complete Government's prospecting and excavating powers in regard to all minerals, legislation would also be required in the case of Kumaun waste-lands where Government may work minerals if it pays compensation, to provide for the assessment of compensation by a revenue officer, subject to right of appeal to the civil court.

APPENDIX VI.

Question of placing co-operative societies on the same footing as companies defined in section 3(e) of Act I of 1894, with a view to help the societies in the acquisition of land which may be required by them.

With the foundation of central and district banks difficulty has begun to be experienced in these provinces in securing sites for buildings and the problem is likely in the near future to grow acute with the appreciation in the value of land in large towns and the rapid development in the scope of co-operative enterprise. So far only one specific case has arisen in which Government has been asked to apply the provision of the Land Acquisition Act. This was an application for land for an office for the district co-operative bank at Mainpuri and for a seed dépôt in the same district.

2. As a result of the consideration of this case Government decided to suggest to the Government of India that co-operative societies registered under the Co-operative Societies Act, 1912, should be included in the definition of the word "company" in section 3(*e*) of the Land Acquisition Act, 1894, so as to enable land to be acquired for such societies where necessary under the latter Act. The Lieutenant-Governor thought that it could not have been the intention of the legislature to deny to societies registered under the Co-operative Societies Act privileges specially enjoyed by other companies in the matter of land acquisition. This matter had been overlooked since in practice no inconvenience had arisen in the stage of development which co-operative societies had reached. The position has now changed with the fuller development of the activities of these societies and their need for suitable accommodation. The privilege is not likely to be abused as the law already demands searching enquiry before land can be acquired for a company, and the activities of co-operative societies are such that they are in all cases likely to prove useful to the public. These societies are in no sense close corporations.

3. The Government of India have not as yet sent a final reply to this Government's proposal, but they are inclined to take the view that such an extension of the scope of the Act is not desirable on broad grounds. Any acquisition by a co-operative society would necessarily be for the immediate benefit of the members and only indirectly to the public advantage.

4. The matter is still under consideration.

APPENDIX VII.

Paragraph 19(*a*) of preliminary note.

Introductory.—In 1891 a Committee was appointed by Sir Auckland Colvin, the then Lieutenant-Governor, to examine the question of technical education in the province.

The Committee recommended, *inter alia* :—

(i) the establishment of a technological school of art at Lucknow, with industrial art workshops as in Madras;

(ii) the establishment of industrial schools at Roorkee and Lucknow or Allahabad.

The first suggestion was dropped as art schools came under a cloud at that time. But the establishment of an industrial school at Lucknow was sanctioned in July 1892 at an annual cost of Rs. 4,544; it was opened by Sir Auckland Colvin on the 1st of November, 1892. The history of this institution up till 1907 is a record of "inconstant purpose with breaks of unconcern." The Committee of 1891 intended it to train the children of artisans (especially artisans in railway workshops) in reading, writing, arithmetic, elementary mechanics, physics and drawing, in strict subordination to manual training in a workshop under skilled instructors. This object was ignored. No workshop was erected; no machinery was ordered; no skilled instructor was appointed; no effort was made to link the institution to the railway workshops. In 1896 the guiding idea of the school was declared to be preparation for the Thomason College; although classes for dyeing and glass-blowing were retained. Changes in the curriculum became almost seasonal. After ten years a competent headmaster was imported from England. Four classes were started: (1) an industrial class; (2) a class preparatory for the mechanical apprentice class at Roorkee; (3) an apprentice class in the bazar on the lines of the Casa Nova School at Naples; and (4) a night school. The two last failed *ab initio*: the first emptied when literary education was withdrawn. A further reorganization then took place. Some machinery was erected, and manual training was added to primary education of a non-literary character. Early in 1907 it was decided to attempt to connect the school more closely with the railway workshops; and so after fifteen years' vacillating effort the school arrived at a prospect of fulfilling the function for which it was originally designed. It became in fact a manual training primary school of a modern type, filled with machine tools; and thus ceased to be an industrial school, though it met a distinct want.

2. The Lucknow school was the only Government technical institution in existence (besides the Thommason Engineering College, Roorkee) at the time when Sir John Hewett assumed charge of the province; and with a view to translating the subject of technical and industrial education from the atmosphere of theory to the region of practice, he called together in August 1907 an Industrial Conference at Naini Tal to make a comprehensive survey of the whole situation and to submit definite recommendations. The proposals of the Conference which applied more directly to technical and industrial education were for the establishment, among others, of the following :—

(1) two industrial schools on the lines of the Lucknow school which was itself to be enlarged;

2) a school of design;

(3) an experimental weaving station;

(4) a carpentry school;

(5) a leather school.

3. *Technical schools, Lucknow and Gorakhpur.*—

(a) Technical School, Lucknow.—As stated above the Conference recommended the improvement of the Lucknow Industrial School and the establishment of similar schools at Cawnpore and Gorakhpur, and subsequently elsewhere. The Lucknow school after passing through many stages was thoroughly reorganized. The numbers were reduced and it then contained only genuine industrial students. The staff of the school was strengthened both on the literary and industrial sides, and the equipment was greatly increased. A hostel was added and stipends were provided for relatives of artisans. A night class was also attached to the school. Many of the students attending this class are workers and in response to their demand the workshops are now thrown open at night in order that they may study modern machinery in operation. A class for painting and polishing has also been started, and is attended solely by the relatives of painters. The work of the school was further expanded in 1913 by the transfer of the motor drivers' class from the Thomason College, Roorkee. On the recommendation of the Advisory Committee the name of the school was changed from Government Industrial School to Government Technical School, as the former name was opened to some misconception. The report for the year ending March 1914, says that the total number of students in the school was 85, of whom 28 were in the mechanical section, 28 in the junior section, 15 in the artisan class, 5 in the painting and polishing class and 9 in the automobile driver class. Of the 85 students, 47 were scholarship-holders and 22 boarders. The first batch of passed students from the mechanics class obtained suitable posts through the assistance given by the Upper India Chamber of Commerce.

There was, however, a slight fall in the number of pupils in the following year. Four students completed their training in the mechanics section, and eight others who passed through their course of training were found apprenticeships. Nine students of the automobile driver class also completed their training, of whom three secured appointments. In November, 1914, the mechanical apprentice class was transferred from Roorkee, and in addition a new class for oil-engine drivers was formed to which admissions were made on the 2nd August, 1915; both these classes have considerably added to the work and responsibilities of the school and have thus extended its activities. The number of students on the rolls on the 31st March, 1916, aggregated 111. Four students completed their training in the mechanics section and were apprenticed to the Locomotive department of the Oudh and Rohilkhand Railway, where all are reported to be working satisfactorily. Nine students completed their training in the automobile driver class, and satisfactory reports upon seven of them have also been received from their respective employers. Two students passed out from the artisan section and are now employed in the Mission Industrial School, Gorakhpur.

4*(b) Technical School, Gorakhpur.*—Of the two new industrial schools proposed by the Conference of 1907 only that of Gorakhpur has been started. It opened in 1910 on lines similar to those of the Lucknow school, and made an excellent commencement. The name of this school was also afterwards changed from industrial to technical school. There were 70 students on the rolls during 1913-14, of whom 27 were in the mechanics class, 32 in the junior class and 11 in the artisan class; 41 were scholarship-holders. The first students of the mechanics class to complete the course passed out and obtained apprenticeships. These students were reported in the succeeding year to be doing well.

On the 31st March, 1916, the number of students was 78; 16 students passed out, and it is estimated that 10 more will shortly pass. During the year 1915-16 a considerable amount of work has been done by the school for the Public Works Department, notably the construction of a screw pile bridge of 63 feet span. Two roof trusses of 33 feet span were also constructed for the new post office at Azamgarh.

5. Great importance is attached to the maintenance of close communication between the two technical schools and the actual employers of labour. The Principals keep in touch with the leaders in the chief industrial centres. The schools are doing good work and continue to expand on the lines previously laid down for them; their discipline and tone have been very satisfactory, while the Gorakhpur school has also extended its activities in close co-operation with the authorities of the Bengal and North-Western Railway. Both schools have established a working connection with local industries, and facilities are now available for turning out workmen equipped not only with better ability to perform ordinary tasks, but with a training which should enable them to rise to higher positions in their trades.

6. *School of Arts and Crafts, Lucknow.*—Another recommendation of the Conference was the establishment of a school originally designated the School of Design. This is called the School of Arts and Crafts and was opened at Lucknow in 1911. A good start was made, and a hostel has been provided for students coming from a distance. The subjects taught are ornamental work, wood carving and gilding, stone carving and sculpture, stencilling, iron work, drawing, painting, designing and modelling. The institution is intended to provide instruction in those branches of design and handicraft which bear on the more artistic trades and professions now practised or which may be developed in the province. It attracted a large number of scholars at the beginning of the session 1912-13, and the number of pupils on 1st March, 1913, was 74, of whom 56 were receiving scholarships. These increased to 112 students in March, 1914. Lithography and art printing were added during that year to the list of subjects already included. As an experimental measure evening classes have been started. The number of pupils is steadily increasing: in May 1915 there were 118 with an average daily attendance of 110, but by the end of August 1915 the total rose to 139. The recruitment of boys directly belonging to the trades of silver-workers, blacksmiths and wood-workers is still unduly small, and at present only goldsmiths are eager to join the school. As the school is only in its fourth session none of the students have yet completed the full five years' course, but five students have received special training and have gone out into employment. One is employed as drawing and design master at the Central Weaving Institute, Benares, one as a drawing master of the High School, Pilibhit, and one as a draftsman to a firm of civil engineers, while two are employed as teachers in the School of Arts and Crafts itself. The school has organized a revised system of scholarships intended to secure a class of students from middle schools especially fitted for the study of design in connection with industries. The aim of the school is however an industrial one and special care is taken to check any tendency to divorce it from a closer connection with the practical working industries. For these reasons it is not permitted to develop in the direction of becoming a training ground for teachers of drawing. The school has almost passed through the experimental stage; it has made good progress as regards numbers, but it is still too soon to form a definite conclusion as to whether the right class of students have been attracted. It also appears very doubtful whether the School of Arts and Crafts will really be able to establish itself in a definite and useful connection with the art industries of the province.

7. *Central Weaving Institute, Benares.*—An important part of the Local Government's scheme of industrial development was the revival of the handloom cotton-weaving industry through the popularization of improved looms and methods of warping. The establishment of a central weaving station formed an item of the general scheme. The school has been situated at Benares and started work in 1911, the subjects of instruction being cotton-weaving, hosiery, knitting and silk-weaving. The class for which it caters is very poor, backward in education and suspicious of novelty. There were 56 students on the rolls of the weaving station on the 31st March, 1914. Only one of the students was a weaver by caste, but several students in the artisan section had definite connections with the local weaving industry. The numbers at the school during 1914-15 were the same as in the previous year, but the number of practical weavers attending the classes slightly increased. Five students of the artisan second year class appeared at the City and Guilds of London examination at the Serampore centre. Three were successful. The name of the school has recently been altered to that of Central Weaving Institute. A slight decline, however, took place in the number of attendances at the Institute during 1915-16 though at the beginning of the current session 84 admissions have been made. Four ex-students have opened a hosiery factory in Benares, and three students who passed out of the artisan class are now employed there.

The school is still in its initial stages and suffers from the fact that the majority of the boys do not belong to the weaving caste as it is not yet popular with weavers. Many of the students of the Institute are also not of a satisfactory type from the point of view of the progress of the weaving industry. The extreme conservatism of the weaver class coupled with the fact that the workers are to a large extent tied down to their employers by a system of advances has rendered progress slow and difficult. But it is too early yet to hazard a definite opinion as to the ultimate prospects of the Benares Institute.

8. *Carpentry School, Bareilly.*—A carpentry school was opened at Bareilly on August 1, 1912, with 33 students in the junior class and 20 in the artisan class. The work of the school is purely technical, instruction being limited to practical carpentry with the necessary amount of drawing and the calculations involved in making estimates. At the close of the year 1913-14 there were 41 scholars in this institution, of whom 14 were in the first year junior class, 15 in the second year junior class, one in the second year senior, two in the first year carpenters' (artisan class), and 8 in the second year artisan class. A simple entrance examination has been prescribed for the junior class, the motive being to secure a better educated and more uniform set of students. Those who joined the junior class on passing this examination have already proved themselves better able to take advantage of the course. The report of the Director of Industries for the year 1915-16 shows that the number of pupils in this school is also gradually increasing. The average daily attendance was 44·95 out of a total enrolment of 46, and this, considering the fact that the school does

not possess a hostel, may be regarded as very satisfactory. A great deal of practical work has been done by the pupils; and a night class was opened in February 1916 in technical drawing for wood workers and in practical setting out. The number of students attending is 87; nearly all are representatives of the principal furniture firms of Bareilly, thus evincing the lively interest taken in the school by the workers.

This school has continued to do most useful work and is in a flourishing condition; it meets a real demand and promises well for the future. Owing to the exceptional capacity and enthusiasm of its Principal it has now established itself in a definite relation to the whole of the local furniture industry and bids fair to expand the sphere of its usefulness much outside the limits of Bareilly.

9. A proposal is at present under the consideration of the Local Government as to the enlargement of the scope and work of four of the five technical schools dealt with above. The underlying principle will be to arrange the instructional work in such a way that its products have a commercial value, which could be utilised by the Public Warks Department; it is thought that this will greatly stimulate and give reality to the teaching imparted in these institutions.

10. *Aided and unaided industrial schools.*—In addition to these larger schools there are eleven aided and seven unaided industrial schools founded with the object of helping poor boys to earn a livelihood by joinery, smith work, printing, tailoring, shoe making, gardening, etc. The schools are reported to attain the greatest success when they are organized on the apprentice system under which a journeyman artisan works with not more than two or three boys to help him. There is not much demand among the artisan classes for tuition, but a growing demand has been noticed among those not of the artisan classes for industrial tuition for their friends and relatives.

11. *Aided weaving schools.*—There are also a few weaving schools, the first and most important of which is the Hewett Weaving School at Bara Banki. These schools were at first placed under the Agricultural department, but were transferred in 1911 to the control of the Department of Public Instruction. They are managed by local committees and aided by grants-in-aid from Government; stipends are given to pupils. The number of scholars on the rolls on the 31st March, 1915, aggregated 172. All the aided weaving schools are now in the charge of trained superintendents and a definite curriculum has been put into force. Hosiery classes have been started at Moradabad and Mirzapur with the object mainly of providing a quickly learned trade for workers whose ordinary vocations have been curtailed owing to the war. There are signs that hosiery manufacture may establish itself as a cottage industry. Sometimes the pupils attracted at these schools are not members of the weaving class, and though accurate figures as to after employment are not available, it is noticed as significant that it was recently found necessary to ask mill-owners if they would give employment to past pupils. The work of the weaving schools has been of a very varied character, and they have hardly yet justified their existence. Since September 1915 the weaving school at Deoband has been abolished and in its place two peripatetic weaving classes have been formed with a view to introducing the fly-shuttle loom into districts where it is not yet known. The results to date are said to be highly satisfactory, and it is hoped that this system of instruction will further extend the benefits to be derived from the public demonstrations of improved appliances at district exhibitions.

12. *School of Needlework, Lucknow.*—Though the men's section of the Hewett school has been successful to some measure, the *zenana* section proved a failure. This section was therefore closed and in its place a school of needlework was founded at Lucknow in March 1916. The teaching at the beginning is confined to plain sewing and embroidery, the intention being to develop the commercial side and to provide the pupils with a training which will enable them to earn money when they leave the school. In this respect the model of the sewing schools in the Philippine Islands is being followed.

13. *Dyeing School, Cawnpore.*—A dyeing school was started at Cawnpore in July 1914. Owing to the cutting off of the supply of German dyestuffs attention has been largely diverted to the exploitation of indigenous dyes. It has done good work and gave demonstrations at several fairs and exhibitions. Seven of the students sat for the 1916 examination of the City of London and Guilds in cotton dyeing; six of these passed, three of them passing in the 1st grade.

Peripatetic dyeing class.—As an extensive demand for instruction in improved methods of dyeing was found to exist a peripatetic dyeing class has also been established. This class moves from one centre of business to another imparting instruction to the local dyers, and it is expected that the illiterate and to some extent ignorant village dyers will reap material benefit from the operations of the class.

14. *Leather Working School, Cawnpore.*—This school was opened in December 1915, and at the close of March 1916, there were 11 boys in regular attendance out of an admission roll of 17. Elementary lessons in closing, fitting, lasting and stitching are given, both practically and theoretically. The working of the school is experimental and it is too early yet to express any opinion as to its future.

APPENDIX VIII.

Dated Naini Tal, the 29th August, 1914.

RESOLUTION.

OBSERVATIONS.—The campaign of technical education which was planned by Sir John Hewett's Government in 1907 was checked, partly by want of funds, partly by difficulty in securing the necessary personnel, and partly by the application of practical considerations to a scheme which aimed at a rapid advance with imperfect material. It was impossible however that the check should continue. His Honour has noticed a genuine and growing demand for industrial training everywhere; he sees young men of the so-called "literary classes," accepting the discomforts of manual labour in the most unexpected way provided; they have confidence in their teachers, and the interest in technical schools is clearly based on a conviction of the need for them as a factor in the development of the country. The demand cannot at present be met by private enterprise; and it is essential that Government should take the initiative, at whatever risk of the inevitable mistakes. In the conviction that further delay would be unpardonable, and being at the same time anxious to reduce the risk of error, the Government published the resolution of the 27th August, 1913, reviewing the obstacles that had prevented the complete fruition of the 1907 scheme, and inviting the co-operation and advice of the commercial community and the interested public in regard to a fresh start on somewhat less ambitious lines. The response has been somewhat disappointing, a number of individuals and public bodies whom the Government specially consulted having not yet favoured it with any reply. Helpful and suggestive opinions have, however, been received from, among others, Mr. Burt, Rai Prag Narayan Bahadur, Mr. Chatterjee, and Mr. S. H. Fremantle.

2. Although the Government has a certain amount of practical experience in its own province and in other parts of India to guide it, yet an advance in technical education must be largely a matter of experiment and trial. It must in consequence be costly and at times discouraging; but this cannot be helped, for no *à priori* scheme is possible of perfection in a province where industrial arts are so little in touch with industrial opportunities as they are in the United Provinces. The scheme of 1907 has been tried by experiment and criticism; and the Government is now in a position to proceed with those parts of it which have responded to these tests. In enumerating them, it is impossible to separate technical education from the general work of Government in encouraging industrial progress. The same agency has frequently to be employed for both purposes; and in any case there can be no development without education. On this understanding the four essentials of advance may be described as—

(1) technical schools,

(2) a central technological institute,

(3) a board of industries,

(4) a director of industries.

3. Technical schools may be taken to include both schools for mechanical work, such as those at Lucknow and Gorakhpur, and schools for teaching an art or craft, such as the Carpentry school at Bareilly and the Weaving schools, Benares and elsewhere. The two classes must in some cases overlap, especially in the matter of fitting and repairing tools; but experience will show whether this is avoidable, and in the meantime it need not interfere with the development of each school along lines which will make it, as far as possible, self-contained for instructional purposes. The technical schools proper are required primarily for the training of the superior mechanic as well as the skilled artisan. They are needed, for example, for the instruction of the fitter who will know with understanding what the factory *mistri* now knows empirically, who will be capable of taking a piece of machinery to pieces, executing urgent repairs intelligently, working to drawings, and the like. The great demand for mechanics of this type trained to European methods and proficient in the use of their tools and the paralysis that besets Indian factory industry until they are obtainable in sufficient numbers need hardly be enlarged upon. It will be for future decision what educational qualification should be required for entrance to the technical schools or whether any changes in curriculum are called for. The Mechanical and Industrial Apprentice classes at Roorkee will be transferred to the technical schools as soon as this can be arranged. In the Lucknow Technical school there is already an electrician class, and the junior classes here and at Gorakhpur will be continued.

The proposals for setting up more technical schools in important towns are at present premature. There are still difficulties in disposing of the boys trained in these schools

and a new school, for example, at Cawnpore would at present have the effect of spoiling the chances of the boys turned out from the Lucknow school. Until the existing schools have fully established their reputation and until it is definitely ascertained that they genuinely meet the existing demand for trained labour of the class described, it would be unwise to open more schools of the same expensive type. Although the Lieutenant-Governor fully appreciates the force of the arguments put forward by Mr. Fremantle as to the necessity of increasing the facilities for the training of artisans, the cost of these highly-developed schools is so high that the Government cannot well embark on others until the commercial value of the existing schools is proved and generally known. It has, however, been decided to transfer ultimately the textile class from Roorkee to Cawnpore, when a more definite assurance of co-operation from the Chamber of Commerce and other owners of mills and factories is obtained. When this transfer is effected, the class will form the nucleus of a third technical school of a specialized type at Cawnpore.

4. As regards the schools of special handicraft contemplated by the scheme of 1907, those established up to the present include the School of Arts and Crafts in Lucknow, the Carpentry school in Bareilly, the Central Weaving Institute in Benares, and smaller weaving schools in various places. The progress made by the Lucknow and Bareilly schools has been good, while the improvement of the weaving schools has, it is hoped, been only temporarily arrested by the regretted death of Mr. Cook. All afford examples of the struggle which has to be made through discouraging experience to success. Inability to purchase improved implements, unwillingness of workers to co-operate, incapacity to exploit the most favourable markets, lack of interest in a trade which is not ancestral, and a tendency to drop it after leaving the school, all these apathies and disabilities are against real progress and they emphasize the need for caution in starting new schools and in framing their courses. So far experience has been more favourable with workshop industries like carpentry than with cottage industries, which cling to the tradition of individual effort and little or no capital. There is no doubt that the co-operative movement will help in time; and judgment and care are needed in deciding how the Government can best meet it and secure its assistance. Meanwhile, the Board of Industries, which is to be constituted, will be asked to consider whether new carpentry, metal, leather or other schools can with advantage be opened at industrial centres in the provinces.

5. As regards the combination of technical and ordinary school instruction, the Government is also still on the unsure ground of experiment. To the introduction of manual training into primary schools the Lieutenant-Governor is wholly opposed, for reasons given in resolution no. 1611/XV, dated the 25th August, 1914, on primary education. But it may be possible, as advised by Mr. Fremantle, to establish simple science courses in the vernacular middle schools, especially in large towns with a view to interesting boys in technical and manual work and to stimulating them to proceed to regular technical training thereafter. The question is one which the Board of Industries and the Director of Public Instruction should examine. To half-time schools there is no possible objection; and a very satisfactory object-lesson is provided by the school which Messrs. Cooper, Allen and Co. maintain in their factory at Cawnpore. At this school, which is now attended by the great majority of the boys who work in the factory, vernacular instruction of the ordinary lower primary type, but with a special bearing on the actual factory work and with a short period for drill is given for two hours of the working day, the boys attending their classes in shifts. The school is under the supervision of the Education department, and there is no attempt to give specific manual training; the industrial bias appears solely in the subjects of the readers, and in the nature of the object-lessons.

In the case of smaller concerns, the Government would be glad to give any assistance to schools of this type. The genuine night-school advocated by Colonel Kenyon for giving training to young men who are working all day in the factory, seems very doubtful of success in the climatic conditions of the big manufacturing towns of this province; but there is no possible reason against trying the experiment wherever there appears to be a promising opening; and the Board of Industries should keep the Director of Public Instruction advised on the point.

6. The general proposition that the central institution in the province for higher technical training should consist of two branches—one at Roorkee and the other at Cawnpore has met with general acceptance. The arrangement is not an ideal one; but the Government is tied to it by the existing facts. The Thomason College is an Engineering College established "to give theoretical and practical instruction in Civil Engineering to Europeans and Indians, with a view to their employment on the public works of the country." This function becomes of higher importance every year with the general progress of the country, and there is no intention of diverting the College from its original rôle. The training of mechanics and artisans is foreign to its purpose; and instruction in textile or other arts is incompatible both with the idea of an Engineering College and with the distance of Roorkee from centres where those branches of industry are actually practised. If a polytechnic is to be established, it should, if at all possible, be in a locality where the students are able to see their particular craft in operation on a commercial scale.

In this view the Thomason College should be relieved altogether of its Department of Technology. The higher division will close, at the latest, with the passing out of the few students now working in it. The apprentice classes will be taken over, as soon as possible, by the schools at Lucknow or Gorakhpur; and the textile department will be transferred to Cawnpore when the necessary arrangements for housing and supervising it can be made there. If, however, the old technical class, for the training of the "Improver" grade of engineer is likely to meet with success, it may, without serious objection, be revived at the College. The Lieutenant-Governor would be glad to see it elsewhere; but there seems to be no other satisfactory location for it. Unless, therefore, the Board of Industries can advise differently, in His Honour's opinion, a combined scheme of college education and practical work may be devised for this purpose.

7. Turning to the Cawnpore branch of the central organism, the idea of starting it as a polytechnic may at once be abandoned. There is no room in these provinces yet, whatever the future may bring forth, for a large institution, teaching the application of science to a variety of industrial arts. There would be little or no opening for its diplomates; and education of this kind, costly as it must be in its high specialization, can only be offered by the State when the promoters of industry put forward a demand for it, based on the conviction that it is necessary for the successful development of their business. For the present, the Government must be content with something different, and in certain respects less ambitious. In the first place, there is general agreement among all who appreciate the problem, that provision should be made for research work, with a view to the improvement of existing industries. No special line of research can at the moment be prescribed. Much will depend on the workers whom the Government secures, and on a more systematic review of its provincial industries, their defects and their potentialities than has hitherto been possible. But that research will be the keynote of the Technological Institute is now beyond question. As far as possible, it will be conducted with relation to the local industries which the Government hopes to create, improve or develop; and the more important of these may be enumerated, as the result of the discussion that has now taken place, in the following approximate order of importance:—

(1) Dyeing, bleaching, printing, colouring, and finishing of textile goods;

(2) extraction of vegetable oils;

(3) refining of vegetable and mineral oils;

(4) tanning and the treatment of leather in general;

(5) treatment of indigenous alkalis;

(6) wood and grass-pulping;

(7) wood-distillation;

(8) glazes of pottery and tiles;

(9) production of perfumes and herbal extracts generally;

(10) production of citric acid and allied products,

The above list must not be understood as suggesting that it is either exhaustive or scientific. The discussion on this Government's resolution of the 27th August, 1913, has been of little assistance in this respect: and the Government is still at the stage of endeavouring, in the manner of laymen, to catalogue the more prominent outlets of industrial activity in the province, in order that the expert may have some material for deciding in which directions the research may with most advantage proceed. The final selection will rest with the head of the institution, working in consultation with the Board of Industries.

8. The first step then is clearly to obtain, under the orders of the Secretary of State, a thoroughly competent head for the new organization. It is desirable to secure his services without delay, so that he may advise Government regarding the arrangement and equipment of the necessary buildings, and let an early start be made upon them. Meanwhile, during their construction, he can be making himself acquainted with the industrial problems of the province, with a view to selecting those which should first be attacked, and to assisting Government in the appointment of the requisite staff. The Government of India are now being asked to assist in securing a suitable Principal for the new institution.

The extent to which the Cawnpore institution can be used for the teaching of students in advanced industrial science is another matter for decision by experience and trial. Provision will certainly have to be made for teaching as well as for research; but the classes will be small, special qualifications will be expected of the students, and the subjects will be determined by the practical importance of applying advanced science to

particular branches of the local industries of the province. All this will have to be worked out by the Board of Industries with the help of the future head of the Institution; it is impossible to lay down anything in the nature of a curriculum at present. The establishment of a textile school, by transfer from Rurki, with possibly the addition of a junior class, is of course entirely independent of the teaching side of the future institution. It may seem superfluous to emphasize this very obvious point, and to explain that the textile classes will simply form a technical school, on the same level as those at Lucknow and Gorakhpur. But the entirely distinct nature and grade of the two establishments require mention, in order to prevent misconceptions which appear in the recent discussion.

9. The appointment of a Board of Industries has been hailed with general approval. Its functions are to meet periodically for the purpose of co-ordinating industrial work and education. Several requests, based on good reasons, have been made for wider representation on it, and the Lieutenant-Governor has been pleased to enlarge the constitution which was originally contemplated. The following gentlemen are being asked to accept membership of the Board:—

1. The Chief Engineer to Government, Buildings and Roads branch, (Chairman).
2. The Secretary to Government in the Industries Department.
3. The Director of Public Instruction.
4. The Director of Land Records and Agriculture.
5. The Director of Industries.
6. The Principal, Thomason Civil Engineering College, Rurki.
7. The Head of the Technological Institute.
8. The Agent, Oudh and Rohilkhand Railway.
9. The Agent, Bengal and North-Western Railway.
10. The Registrar of Co-operative Societies.
11. A Conservator of Forests.
12. Dr. Hill.
13. Mr. Macmahon.

14 and 15. Two representatives of the Upper India Chamber of Commerce.

16. The Hon'ble Rai Nathi Mal Bahadur.
17. Rai Prag Narayan Bhargava Bahadur.
18. Dr. Zia-ud-din Ahmad.
19. Mr. C. Y. Chintamani.

This Board of nineteen will be too big for detailed administrative work in connection with the Thomason Civil Engineering College, Roorkee, and the Technological Institute, Cawnpore, which will have to be managed in the main by sub committees.

The Government will ask the Board to meet as early in the cold weather as possible to examine this resolution and to advise on the general lines of advance.

10. The executive agent to the Board will be the Director of Industries, and the need for a permanent appointment to this post has been urgently pressed upon the Government of India. The Director should, in the Lieutenant-Governor's opinion, be invested with the following duties:—

(a) In due consultation with the Department of Education, he should inspect advise upon and, under Government, direct the industrial education in this province. This would place all existing technical schools under him. The Thomason College, Rurki, and the Technological Institute, Cawnpore, however would be independent of him, though he would have power to visit and enquire.

(b) He should conduct a survey of the industries, both substantive and auxiliary, of the province, and make himself familiar with the conditions of their markets.

(c) He should represent the Local Government in its dealings with the technical and commercial aspects of the large textile and other industries conducted in the province. For this purpose it is essential that he should be in touch with, and command the confidence of, the European commercial community.

(d) He should also study the indigeonous industries, large and small, and advise the Government on their encouragement and development and on the extension of the markets for them. He should bear in mind their artistic as well as their commercial possibilities.

(e) He should build up a bureau of industrial information, for the use both of the Government and of the commercial community.

While therefore the general co-ordinating control of technical education would not rest with him but with the Board of Industries, yet his activities will take many directions and the sphere of his responsibilities will be by no means confined to his directly educational functions. It is primarily on the commercial and industrial side that the Director of Industries will be expected to advise the Board and the Local Government. He should secure that closer co-operation between the Local Government and the commercial community without which any further advance on the part of the Government would be largely unreal and futile. His industrial survey of the province and enquiries into the conditons of the smaller markets and the possibilities of development of the indigenous industries, will add to the effectiveness of the technical schools and will guide the Board as to the possibility of opening new schools of this type. And he will also control the central bureau of industrial information, the formation of which has been repeatedly pressed on the Local Government, and which must be so largely utilized in defining the line of advance of the Technological Institute.

11. The Director of Industries is in short to be the chief factor in bringing the new educational institutions into full touch with commercial realities. It is this principle which the Lieutenant-Governor puts forward as the guiding policy in the next phase of technical education. It is with this object in view that he would now limit the scope of the Technological Institute, and that he cannot assent to proposals for the immediate founding of other new technical schools on the model of those at Lucknow and Gorakhpur. Experiments cannot indefinitely be multiplied, and all the institutions which have been described are still experimental, however promising their work may seem. That there is a strong demand for their establishment the opinions expressed on the resolution of 27th June 1913 leave no doubt. But though this demand secures for the present a good and growing attendance at the schools, it has yet to be ascertained whether the finished product really meets the true needs of the industrial progress of the province: it is useless to produce trained men who have no real place in the commercial system of the country and who must therefore revert to some form of employment which does not give full value to their training.

It is to guard against this that the Lieutenant-Governor places the new institutions under the general care of a fully representative Board of Industries and a Director whose main duty in regard to education is to ascertain real commercial needs and to advise the Board and the Government as to the success of the schools and institutes in meeting them. There is now a wide variety of technical institutions established in the province, and each type may in time be multiplied if it is found to harmonise with industrial requirements. To secure this harmony and to ensure that these institutions are developed, not in academic detachment, but as an integral part of the industrial system, each school producing trained men who have in advance their place in industry, the Lieutenant-Governor again confidently appeals to the co-operation of the commercial and industrial community.

APPENDIX X.

Reorganisation of the Commercial Intelligence Department of India.

THE organization of the Commercial Intelligence department of India must to a large extent depend on the conception entertained of the functions to be fulfilled by it, and these may be briefly summarised as follows:—

2. The Government of India have laid down that in the first place they rely on Commercial Intelligence officers to keep them in touch with the general trend of commercial opinion on a series of important subjects. In the second place they may have to undertake investigations into questions arising from the material collected by the Director of Statistics on economic subjects, such for example as the decay of industries or increased prices. Thirdly, the Government of India desire regular and spontaneous information regarding any developments of industry or commerce which are likely to affect Indian production, imports or exports, or the flow of capital in any direction. Fourthly, Commercial Intelligence officers must be accessible to the general public and be ready for all enquiries

whether from persons in India or abroad. Finally, and perhaps most important of all, the Government of India would require them to undertake, often at short notice, special enquiries to investigate specific difficulties arising from the administration of the numerous acts and regulations directly under their control, or crises which appear to indicate the necessity for legislative control in some form. To this list of important duties the Local Government would add that from the point of view of an inland province a department which is intended to deal with every side of the economic development of India must include among its most important functions the fostering of the steady development of indigenous industries, in which this province is particularly rich. Any organization which would tend to entirely subordinate local industries to the interests of the commerce centred in the great ports—linked as those are with the interests of the chief railway systems—would not, in His Honour's opinion, afford a satisfactory permanent basis for the working of the department.

3. In matters of commercial intelligence and of commercial and industrial development, the Lieutenant-Governor considers that the ordinary lines of administrative organization in this country are those which should be followed. No other scheme of organization would be readily understood by the people, or would easily co-ordinate itself with the other administrative agencies on which it must largely depend for help and information. In other words, there must be a central or Imperial agency side by side with a local or provincial agency. The attempt to concentrate all the work in an Imperial agency has been tried and has broken down. The Director-General of Commercial Intelligence could not possibly cope with the immense variety of the work, and was driven perforce to confine his attention to a few large and highly organized industries which focus at the great ports. He was unknown in a province like the United Provinces with its great potentialities and its wide range of scattered and comparatively small industries. By giving him an enormous staff it might have been possible to let him cover more ground: but even so he would have remained isolated and inaccessible to most of the smaller interests which would well reward his attention.

4. The compromise of two imperial Directors at Calcutta and Bombay, even if a third is added for Northern India, is, in His Honour's opinion, doomed to failure. It is based on a theory of industrial units of area; and, except for a few industries, such as jute, there are no such self-contained units in India. There would therefore be every probability of trouble and misunderstanding with Local Governments and a marked tendency for each Director to become disproportionately absorbed in the problems of his own headquarters, without due regard to the outlying fields of investigation. The scheme would, in fact, only be a half-way house to a claim for a Director by each major province, and the Lieutenant-Governor considers that it would be far better to anticipate that claim now, and to base the proposed decentralization on an assured provincial foundation.

5. Moreover, it is now a matter of vital importance to interest Local Governments in commercial development and to make them feel that in this direction there lies an integral part of their administrative functions. There has been a distinct tendency in the provinces for the Government to argue that commerce is perfectly capable of looking after itself, and that intervention will be resented. A Local Government has also little knowledge of things industrial, and fears the risk of making mistakes over them. It has no funds for them, and no special functions, and it is usually glad to shift this part of its responsibilities on to the Imperial Government, with its special organization for dealing with commercial matters. A province may occasionally have a head like Sir John Hewett, who by training or experience is interested in affairs of commerce and industry; and that province may then begin to look on the subject as more than a matter of perfunctory routine. But there is no general linking up of provincial Governments in the big movement of developing Indian industries and their markets.

6. This, in His Honour's opinion, is a real calamity. It involves a risk of alienation between the business classes and the Government, and it deprives the former of help which the State ought to give and would willingly give if it knew the way. It also means much initial loss of capital in new enterprises. The Lieutenant-Governor has, in fact, observed a strong and even bitter feeling among the commercial community that Government does less for them in India than is done in most other countries, while most Provincial Governments cannot but admit a feeling of profound ignorance as to what they should do, and of deep distrust as to what they may safely and prudently attempt. It is of the greatest importance to the future of India that a remedy should be found for these very serious defects, and His Honour considers that the first essential step towards evolving a remedy will be to make the provincial Governments more directly responsible for the development of commerce and industries, and to equip them with means for studying this part of their duty. Such means must necessarily include an expert agency in each province for dealing with commercial intelligence, and adequate secretariat arrangements for bringing its work into touch with the Local Government.

7. Purely provincial agencies cannot deal competently with the international aspects of Indian trade, or with certain features of the bigger industries which transcend provincial boundaries. For these and other purposes noted below, an imperial agency is clearly necessary. But the provincial bureau can do much even with regard to the bigger industries. In many cases their organization is solely in the hands of a group of large exporters or manufacturers; and the whole business of production and preparation for the market is left to a crude unguided competition, with the result that there is great waste and loss of opportunities. In regard to the smaller localized industries the field for local enquiry and assistance is immense, and it can be covered only by provincial workers. Taking for example the cases of this province the only large group of primary producers consists of the cultivators whose interests cannot possibly be as well appreciated by an Imperial officer as by the Local Government and its officers. Their interests, are perhaps not those to be specially considered by the Department of Commerce and Industry, but, apart from their case and from that of the local traders, it has to be remembered that the term manufactuers is one of very wide connotation. They include not merely the big concerns represented effectively in the chambers of commerce, but also the smaller men scattered all over the provinces—men who have flour mills, sugar mills, oil mills, brass and iron foundries and the like, and who have to face the competition of imports, backed up in some cases by the railways. It is this latter group which should, in the Lieutenant-Governor's opinion, receive the major share of a Local Government's solicitude. The bigger men are adequately represented in the chambers of commerce and can obtain access to the Imperial Government, but the smaller men, although they represent those widely scattered industries on the development of which Sir John Hewett laid great stress, and which it has been the policy of all Famine Commissions to encourage, have not yet found their voice, while their needs are too diversified and remote for effective or indeed for any real representation to or by a single Imperial officer. To bring these industries into touch with the markets, to help them in improving their methods and standardizing their products, to interest local capital in them and assist them in other ways too numerous to mention—all this is in His Honour's opinion, work which can only be done by a provincial agency. At the same time with the best of intentions a Local Government cannot possibly attempt these multifarious duties, unless it has an expert adviser and observer of its own. That it will be ready and willing to undertake this task, and to put into it the same zeal and energy as it applies to other administrative work may be safely accepted; the only necessity is to make all Local Governments realize that this is their duty, and that commerce and industry are not reserved for a distant and generally invisible agency at Imperial headquarters.

8. The Lieutenant-Governor is convinced that a properly qualified Provincial Director of Industries working in concert with the Director of Land Records and Agriculture and provided with adequate secretariat arrangements will find no difficulty in performing all the functions which are at present discharged by the Director-General of Commercial Intelligence. Most of these functions have, in fact, been performed for many years in these provinces by the Director of Land Records and Agriculture, and latterly to a greater extent by the Director of Industries. No one but a Provincial Director can be in sufficiently close touch with manufacturers—both large and small—to appreciate their difficulties and to represent their needs. The interests of cultivators fall most naturally into the sphere of the Director of Agriculture, and he would share with a Provincial Director of Industries the close knowledge of local circumstances and intimate acquaintance with current trade conditions which are required in the interests of local traders. As regards the investigation of questions raised in the Statistical department, a large number of enquiries regarding matters of trade are already sent to the Director of Land Records and Agriculture or Director of Industries to deal with, and can be more effectively carried out by them than by an Imperial officer who would not be in a position to make the same accurate local enquiries. Should the investigations required be specially numerous or extensive, it might occasionally be necessary to depute provincial officers on special duty to assist the Director concerned.

The supply of regular and spontaneous information regarding developments of commerce and industry could also be more satisfactorily undertaken by local officers with a moderate charge than by an Imperial officer whose travels would extend over a very large area. It might take some little time before a satisfactory system was evolved, as the idea of voluntary information would at first be a novel one; but when once it had been brought home to Local Governments that their responsibilities towards trade and industries are as great as in other directions, it should not take long to work out a satisfactory solution. Its basis is, in fact, already in existence in this province, where the Director of Land Records and Agriculture has always kept a careful watch on the industrial problems which have presented themselves, and has even—if somewhat spasmodically—undertaken a number of important enquiries in this connection.

Accessibility to the public is already imposed on both Directors, and they have made considerable progress in accumulating the bureaux of commercial and industrial intelligence required in connection with the very numerous enquiries which have poured in on

them not only from this province or even from India, but from all parts of the world. For such purposes a Provincial Director should be in a better position to assist the commercial community than a distant officer, more especially as in this province a large proportion of commercial correspondence is still carried on in the vernacular. There are, it is true, drawbacks in respect of the comparative isolation of Provincial Directors and their being out of touch with the conditions in other areas, but these could be minimised by correspondence between the Directors, by occasional conferences or tours in other provinces and by the mutual exchange of information collected. The provincialization of commercial intelligence would not, however, make it possible to dispense with an Imperial agency for the issue of its journal of bulletins dealing with subjects of general interest, and the editor of these publications would be in the best position to collect and disseminate the information required from foreign countries. Finally, as regards the function laid down by the Government of India as the most important of the department, namely the undertaking of special enquiries to investigate specific difficulties, His Honour sees no reason why these should not be carried out with at least equal thoroughness, though possibly at somewhat lesser speed, by a provincial officer than by Imperial agency. Such an arrangement would, moreover, operate as a check on the natural tendency to slur over inconvenient divergencies of views or interests on the part of an officer whose report would purport to cover the whole of some large question. Such divergencies must in general exist with reference to any complicated problem, and to overcome or reconcile them is not the work of the commercial intelligence officers, but of the Imperial Secretariat.

9. Outside all these considerations stands the clear necessity for an Imperial agency to collate and co-ordinate the results of the more detailed work carried out by the provincial agencies. Its chief task would be to keep the latter in touch with each other, and to distribute among them problems of an all-India nature. It alone can play the directing part in handling the international finance of trade, and the effect upon it of tariffs, telegraph facilities, communications and railway rates, or of imperial acts and regulations affecting India as a whole. It must be in close relation with the Imperial departments which are concerned with these and cognate matters, and with the assistance of the provincial bureaux it will be in full possession of all the details which are necessary for consultation and advice on the Imperial aspects of such problems. Indispensable as he regards the provincial agencies, if local problems are to be adequately dealt with and local industries properly represented and developed, His Honour is convinced that an Imperial authority of markedly higher calibre is equally essential for handling questions of interprovincial and international significance.

10. The form and relations of the two agencies can at present be described only in outline. In the Lieutenant-Governor's opinion the Imperial agency should be a competent Director-General at headquarters, with an adequate commercial bureau under him and an adequate claim on the services of the Director of Statistics. His Honour can see no necessity for provincial or other assistants in the Imperial service, and no difficulty in establishing suitable relations between the Director-General and the provincial authority. What form the latter authority should take is a matter for the consideration of each province. In the United Provinces it is proposed to entrust these duties to the Director of Industries with such assistance as the development of the scheme may show to be necessary. He will be the adviser and agent of the Local Government in commercial and industrial matters.

While, however, there will be no restrictions of any kind upon his affording the Imperial Director-General unofficially all the advice and assistance in his power, His Honour would not recommend direct official correspondence between the two officers. Their proper channel of communication should be through the Provincial Secretariat, and all official correspondence from the Imperial Director-General, all questions of policy and principle, and all demand for important enquiries, statistics and opinions should be addressed to the Local Government.

Appendix X.

One of the recommendations made by the Industrial Conference which was held at Naini Tal in the year 1907 was the establishment of an Institute of Chemical Technology at Cawnpore which should be devoted to special research, and to the treatment from the industrial point of view of the following subjects :— Paragraph 19(g) of preliminary note

(1) Sugar.

(2) Leather.

(3) Acids and alkalis.

(4) Dyeing, bleaching, printing, colouring, and finishing of manufactured goods, and paper-making.

The head of the institute was to be capable of dealing with general applied chemistry, particularly of acids and alkalis, and was also to have some knowledge of engineering. He would have three professors first rate chemists specializing in sugar, leather, and bleaching, etc. He would be assisted by a chemical engineer and there would be four Indian assistant chemists. The initial cost of the institute, including laboratories, hostel and professors' houses, was to be 8 lakhs; and the recurring cost somewhat over 2½ lakhs. The Secretary of State did not accept the scheme in its entirety. He suggested the probability of overlapping with Bangalore; he doubted the possibility of any fresh light on acids and alkalis; and in brief he suggested further and wider enquiry. Dr. Travers of Bangalore was consulted and Sir Thomas Holland also gave his views informally. The result was to deprecate very strongly the suggestion that there must necessarily be any overlapping with Bangalore, the problems for enquiry being sufficiently varied and the conditions in Northern and in Southern India showing wide differences. After much discussion the Local Government submitted to the Government of India in May, 1910, a greatly reduced scheme. As subsequently modified in certain details, it provided for one chemist on pay of Rs. 800 rising to Rs. 1,200; with four assistants and a head mechanic. The institute was to share a library with the Agricultural College; and it was hoped to keep the total cost down to 3½ lakhs initial and Rs. 83,000 recurring. The Secretary of State sanctioned this scheme in August, 1911; and various authorities, including the Upper India Chamber of Commerce, were consulted regarding the type of expert who should be sought for as head of the institute. In the end the Secretary of State was asked to select a thoroughly good all-round chemical engineer, who should be able to teach the general principles of applied chemistry, the economical utilization of heat and the broad lines of machinery designs, etc. The assistant chemists would be men possessing some practical knowledge of the four branches in which the institute was to specialize. The request was practically in accord with the advice of the Upper India Chamber of Commerce.

At this point fresh difficulties arose. The Board of Education, who had been consulted by the Secretary of State about the selection of a Principal for the institute, took expert advice in England and recorded their opinion that a technological institute on the lines proposed would not be a success. It was impossible to obtain a capable chemical engineer on the terms sanctioned, and they advised that the Local Government should again investigate—

(*a*) with what industries the institute would deal and in what order of importance,

(*b*) of what special industries the head of the institute should have an intimate practical experience, and of what related industries he should have a general knowledge,

(*c*) the terms of his appointment and his staff.

Pending the investigation of these questions no further steps were taken other than the appointment of an assistant chemist in anticipation of proceeding with the general scheme.

The questions asked by the Secretary of State showed that the first point to be decided was the particular lines of instruction and enquiry which were to be followed. Out of the four branches of applied chemistry which were originally contemplated, one branch—that of sugar—was handed over to the Agricultural department, which provided itself with experts on the subject. As regards the second branch, namely leather, it was understood that no investigation was desired by the firms who control this particular industry in the provinces and already employ their own chemists. The question whether instruction in the chemistry of leather might not be imparted was not specially considered; but it seemed probable that the field of future employment for students of the subject would be somewhat narrow. As regards acids and alkalis the main problems in connection with this industry appeared to be mechanical and commercial rather than of a type to be dealt with at a chemical institute. There remained therefore dyeing, bleaching and kindred processes. It was doubtful whether this limitation of the proposed scheme should be accepted as final, and it seemed preferable to regard the institute and its staff as ready to take up the investigation of any promising local industry for which under conditions of greater industrial efficiency, there would be a definite market. In the first instance, the institute was to deal with actual industries and with practical measures for developing and improving them. It could not, at the outset at any rate, entangle itself in the study of industries which do not exist or for which the raw material is not procurable in this part of India. It was considered, however, that the institute might devote itself to the chemical and commercial examination of the following industries among others:—

(*a*) Dyeing, bleaching, printing, colouring and finishing of textile goods, as in the original proposals of 1907. There was unquestionably much to be done in examining the dye-stuffs indigenous to the province.

(*b*) Tanning materials, which also are abundant, but have not, so far as was known been exhaustively investigated.

(*c*) Wood distillation, with special attention to the production of acetic acid, wood tar, wood alcohol, etc. It was thought probable that much of this work had been done at the Forest Research Institute, Dehra Dun, and the forest experts were to be consulted with reference to the branches of work which might be taken up at Cawnpore.

(*d*) Paper-making, the materials for which, in the form of wood and grass pulp, are only now beginning to be exploited.

(*e*) The extraction of oil from seeds, which appeared to be carried out in a very empirical and uneconomical manner.

(*f*) The refining of vegetable and animal oils.

(*g*) The production of citric acid and allied products which were neglected.

(*h*) Perfumes and herbal extracts generally, for which there ought to be abundant material, and in which there was already a struggling industry in this part of the province. Before, however, the institute was committed to any of these lines of work, it was decided that the case should be again referred to the commercial community of the province with a view to obtaining a definite expression of opinion regarding the particular branches of industry in which Cawnpore was to specialize. The subjects which had been suggested, and any others which could claim consideration, were to be placed in a rough order of importance; and the particular sections of the work in which the new head of the institute ought to be a recognized authority were to be specified.

After obtaining further opinions on the scheme it was decided to abandon the idea of starting the institute as a polytechnic. There is no room in these provinces yet, whatever the future may bring forth, for a large institution, teaching the application of science to a variety of industrial arts. There would be little or no opening for its diplomates; and education of this kind, costly as it must be in its high specialization, can only be offered by the State when the promoters of industry put forward a demand for it, based on the conviction that it is necessary for the successful development of their business. It was decided that for the present the Government must be content with something different, and in certain respects less ambitious: that in the first place there is general agreement among all who appreciate the problem that provision should be made for research work, with a view to the improvement of existing industries. No special line of research can at the moment be prescribed. Much will depend on the workers whom the Government secures and on a more systematic review of its provincial industries, their defects, and their potentialities than has hitherto been possible But that research will be the keynote of the technological institute is now beyond question. As far as possible it will be conducted with relation to the local industries which the Government hopes to create, improve or develop; and the more important of these may be enumerated in the following approximate order of importance:—

(1) Dyeing, bleaching, printing, colouring, and finishing of textile goods.

(2) Extraction of vegetable oils.

(3) Refining of vegetable and mineral oils.

(4) Tanning and the treatment of leather in general.

(5) Treatment of indigenous alkalis.

(6) Wood and grass-pulping.

(7) Wood distillation.

(8) Glazes of pottery and tiles.

(9) Production of perfumes and herbal extracts generally.

(10) Production of citric acid and allied products.

The above list must not be understood as suggesting that it is either exhaustive or scientific or as determining the particular industries on which the institute will ultimately concentrate its work. Such a decision will depend on the class of problems which actually present themselves for solution in the early years of the working of the institute and the final selection will rest with the head of the institution, working in consultation with the Board of Industries.

The extent to which the proposed Cawnpore institution could be used for the teaching of students in advanced industrial science is another matter for decision by experience and

trial. Provision will certainly have to be made for teaching as well as for research; but the classes will be small, special qualifications will be expected of the students, and the subjects will be determined by the practical importance of applying advanced science to particular branches of the local industries of the province. All this will have to be worked out by the Board of Industries with the help of the future head of the institution: it is impossible to lay down anything in the nature of a curriculum at present.

For the purpose of commencing work on these lines the first desideratum is to obtain a scientist who would be not merely a specialist in some particular subject but an organizing head of the institute. It seems desirable that he should possess sufficient general acquaintance with research in such subjects as have been enumerated as to make him, so to say, a "general specialist" in industrial chemistry, concerned with vegetable rather than mineral products. He must be able also to assist the Government with his advice on the buildings and equipment which can be used for whichever of these subjects seem, on a more informed enquiry, to be the most suitable for research; and the Government will further be largely dependent on him for the final selection, in consultation with the Board of Industries, of the subjects for investigation, and for determining the nature and strength of the technical staff to be employed. In 1914 the Government of India were asked to assist in securing a suitable Principal.

It was recognized that the price to be paid for a really good man, of sound judgment and receptive character, would not be small, and the decision of his emoluments was left to the Secretary of State. Something between £ 1,000 and £ 1,600 with free quarters was however suggested as approximately the scale of pay for which a man of the necessary qualifications might be willing to come to India for a term preferably of five years. The Secretary of State has accepted the scheme of the Local Government in principle, subject to definite provision being made for including a certain amount of teaching work among the activities of the institute. But in view of the exceptional circumstances of the present time the Board of Education have recommended to the Secretary of State that the actual appointment of a Principal should be deferred for the present. The reason assigned is that the best candidates would not be available before the end of the war as they are occupied in other work which they would be most unlikely to leave, and from which it is highly undesirable that they should be drawn away.

In view of the fact that the duties of the contemplated post could only be carried out by a man of first class calibre, the wisdom of the advice is indisputable; and disappointing though the delay must be the Local Government has no alternative but to postpone the scheme for a technological institute until the end of the war. In the meantime, however, it is hoped that the advice and assistance of the Director of Industries,—who has now a small laboratory which has recently been enlarged,—and of the technological chemist at his disposal, will enable those taking part in the industrial development of the provinces to dispose of some of the more pressing problems hampering their advance.

ORAL EVIDENCE, 8TH NOVEMBER, 1916.

President.—You are Financial Secretary to the Government of the United Provinces?—Yes.

As such the Industries department comes under your charge?—Yes.

Under whose control is the Department of Agriculture?—Under the Chief Secretary in the Revenue department.

Under which department is education?—Under the Judicial Secretary.

So that there are three Secretaries that deal with industries, agriculture and education?—They do not work altogether separately. Many things come to all three.

The Director of Agriculture is Chairman of the Board of Industries?—Yes.

Is the Chairman *ex officio*?—No. He is specially appointed by Government.

Hon'ble Sir R. N. Mookerjee.—All you say about financial aid to industries is not only your opinion but your experience?—I cannot speak from practical experience of the industries, but I have formed my opinion from the cases that have come before me.

Hon'ble Sir F. H. Stewart.—The Financial Secretary is perhaps the busiest Secretary?—At certain times of the year, but not throughout the year.

I rather gather from your note that you are inclined to recommend a separate Secretary for Industries?—I think that before long it will be necessary to have a redistribution of work but Industries would in any case be combined with other departments.

With reference to a suggestion by the Director of Industries regarding the formation of an imperial department, have you any particular views on that subject?—I don't think an imperial department of industries with executive powers and controlling the provincial department of industries is required, but a better organisation is necessary to deal with the wider questions of commerce and industry, and more especially those questions which affect all India

In your connection with the Industries Department have you found that the Department of Commerce and Industries is able to give sufficient time and attention and has sufficient experience of industries?—My opinion is that they have not at present sufficient time.

Hon'ble Sir Fazulbhoy Currimbhoy.—As regards financial assistance by Government to industries you say the provision of a part of the share capital of companies on the same basis as public subscriptions would be more effectual in inspiring confidence among investors than the application of similar sums of money in other ways. Do you think if Government gives money on the preferential shares it would be quite safe?—It would be safer. I think more confidence is shown by taking ordinary shares.

If a considerable degree of Government control over the enterprise were insisted upon then you would like to give the money?—As I have said further on I do not think Government should try to directly control industries to which it gives help.

I have suggested that some stipulations should be laid down as to staff and methods of management as these two restrictions seem desirable.

You say that there is a wide field for industrial banks but the greatest obstacle to their working is the difficulty of securing proper experts to advise on applications for loans. Do you know that there is a big industrial trust formed in this country by some of the banks?—I have heard it from Mr. Silver.

Do you think it will pay?—Not unless it has a proper organisation.

You think that an Imperial Department with executive powers and controlling the Provincial Departments of Industries is not necessary?—I think that the executive powers are unnecessary.

Take for instance your Board of Industries. They think of a big scheme in which much money is required. They submit it to the Local Government; the Local Government sends it to the Government of India; the Government of India sends it to the Imperial Director of Industries, and so on. Don't you think that is a very long procedure?—Undoubtedly, but if the money to be spent is that of the Local Government that Government must have a full say in the matter.

Are you in favour of controlling provincial industries without consulting the Imperial Department. The control should rest with the Local Government subject to general principles laid down by the Imperial Government.

Mr. A. Chatterton.—You think that Government assistance in a pecuniary form would induce private capitalists to come forward?—Yes.

What machinery would you suggest that Government should employ when they not only invest public money in such undertakings but also take upon themselves the responsibility of practically advising the public to invest its money at the same time?—As I have said the machinery does not exist at present. There are a few experts available, but when you go outside those experts there is nobody but the Director of Industries. He can give good business opinions but in many cases they are not enough. I think it would be better to increase the number of experts in the main branches in which these matters come up.

In your note you say "The small hand industries such as weaving hosiery, etc., labour under great difficulties as regards securing more than a merely local market for their outturn and when improved methods of production have been suggested, an objection constantly put forward has been that they would be unable to secure a market for any largely increased outturn." Does not that suggest there is over production in outturn?—I do not think so necessarily. It may be so in some cases.

It is a common fact in Southern India that the introduction of the fly shuttle loom, which increases the outturn of a weaver by something like fifty per cent. does not in most cases benefit him, because already he is able to turn out more than he can sell. Does this not suggest the idea that to a certain extent we are working on wrong lines in the methods of dealing with these indigenous industries?—That is rather a wide conclusion to draw in view of the exceedingly imperfect methods of marketing.

Have the co-operative banking facilities for marketing raw products been successful?—To a small extent. The note by Mr. Willoughby mentions two cases: one in connection with the Muzaffarnagar woollen industry and the other some association of Chamars.

What occurs to me is that the question of marketing is more important matter than the question of improving the technical appliances of these industries. A weaver is accustomed to weave a certain class of goods. He goes on weaving that class irrespective of the fact that there is a diminishing demand. Would it not be better if the departments of industries of the provinces and these co-operative societies had their attention directed to the study of the markets so that a class of goods may be woven which will be more readily saleable?—Certainly. I think that should be done.

At the present time the tendency all over India has been to concentrate on improved technical processes rather than the study of the market demands for goods. I should like to know whether any attention has been paid to that aspect of the question in your provinces?—Some attention has been paid, but the results up to the present are not very great.

President.—There is one paragraph in your note that is not entirely convincing as at present worded. Possibly some supplementary remarks from you may help us to get the idea that is in your mind. You say that "a point which is not directly raised by any question but which is of great importance to the success of any attempts to train labour is the absence of any powers in Local Governments to raise the pay of any officers in charge of technical schools who have shown their value in these posts. Such men have a recognised commercial value and unless some liberty is given in regard to fixing their pay at a fair rate they will leave Government service on the expiry of their agreements. A case in point is that of Mr. Kinns, head of the Bareilly Carpentry School. The Local Government has made several attempts to raise his pay to a rate which it considered necessary for the purpose of retaining his services, but they have been refused." Presumably the refusal was given by the Government of India?—Yes.

Did the Government of India give any specific reasons?—No reasons whatever.

Do you suggest the Government of India was ill-advised?—I would not venture to suggest that. I think it is a matter in which local opinion should carry greater weight.

In other words the Local Government has a greater opportunity for judging accurately of a man's value?—Yes. It is a matter of commercial supply and demand and Local Governments might be trusted with a reasonable discretion to vary the terms even of appointments made by the Secretary of State after experience of what a man is worth.

I presume that you will admit that without some system by which officers are paid according to a recognised scale it is possible for one Local Government to spoil the market for another Local Government by giving undue appreciation to its men?—It is possible, but I think that it is only fair to allow some liberty to Local Governments in such matters.

You feel that Mr. Kinns' appointment is an appointment of rather an exceptional nature and of a kind that the Government of India has little experience of? Do you think that the Government of India would be better advised if it had an Imperial Department such as was proposed by Mr. Silver?—Probably, though a special department is hardly necessary for this purpose only. There are not many such cases in any province nor are there likely to be for a considerable time.

There ought to be some rules governing the terms of appointment and those general rules can only be made by the Government of India?—Yes. But a certain amount of discretion should be given to the Local Government.

I suppose that the terms of Mr. Kinns' appointment were originally proposed by the Local Government?—They must have been proposed by the Local Government. They have been changed once.

You do not remember if the proposals of the Local Government as regards the pay of these posts was rejected or modified by the Government of India?—I do not remember.

You do not wish then this general conclusion to be drawn absolutely in consequence of this incident that the Local Governments should be left with full power?—No. A certain amount of liberty is however necessary.

You think that in developing a series of these new posts, as they have been developed during the past two years, there must be more or less irregularity in the earlier experimental stages?—There are such even in the same province.

Don't you agree that the sooner these local variations are brought into line the better it will be generally?—Yes, but a reasonable latitude should be permitted to provide for local conditions and the varying commercial value of different types of men.

Does Mr. Kinns come under the terms under which you are now able to grant pay to the provincial educational service officers?—Mr. Swinchatt does, but not Mr. Kinns.

With regard to these technical schools, are these appointments of a special nature?—Yes, they are.

You have seen Mr. Silver's evidence on the question of an imperial department. Are you generally in agreement with his views that there should be a department with powers limited to advisory functions?—I do not think I can go as far as Mr. Silver I understand he contemplateda certain amount of executive control of the provincial directors, but I agree that there should be a department with advisory functions.

Mr. Silver made the suggestion that the head of the imperial department might be allowed to advise Government with regard to rules, such as you call in the Forest department "working plans," and that, these rules having been framed, the Local Governments should fall into line with the general policy consistent with local circumstances?—Yes, provided allowance is made for local variations.

Do you think there is any great disadvantage in perpetuating the system that now exists in Madras with regard to industrial development which is utterly different in some respects to the policy of the United Provinces?—In the earlier stages it seems advantageous to permit of experiments being made on varying lines. When sufficient experience has been gained of different methods of working, a general policy may be laid down.

In this experimental stage the Local Governments might experiment along different lines of policy?—I think so.

Hon'ble Pandit M. M. Malaviya.—What is the system of giving financial assistance by Government to industries? Suppose an individual makes an application, how is it dealt with?—An application is generally made to the Director of Industries. He sends it to Government and in almost all cases he is asked to consult the Board of Industries. When the recommendation of the Board of Industries is received Government pass final orders.

You are in favour of establishing an industrial bank, but you do not seem to be in favour of Government putting any money into the bank?—I have not given an opinion on this point. The character and extent of Government assistance will have to be considered in detail.

If the Government gave some assistance it would inspire confidence and draw forth capital in these provinces?—In these provinces it certainly would.

You speak of the ineffectiveness of the control which Government might exercise, but it would exercise some control?—Not sufficient.

Don't you think that the risk of Government losing some of its money by a bank not being properly managed would be compensated by the gain that is almost certain in the way of encouragement to people to come forward to invest in business?—I do not think Government has any right to run a serious risk, but the question is a much wider one than that of the loss of a sum of money by Government.

You say the Thomason College department of technology was founded for the purpose of attracting students related to capitalists and manufacturers who in the natural course of events might expect to become managers, etc. You say that not a single applicant of that type joined the class but it was joined by other students?—It was joined by a few students who were not of a satisfactory type.

Have you fully investigated the matter to your satisfaction to know the real cause of the failure?—Enquiries made in various centres showed that no capitalists or manufacturers had the intention of sending their boys.

Have you considered whether there were not certain conditions which stood in the way of students availing themselves of the department?—Nobody ever suggested any such conditions.

You are aware that a number of our students go to England to receive technical education and that their number is growing. Don't you think there must be some reasons why students were not attracted to the technological department of the Roorkee College?—Partly because it was only intended for a special class of persons. It is intended to replace the department by a class with a wider scope on the lines recommended by Colonel Atkinson and Mr. Dawson. Apart from this. I know of no special reasons.

Colonel Atkinson had very strong views against providing any higher technical education than that for the "improver grade." You know that?—Yes.

You have said very clearly why you think that an imperial department of industries is not necessary and you have heard Mr. Silver's opinion on that point. Do you think that any organisation should be created to correlate the activities of the different departments

of industries ?—I think a separate organisation is necessary for dealing with the wider industrial questions and for advising Loca. Governments. It would presumably be under the Member for Commerce and Industry.

Do you think that an organisation like the Railway Board consisting of the Directors of Industries meeting together and making their recommendations to the Member for Commerce and Industry will not answer that purpose?—I do not think that such arrangements would be adequate though periodical conferences would be useful.

There is no reason why provincial departments of industries should not correspond directly with each other ?—None whatever.

It would be an advantage if each were to communicate all the problems that they have in hand to the others through an industrial journal to which all provinces should contribute ?—That should be possible to attain by separate notes.

Don't you think that there will be a disadvantage in sending separate notes as they will be isolated publications whereas a regular journal will ensure more attention ?—I should not say that.

You have noted that at present the inland provinces are at a disadvantage in comparison to the great seaports. Don't you think it necessary that there should be some authority to safeguard the interests of these inland provinces ?—There seem to be economic tendencies in favour of the seaports and I think that inland provinces do require some protection.

You say it is possible that those interested in seaports would not be inclined to favour the development of the inland provinces ? It is a possibility which is suggested by the experience of other countries.

You have spoken of the difficulty of deciding what the scope and object of an institution of chemical technology should be, but does not the experience of the other provinces show that there is room for development?—The scope of such enquiries is immense. A Local Government cannot afford an institution which could deal with investigations into all the important branches of industrial science, and it is most difficult to decide what subjects should be taken up in a province such as the United Provinces.

Don't you think that a province like ours with a population larger than that of Japan should find the money to maintain a first class research institute in order to develop our industries ?—The cost would be very great. I have not objected to having a small organisation to deal with certain simpler problems and to sift difficulties that are proposed for investigation. There is however a risk of waste of money and of labour if the same chemical problems are dealt with by small organisations in different parts of India. Concentration is important in such matters.

Your main difficulty is cost ?—Partly the cost and also the organisation of the service and the general control. I do not think a Local Government is suited for controlling a big institution of that kind.

But if you have the officers lent by the Government of India then the work will be done in the province?—If there are certain branches of investigation which can be carried on locally, I think the work should be carried out by officers lent by the Government of India. The question is whether there is room for both imperial and provincial institutions. I am not competent to say.

WITNESS No. 24.

Mr. C. M. de Souza.

MR. C. M. DESOUZA, *the Premier Oil Mills, Ltd., Cawnpore.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

Capital.

Qs. 1-2—I have not had much experience of the raising of capital for industrial enterprises.. The capital of our company in the first instance was subscribed by my partner and friends ; I did not have any difficulty in raising it, and I am now assured of as much capital as may be required for extending the business. Capital is principally drawn from professional and business men, and to some extent employés of Government and business houses.

Q. 3.—My attention has been mainly confined in watching the development of oil industry and although in some centres the oil factories so far established have often to curtail production, it is not, in my opinion, due to the number of factories being excessive but to the quality of the products sent out by most of these being only suitable for local consumption

On the whole the condition of the oil industry in India is unhealthy, due to the imitative tendency of most Indian capitalists who are always ready to follow up and launch out schemes whether or not there be room for them.

Government assistance.

Q. 4.—I have not had experience as to the results of financial aid by Government on a large scale to industrial enterprises. The United Provinces Government have, to my knowledge, rendered small aid in the shape of a loan to a tin pressing business with satisfactory results. We have also been offered a loan for improving our plant which was originally started by Government for proving the possibilities of cotton oil industry in these provinces. The time necessary to negotiate and secure aid from Government often tends to make this help of doubtful utility. For instance, we had applied for a loan in April, 1915, when our bankers were disinclined to take up new business owing to the abnormal conditions of the money market at the time due to war, and the draft of the necessary documents for the Government loan was received by us about eight weeks ago.

Qs. 5-6.—My opinion is against any aid from Government to existing or new industries excepting for pioneer work (see my answer to question nos. 7-8 below) in the manner set out under methods nos. 2, 3, 5 ; as Government control as regards management of any industrial undertaking is undesirable (this covers question no. 6).

(1) Grants may be given by Government to Government departments or industrial concerns for educating the masses as to the benefits derivable from the use of certain industrial products regarding which they are not sufficiently enlightened, and also for the purpose of preventing economic waste.

(4) Loans may be given by Government at low interest on sufficient security, preferably through a bank (which could be started for this purpose) should any promising industrial concern suffer for want of capital, and be unable to raise a loan on moderate interest.

(6) Government may, failing any other arrangement to develop a promising new industry, subscribe towards its capital. The Director of Industries could represent the interest of Government on the Board of Directors.

(7) In the case of a new enterprise Government may guarantee purchase of a portion of products for a limited period.

Pioneer factories.

Q. 7.—My experience of Government pioneer factories tends to the opinion that Government should, if possible, refrain from running these entirely on their own account.

Q. 8.—Government should principally confine their attention to the research work, collection of statistics, and investigation as the possibility of success of new industries. When Government is satisfied that any industry could be successfully worked and its establishment is desirable offers should be called from respectable commercial houses to undertake the establishment of a factory and arrangements concluded with a firm offering best terms, by giving, if necessary, grants-in-aid or any other help tending to the maximum benefit to the public with the minimum expenditure to Government.

Government should not, in my opinion, be permanently interested in any enterprise excepting for reasons of State.

Financing agencies.

Q. 9.—I have no experience or personal knowledge of any industries being hampered by the conditions under which they are financed.

Q. 10.—It may be possible to give more financial assistance to industrial undertakings should the banks extend their scope, and besides the business of granting loans, subscribe towards the capital of a promising enterprise. There should also be greater facilities than now existing to raise a short term loan from banks on immoveable property.

Limits of Government assistance.

Q. 13.—The principle to be followed should be to first offer a chance to existing private enterprise to take up the business when the aid is in the shape of a loan, or subscription towards capital.

Q. 14.—Yes, if the established external trade is of greater economic value to India.

II.—Technical aid to industries.

Technical aid in general.

Q. 15.—I have had no experience of technical aid provided by Government to industrial enterprise.

Q. 16.—With the exception of the activities of the Assistant Technological Chemist under the direction of the Director of Industries, United Provinces, in solving the difficulties experienced by some local industries since the outbreak of war, I have had no personal knowledge of any benefits received by local industries from researches conducted by Government departments.

Q. 17.—It is difficult to lay hard and fast rules or conditions for the loan of Government experts to private firms or companies. The terms should mainly depend on the circumstances of each individual case. In my opinion Government should approach this point in a liberal spirit, but not so liberal as to encourage abuse.

Q. 18.—Results of research carried out at the expense of private firm, even if conducted under the guidance of Government paid expert, should not be published by Government without permission of the said firm in the absence of understanding to the contrary while lending the services of the expert.

Demonstration factories.

Q. 19.—Demonstration factories in any forms, unless the success of any industry is assured, would, in my opinion, be of doubtful utility as regards promoting or establishing new industries. Pioneer factories on the lines suggested in my answer to question no. 8 would result in greater utility. It could be arranged to utilize these for demonstration purposes; or a demonstration section may, when necessary, be added to existing factories to test the theories regarding a promising new line. Small demonstration plants, if attached to technological institutes, would, on the other hand, be very beneficial for training students.

Q. 20.—I am not aware of the need of a demonstration factory for the promotion of any industry in these provinces.

Research abroad.

Q. 21.—I have no experience as to the aid afforded by the Scientific and Technical Department of the Imperial Institute.

Q. 22.—Should a complete and efficient organisation be established in India for carrying out research, no advantage could be derived, excepting for the purpose of comparing notes by having research carried out in the United Kingdom.

Q. 23.—By publishing the results of the research, and expressing their view or recommending as to how far they could apply or be worked under Indian conditions.

Q. 24.—It would be rather difficult to organize any such system in India, excepting that of Boards of Industries comprising men each representing and having close knowledge of particular industries, and capable of appreciating and recommending research in particular lines.

Surveys for industrial purposes.

Qs. 25-26.—Yes, the surveys must be more thorough and made with the view of rendering facilities to industrial concerns for obtaining correct data of the resources of the country.

Q. 27.—By keeping the Directors of Industries posted with the results.

III.—Assistance in marketing products.

Commercial museums.

Qs. 28-29.—The commercial museum has not been in existence long enough for basing calculations as to its value, but my opinion is that it will prove of doubtful utility as a medium for bringing the manufacturer and Indian dealer together. It may prove a cheap advertisement for bringing the manufacturer and Indian dealer together. It may prove a cheap advertisement for some exhibitors, and result in some retail trade.

Sales agency

Q. 30.—Merely for the products of small cottage industries these are likely to prove useful, being more beneficial to the producer than the "middleman" who generally derives the greater benefit, and in time these sales agencies may succeed in organising the cottage industries on a sound basis.

Exhibitions.

Qs. 31—33.—My limited experience regarding exhibitions tends to the opinion that in India they are likely to prove of as little utility as commercial museums for bringing together the manufacturer and Indian tradesman, on whom the former must mainly depend for marketing his products.

Trade representatives.

Qs. 34-35.—I do not think that Indian trade representatives in Great Britain or foreign countries are at the present stage at all necessary nor to have special enquiries conducted by temporary commission.

Q. 36.—Should Government appoint Director of Industries with business knowledge in each province, there should absolutely be no need to have trade representatives.

Q. 37.—Such lists, if published, are bound to prove very useful.

Government patronage.

Q. 38.—A great deal of criticism. Such occurrences as recently exposed at the Central Criminal Court, London, in the Army Contract Scandals, I am informed, are not rare in the purchasing departments of Government and railways in India. This difficulty, in my opinion, could to a great extent be overcome should a purchasing department be attached to the office of the Director of Industries (the Director should, in any case, of a necessity, be an expert businessman) in each province and purchases made of the products of each province through

them; as they are bound to know, and be in a position to judge as to the prices to be paid for different articles better than most other Government departments.

IV.—Other forms of Government aid to industries.

Supply of raw material.

Q. 40.—The only raw materials under Government control that I can think of as essential for the development of the industry in which I am interested (and no doubt many other industries) are excisable, i.e., alcohol and salt. Restrictions regarding these should be modified to suit industrial needs of the country.

Land policy.

Qs. 41—43.—The present land policy of Government is not sufficiently liberal. The position of an individual as regards acquiring land for industrial purposes is no better than that for acquiring it for any other purpose. Government should, in my opinion, encourage the acquisition of land for industrial purposes on most favourable terms, and should, if necessary, alter the law to overcome possible opposition in this respect of interested parties.

V.—Training of labour and supervision.

General.

Qs. 44-45.—By taking steps to improve their surroundings, and housing them on the same system as the Lalimli and other similar labour settlements. But in this respect Government should co-operate with industrial concerns by giving a grant of land at a nominal figure, and by arranging to supervise the sanitary conditions of the settlement.

Q. 50.—It seems to me obvious that industrial schools should be under Industries department.

Training of supervising and technical staff.

Q. 51.—After completion of the training of candidates at industrial schools and technological institutes, arrangements should be made to have them admitted as apprentices in different works.

Q. 52.—It should be left to industrial concerns to act in this matter themselves, and at their own expense to suit their respective needs.

Q. 53.—This question is entirely for Government to decide.

Mechanical Engineers.

Qs. 54-55.—I understand there is a want of uniformity in the standard of examination and even powers of certified engineers in different provinces, and steps should be taken to attain uniformity in all provinces.

VI.—General official administration and organisation.

Director of Industries.

Q. 56.—The present Director is the right man in the right place being an expert businessman with extensive local knowledge. The only criticism I have to make regarding the constitution of his office is that he is handicapped for want of expert assistants or specialists capable of taking up and solving industrial problems.

Q. 57.—For the future development of the industry, I would recommend that Government may make up the above deficiency for assisting the Director of Industries in his work. There should, in addition, be a Board of Industries, and their functions should be merely advisory.

Q. 58.—The Advisory Board should be constituted of business men, each representing the interest of a principal industry, with the necessary compliment of officials from Forest and Agricultural departments; and the Board should be under the Presidentship of a prominent business man, with the Director of Industries as Secretary. The recommendations of the Board on questions of industries should not be treated lightly by Government, otherwise no one with any self-respect would care to serve on such a Board of Industries.

Q. 60.—There should be a Director of Industries, and his principal qualifications should be an expert business knowledge.

Q. 61.—The Director of Industries should be the medium of communication between the Board of Industries and the Government.

Q. 62.—The formation of a central bureau for keeping the Director of Industries of each province posted as to the activities of the Director of Industries of other provinces. An Imperial department under a single head may prove unwieldy and unsympathetic.

VIII.—Organisation of technical and scientific departments of Government.

General.

Q. 63.—There is no organisation excepting the Assistant Technological Chemist assisting the Director of Industries.

Imperial department.

Q. 64.—An Imperial scientific and technical department is essential.

Q. 65.—It should consist of scientific experts in industries for the development of which this country possesses natural advantages.

Q. 66.—To carry out research work and solve any industrial problems referred to him by the provincial Governments.

Q. 67.—The relationship of an expert loaned by the Imperial department to the Local Government should be that the expert should temporarily be attached to the office of the Local Director of Industries.

Provincial departments.

Q. 68.—The Local Government should engage their own experts for their principal local industries and organize their technical and scientific departments to satisfy the needs of the respective province.

Q. 69.—The experts and departments should be placed under the Director of Industries.

Q. 70.—Obviously on most advantageous terms.

Co-ordination of research.

Q. 74.—Yes, measures should be devised to co-ordinate and prevent unnecessary overlapping of research activities in the different departments and colleges, and this would not be difficult should the Imperial bureau keep in touch with them, and keep each posted with the activities of the other.

Study of foreign methods.

Q. 77.—This should not be necessary excepting in cases when extraordinary development in any particular line is noticed in other countries.

Reference libraries.

Qs. 78-79.—The collection of books in the office of the Director of Industries is of great help, and if this is extended and kept up-to-date on the lines of a modern reference library under a librarian, there should be no need for any other library.

Colleges of commerce.

Qs. 80-81.—I do not think there is a necessity for one in these provinces.

VIII.—Government organisation for the collection and distribution of commercial intelligence.

Statistics.

Q. 82.—None, excepting that the names and classes of goods imported in and exported out of the country should be more particularly described.

Commercial intelligence.

Q. 83.—The commercial intelligence as at present obtainable is meagre, and as at present constituted the department seems to be merely a bureau for exchanging copies of enquiries and answers. Perhaps it could be made more useful by having a business man at the head. There should, however, be no need for such a department, should each province have a Director of Industries capable of the duties of his office.

Industrial and trade journals.

Q. 84.—The "Indian Trade Journal" has not been of much use to the oil industry.

Q. 85.—It would be very useful, and of great help to the development of industries, to have a general trade journal in each province under a competent editor. He must be a whole-time man attached to the office of the Director of Industries.

Q. 86.—It could be arranged with vernacular papers to copy the principal articles, and those of special interest could, if necessary, be collected and published periodically in vernacular in booklet forms, and distributed either free or their sale could be arranged in the principal villages and railway stations.

Other publications.

Q. 87.—The monograph on oil and soap (I have not seen the others) issued since the outbreak of war has helped to draw public attention to the industries, and the note on this subject recently submitted to Government by our Director of Industries was, to my knowledge, instrumental in attracting local as well as many Calcutta capitalists. Several of them have since consulted me regarding the establishment of oil mills.

Q. 88.—Government could give special instructions to British Consuls and representatives in foreign countries to collect information that may be useful to us, and publish this in the trade journals.

IX.—Other forms of Government action and organisation.

Certificates of quality.

Qs. 89-90.—As regards oil, working on any Government certificates of quality would not be practicable for every day business.

Prevention of adulteration and misdescription.

Qs. 91-93.—There should be penalties imposed for all adulteration and misdescription, especially of those articles intended for edible purposes. There should be restrictions placed on the import of articles that are generally used for purposes of adulteration, for instance in the case of oil, debloomed and white mineral jellies and oils, which are unnecessary in India for industrial purposes. As regards organisation for inspection, I am unable to express an opinion; but the first steps to be taken as regards oil and fat should be to close down all establishments manufacturing artificial ghee, and for blending oils for edible purposes, and make it compulsory to colour all fats unsuitable for edible purposes.

Trade marks and names and patent laws.

Qs. 94-95.—I have had no experience regarding this, but I think that the law should be uniform throughout the Empire.

Registration of partnership.

Q. 96.—I think it is necessary, and the identity of partners should also be disclosed.

Q. 97.—I think we are well served by railways as regards communication.

Roads, railways and waterways.

Q. 98.—Yes, the complaints are mainly the want of uniformity in freight for internal distribution of raw material as well as finished products, and the preferential tariff to and from the ports. My suggestion is that there should be a uniform telescopic tariff for each class of goods for the whole of India based on mileage, and the raw material and bye-products, particularly oil cake, should be carried at the minimum possible rates. Facilities should also be given as regards concession in fares and comforts to commercial travellers representing recognized manufacturing and wholesale distributing houses, as they are to some extent the means of giving goods traffic to the lines on which they may travel. On the whole, firms should be encouraged to send out travellers, as in India they are, in my opinion, the only practical mediums for establishing business relations between the manufacturer and trader. From my own personal experience I am inclined to the opinion that for pushing the sale of goods in this country travellers are preferable to exhibitions, commercial museums and other expensive shows.

Shipping facilities.

Q. 101.—I have experienced considerable difficulty as regards shipping restrictions for the export of oil and oil cake. These should be removed, and, on the contrary, facilities given for shipment.

Forest department.

Q. 105.—As regards oil industry they should certainly give us more information of the forest oil seeds, and their collection, as also take steps to extend as far as possible the cultivation of mowha and phulwa (Bassia Butericia) trees.

Jail competition.

Q. 109.—As regards oil industry, jail competition is infinitesimal. I have not interested myself to find out whether they interfere with other industries.

X.—General.

Q. 110.—In my answers to other questions I have expressed my views regarding the difficulties experienced by the oil industry in this country, and offered suggestions for the removal of these difficulties, and of the help, in my opinion, necessary for the development of the industry. I beg, however, to particularly summarise here the most important of these, and also express views on points not covered by the questions I have answered:—

(a) All possible facilities should be given for collection and transport of raw material, and distribution of products, particularly for shipping the oil and cake; and there should be a low tariff for each class of goods for wagon load quantities, and the minimum possible freight on oil cake. Tank cars should be provided where necessary.

(b) First by determining the superiority of hydraulic press cakes over the country ghany process, it should be laid down that all Government departments shall use only the former. Replace all gram and cereals wherever possible, with oil cake (most cakes are more economical and better balanced foods) for feeding Government animals such as transport bullocks, mules, horses, as also municipal transport animals.

(c) Popularizing the use of oil cake amongst the Indian farmers and cultivators, both for feeding and manure, and educating them as to its economic value; and restricting the use of cotton seed for feeding purposes by enforcing heavy cess or duty of some sort, or raising of railway freights, and refunding those charges when it is proved that the seed is crushed in oil mills; and spending the money raised by this cess or duty or excess railway freights in popularizing cotton oil cakes in the country.

(d) Discouraging when necessary the establishment of oil mills in some centres, in order to prevent overproduction of oils and bye-products for which there may be only a limited market.

(e) The establishment of soap and varnish factories in the country on modern lines should be encouraged, as these are necessary for the development of oil industry.

(f) Loan of technical experts should be given to oil, soap and allied industries, to advise and solve any difficulties they may be working under.

(g) There should be a proper survey as to the resources of the country in raw material. Collection and extension of the cultivation of forest oil seeds, such as mohwa, should be encouraged. I am informed that a great deal of mohwa seed is not collected from the forests for want of facilities, and almost the

whole of the neem seed crop of these provinces is allowed to rot due to the ignorance of people as to its value. Neem oil is now greatly in demand, and neem cake is as good as castor for manurial purposes. The extension of mohwa cultivation will also help in providing raw material for distilleries; the want of cheap alcohol is one of the difficulties in developing the oil industry, and no doubt many other industries.

(*h*) India possesses advantages for crushing the oil seeds it produces as against any other country, and the development of the industry on right lines should be encouraged.

Encouragement should also be given for rendering animal fat on modern lines, as against the wasteful and defective method generally in vogue in India.

(*i*) There should be absolute prohibition for the manufacture of artificial ghee, as this is mostly adulterated with mineral oil and unwholesome animal fat. This refers to adulterated oils also.

(*j*) The sale or the use of unwholesome animal fat for edible purposes should be prohibited, and it should be made compulsory to colour such fat while rendering.

(*k*) As far as possible the quality of raw material should be standardized, and there should be uniformity in the market rules throughout the country.

(*l*) The railway oil mills should be closed as there are facilities now for buying as much oil as may be required by all the railways in India, cheaper than it would cost them to manufacture. nor can there be any excuse now for wasting public money in starting experimental oil factories by Government. For instance I have been informed that the Madras Government has, in addition to the Anderson Oil Expellers, already installed, budgeted Rs. 3,00,000 to put up a large oil plant consisting of hydraulic presses, and to run the factory at Government risk and expense.

In case the work of building the proposed factory is not yet suspended, I would be inclined to question how far the Madras Government is justified in carrying through this new enterprise at the public expense.

ORAL EVIDENCE, 8TH NOVEMBER, 1916.

President.—I understand you are the managing director of the Premier Oil Mills?—I am practically the owner of the Premier Oil Mills.

How long have you been owning these mills?—For about five years.

Before that were you in business in Cawnpore?—I have been in business for about 20 years.

What kind of business?—It was mostly contracts. I was also assistant to a business man here in the capacity of a partner.

Hon'ble Sir Fazulbhoy Currimbhoy.—In answer to question no. 110 you say that the oil industry should be assisted by "discouraging when necessary the establishment of oil mills in some centres, in order to prevent overproduction of oils and bye-products for which there may be a limited market" How do you suppose that there is a limited market? India is such a big country. There are no protecting tariffs. Your oil can go to any other part?—For instance there are oil mills for crushing rape seed in Bengal. That oil is only suitable for the markets of Bengal or the United Provinces. It is not suitable for export and therefore they should curtail their production.

But if private people start industries on their own account why should Government stop them?—I don't say stop them. I say discourage them.

Hon'ble Pandit M. M. Malaviya.—In answer to question no. 40 you say the only raw materials under Government control as essential for the development of the industry are alcohol and salt, and that restrictions regarding these should be modified to suit the industrial needs of the country. What is your definite proposal about salt?—Salt is required for soap manufacture. It should be duty free.

And in regard to alcohol?—Alcohol also is required in some stages of oil refining. The restrictions placed are so great that we cannot use it for industrial purposes.

Hon'ble Sir F. H. Stewart.—Are you engaged in the export trade at all?—Not engaged, but I have studied the export of oils.

You have not found the "Indian Trade Journal" of much use in your own particular industry?—No.

You are inclined to abolish the office of the Director-General of Commercial Intelligence?—Yes.

You recommend a separate journal in each province?—Yes.

Do you think it is feasible from the point of view of expense?—I have only considered the utility of it but not the expense.

Mr. A. Chatterton.—You say that the Madras Government has, in addition to the Anderson Oil Expellers already installed, budgeted Rs. 3,00,000 to put up a large oil plant consisting of hydraulic presses, and to run a factory at Government risk and expense. Have you any accurate information regarding the state of the oil trade in the Madras Presidency?—I have made careful enquiries, and have personal knowledge regarding the crushing of oil seed throughout India. When the experiments have already been carried out by private individuals, it is not fair for Government to come forward with a similar scheme.

Do you know that the United Provinces Government some years ago established an oil mill here, and it resulted in the development of the oil industry in these provinces?—Yes. But they closed down without proving anything. I am working under modified conditions.

You think that the Madras Government has no right to initiate experiments in the Madras Presidency?—Ask private capitalists first whether they would start the industry themselves.

As regards your opinion on the action of the Madras Government, you have no detailed knowledge why they propose these mills with hydraulic presses. You have no local knowledge of the circumstances which led them to do that?—My information is obtained from the Press. They wish to make groundnut oil as good as that in Marseilles.

WITNESS No. 25.

MR. T. GIBB, *Government Distillery Expert, Allahabad.* Mr. T. Gibb.

WRITTEN EVIDENCE.

The written evidence submitted applies to the distilling industry—and its correlation to other industries—those existing and these awaiting development using spirit as a raw material. The witness is Excise Distillery Expert for the United Provinces, Punjab, Delhi, North-West Frontier Province and Ajmer Merwara. An officer originally of the Home Customs and Excise Service, which he entered by open competition in 1894, he was transferred to Indian Service in October, 1909, as a result of the Indian Excise Committee's Report, 1905-6, with a view to advise local administrations on modern excise control of distilleries. The witness is not a trained chemist or distiller; but in the course of his 22½ years' official work he has obtained considerable practical knowledge of distillery plant and processes, and of trades using spirit as a raw material. Distilling industry.

The United Provinces at present possesses 14 distilleries. Four are privately owned, one each at Lucknow, Rosa (Shahjahanpur district) and two at Cawnpore. Of these distilleries one at Cawnpore, the Indian distillery, is run on Indian capital under European management. The others are owned by limited companies under European management. The Indian distillery, in witness' opinion, is run on the most economical lines and is the furthest advanced in plant and processes. All four possess plant capable of producing spirit for industrial purposes, i.e., of high alcoholic strength for which, at present, there is only a very limited demand. The demand supplied by the four distilleries during the year 1915-16 for purposes other than potable, was 18,384 imperial gallons of denatured spirit and 18,315 L. P. gallons of rectified spirit. A considerable quantity of both classes was exported to other provinces. The denatured spirit was probably used for ordinary domestic purposes, such as lighting, heating, etc., and by small tradesmen for simple processes such as the manufacture of varnish, etc. So far as witness is aware there exists, at present, no large industry in the provinces depending on alcohol as a raw material. The rectified spirit was supplied, mostly, to public institutions, duty free, for laboratory and dispensing work. The total output of the four private distilleries for 1915-16 was 7,19,075 L. P. gallons. The possible output is estimated at 1,360,000 L. P. gallons. It is not proposed to offer a written statement explaining why the four distilleries cannot be maintained in full-time employment. Witness thinks this would be more appropriate to his oral evidence.

Of the remaining 10 distilleries, one at Saharanpur is owned by Government. It represents an attempt made to preserve the indigenous distiller who operates in the public distillery to be referred in next paragraph. The buildings are modern. Rupees 21,000

were spent in 1903-4 and 1908-9 on improved plant which is the property of Government. The distillery is run on Indian capital, by a small group of Indian capitalists, and the supervision is entirely Indian. The company rent the distillery buildings and plant from Government. During the past seven years the expenditure on repairs and improvement of plant and buildings has exceeded the receipts in rent from lessees. The output of the distillery goes solely for potable purposes and in 1915-16 amounted to 60,974 L. P. gallons. The company has not met with much financial success. Witness understands that, in some years, a small dividend is earned but has reason to believe that a loss is now being incurred. The distillery, in common with the four mentioned in previous paragraph, depends on Government contracts for the supply of potable spirit to certain areas of the province. The contract price is considerably higher than that given to the other four distilleries. The plant is suitable for the production of a high class potable spirit but is unsuitable for producing a high strength industrial spirit.

The remaining nine distilleries are owned by Government and are situated at district headquarters. The distillers for the most part are small men, forming a small sub-sect of the Vaish caste, who for generations have carried on the art of distillation—disposing of their product in their own shops. The "Kalwar", as he is called, carries on his operations in the Government distillery compound. He pays a monthly fee to Government for the privilege of so doing and spirit manufactured is stored in Government godowns until it issues, on payment of duty, to the shops. The plant used is very primitive and wasteful. As compared with the modern distiller, the Kalwar obtains at least 30 per cent. less spirit from the materials used. This is due to two causes, viz. (1) lack of knowledge of the fermentation process and (2) to the defective nature of the distilling plant. The spirit produced is highly impure according to European standards. Owing to the nature of the distilling plant it is almost impossible to prevent copper contamination. Government is at present expending Rs. 27,000 in two selected distilleries at Allahabad and Fyzabad on improving the water supply and distilling process. The Kalwar is expending a sum of approximately Rs. 700 on an improved still of witness' design. The sums spent will result in the issue of a purer and more wholesome spirit to the consumer but, in witness' opinion, no advance in economy of process is possible in the Government distillery. The Kalwar possesses no scientific knowledge himself and he employs the ordinary coolie for the work. It is hopeless to look for a supply of cheap industrial spirit from the Kalwar until there is scientific supervision. Government policy at present is to close all the public distilleries with the exception of Allahabad, Fyzabad and Saharanpur by 1920. The potable spirit supply of the province will then depend on these distilleries and the four privately owned. It is witness' private opinion that the process of elimination of the Government distilleries should be hastened so that those remaining, especially those privately owned, may be run on sounder commercial lines with an increased output. It is clear that the prime cost per gallon must fall considerably by keeping the working staff and plant in full employment. This is important if industries, depending on alcohol as a raw material, are to be developed. A distillery cannot, in witness' opinion, be run economically on an output of less than 200,000 gallons annually. Presuming that the supply of spirit falls eventually on the seven distilleries the following table will show the position as regards a possible industrial spirit supply :—

Name of distillery.	Present output. L. P. gallons.	Estimated possible output with present plant. L. P. gallons.	Estimated potable spirit demand. L. P. gallons.	Margin available for industrial purposes. L. P. gallons.
Private.	Rs.	Rs.		
Rosa	2,58,601	4,00,000		
Cawnpore Sugar Works	1,73,988	3,30,000		
Cawnpore Indian Distillery.	1,33,929	3,30,000		
Lucknow	1,52,557	3,00,000		
Government.				
Saharanpur ...	60,974	60,974		
Fyzabad	85,400	85,400		
Allahabad... ...	56,993	56,993		
Total ..	9,22,442	15,63,367	13,00,000	2,63,367

The bases used at present for production of spirits are mohua and sugarcane molasses. Both have the same spirit content, practcially,—4·0 L. P. gallons per maund. Mohua is the cheaper base and, for this reason, would be relied on chiefly for the production of industrial alcohol. It is the dried flower of the *Bassia Latifolia* tree which is indigenous to the central and eastern districts of the province. The tree seldom fails to give its crop of flowers in April. There was a partial failure this year and prices are higher, causing distillers to rely more on molasses, either indigenous or imported, the latter a solidified type supplied by the Java sugar factories and capable of producing 4·7 L. P. gallons per maund on an average. Industrial alcohol can be made available from distilleries working on a mohua base and on a commercial scale—at Re. 1·4 0 to Re. 1·6·0 per imperial gallon of strength 65—67 overproof. This price compares favourably with prices in Europe. In witness' opinion a survey of the mohua resources of the province should be made either by the Forest department or department of Agriculture. It is important to have concise information on this point if an increased demand for industrial alcohol is to be met. If the resources are limited the Forest department might supplement them by judicious afforestation.

It might almost be said that the industrial progress of a country can be measured by the quantity of alcohol used in its industries. Unfortunately, the high tax on alcohol used as a beverage prevents its unrestricted use for industrial purposes unless in a denatured or unpotable state. The ingredients used for denaturing in India are caoutchoucine and mineral pyridine bases which, under the present abnormal conditions, add 3 annas per gallon to the cost of the alcohol. Denaturation is done in the distillery, under Government supervision, and the denatured spirit is liable on issue to a 7½ per cent. *ad valorem* tax calculated on a *valorem* of Rs. 2-8-0 equal to 3 annas per gallon. Witness has recommended Government to abolish the tax and it is understood that abolition is contemplated by the Government of India at next re-arrangement of tariff. The cost of denaturation is borne at present by the user and must remain so. The provincial denaturing regulations are elastic in so far as special ingredients may be allowed where it is proved that the standard denaturants hamper special industries. So far as witness is aware the soap industry is the only one from which an application has been made. Sanction was given but has fallen into disuse. An application from the perfume industry at Kanauj is at present under consideration. The provincal denaturing regulations, in witness' opinion, are not such as can hamper industrial development. He would only invite the Commission's attention in this connection, to the following points: (1) the necessity for uniformity in the denaturing regulations of all provinces, (2) the free inter-provincial exchange of spirit, denatured under excise supervision. These points are clearly important if industrial expansion is to be considered as a whole. Regulations are not uniform at present; and as regards (2) some provinces, notably Bombay, raise unnecessary obstacles, in witness' opinion.

Industrial development has probably proceeded further in Germany within a comparatively short period of time than in any other country. As an index of this development it may be stated that 10,302,630 gallons of spirit were used for domestic purposes and in her industries in 1886. The denaturing laws were passed in 1887 and in 1907, twenty years after, over 100 million gallons were used. The consumption in a few trades are given for the year 1903 :—

Trade.	*Imperial gallons.*
Vinegar making	3,624,588
Polishes, lacquer and varnish ...	1,498,090
Ether	1,135,398
Medicinal extracts, coal tar, colours, etc. ...	850,014
Celluloid	493,636
Paints and colours	118,734

The following are some of the figures for United Kingdom for the year 1901 :—

Trade.	*Imperial gallons.*
Finish, varnishes, lacquer, stains, paints, enamels, etc.	1,221,013
Soap	144,384
Hat making	121,104
Celluloid	106,589

Trade.	*Imperial gallons.*
Ether, chloroform and iodoform	97 906
Explosives	48,052
Medicinal extracts, medicaments, fine chemicals ...	39,637

In witness' opinion attention might usefully be given in India to development of a few of the above-mentioned industries. In a country where shellac, resins, turpentine and spirit are available, the manufacture of varnish seems particularly worthy of attention. Witness also desires to point out the possibilities of use of alcohol as a motor fuel. Petrol is selling at Re. 1-7-0 per gallon. Alcohol at the same price (denatured) might prove a useful stand-by should supply of petrol fail. The point is receiving close attention at home. The possibilities for coal tar dyes might also be mentioned. India has the coal and cheap alcohol, necessary. The production of methyl alcohol, obtained by the destructive distillation of wood might also repay investigation. This subtance is in large request as a denaturant in most countries and the residue of manufacture, charcoal can be easily disposed of.

Witness is strongly in favour of an industrial, research or technological institute for each province at any rate the larger ones. Such an institute would be useful, as regards the distilling and sugar industries which are closely allied, in the investigation of processes of fermentation, denaturation, etc. Witness favours the idea of small groups of investigators working under local conditions and on local materials rather than a central institute out of touch with local requirements. The provincial institute should, clearly, be under the control of the provincial Industries department. Access to assistance from the institnte should be made as easy as possible to traders requiring help in technical difficulties. The result of any investigation made should be available to others in the particular industry. The expert is often in a difficult position. An instance may illustrate this. Witness' colleague in Bombay Presidency considered that a certain plant would be more economical for preparing mohua spirit than that usually used. The plant is expensive and there was difficulty in persuading any firm to instal and give it a trial. The plant was not known to Indian distillers. A firm eventually came forward to purchase it and I have recently had an opportunity to examine its working. The question arises whether, as a Government expert, witness is justified in distributing to the distillers of his circle the information gained. Witness thinks he is not—it would be unfair to the Bombay firm who undertook the risk of failure of plant and is entitled to reap any benefit. With a Government technological institute it would be different. Research made by Government officers would be open to all the trade. If research demanded practical experiments at a factory on a commercial scale these should be done, in witness' opinion, at Government expense, and the results made available to the trade. In the development of new industries the technological institute should have funds to provide for demonstrations on a small commercial scale. It is witness' experience that the Indian wants to be convinced of the practicability of a new apparatus for his trade before he will venture a change. In the case of the improved still mentioned above, witness obtained sanction from Government to purchase a sample, built to his design, and worked it in Allahabad distillery for demonstration purposes. The distillers were at once convinced of the improvement.

Witness favours the appointment of trade representatives abroad, especially in the leading industrial countries, such as the United Kingdom, United States, Germany and France, and in countries, such as Russia, where development is likely to take place. These representatives or commercial consuls should if possible, be men trained to commerce and fully aquainted with Indian resources and conditions. They would be under the control of the Commerce and Industry department. The representative in the United Kingdom should be at the India Office and a useful combination there would appear the purchase of stores for India. The witness ventures his opinion on this point with some diffidence. Sometime ago his attention was drawn to it by the following case. Witness, from information received from private sources at home, formed the opinion that a market was open in London for industrial spirit for use in the manufactures of high explosives for munitions. He made enquiries in Cawnpore, prepared an estimate of price, and moved Government to communicate with the Ministry of Munitions on the matter. The reply was received that the ministry was purchasing spirit for this purpose at one penny per gallon cheaper in London and expected the rate there to fall a little further. The ministry, unfortunately, not possessing the commercial instinct apparently, missed the essential point of the Indian quotation which included the cost of the cask or other container which had been placed at 8 pence per gallon. There is, in witness' opinion, a market in England, France, Italy and possibly Russia for Indian industrial spirit at any rate in these abnormal times. Even if Indian distillers had agents abroad it must take months to get in touch with a new market. Disappointment and vexatious correspondence only serve to increase the enertia which is so apt to creep into commerce and officialdom alike in this country.

The ordinary labourer in this country is efficient and skilful enough for distillery requirements. The urgent need of the industry is for skilled supervision. The witness feels quite safe in stating that there is more lack of this in the distilling trade than in almost any other. The success of a distilling concern depends, not on the skill of the labourer, but on the technical knowledge and directing power of the supervisor. A skilled manager should have a sound knowledge of organic and inorganic chemistry and laboratory practice. A knowledge of mechanical engineering, though not essential, would also be useful. A science graduate ought to make a suitable distillery manager after he has taken a postgraduate course in practical work and accounting at an up-to-date distillery. Witness in 1914 suggested to Government that aid might be given to spirit manufacture by the grant of a few State scholarships to enable students to study European processes in Europe or in India. European managers in this country have had to pay heavily for their training and education and are not anxious, naturally, to reveal their methods and processes to enquirers without recompense. The only course open to the aspirant, therefore, is to enter a distillery either as a pupil paying a heavy premium or as a subordinate on a very low pay. I know of only one up-to-date distillery in this country where pupils are trained—the Indian Distillery, Cawnpore. The premium charged by Mr. G. H. Dickson, the managing partner, for a course of instruction is Rs. 2,000. Few students would be able to pay this sum; and few, after taking a science course at college, would be willing, witness thinks, to accept a low paid subordinate post in a distillery on the chance of getting to know the processes. The social stigma attached to the trade also militates against a supply of capable men, even though one fully qualified could command an initial salary of Rs. 200—300 per mensem. The study of processes in Europe would be expensive and in some ways of less practical value than instruction received in this country. Considering how closely alcohol is interwoven into a developed industrial fabric, witness suggests to the Commission that the supply of Skilled supervision to the industry might be increased by giving aid to science graduates, either in the shape of State scholarships for a course in sugar and alcohol manufacture (which are closely allied) in Europe or a grant to cover instruction as premium pupils at approved factories in this country.

ORAL EVIDENCE, 9TH NOVEMBER, 1916.

President.—Your activities extend over the adjoining provinces of the Punjab, Delhi, Ajmer, and the North-West Frontier Province?—Yes.

What other officers of the same kind are there in India?—There is one for Bombay, Sind and Baluchistan. There is one for Bengal and Assam. There is one for Bihar and Orissa and Central Provinces. There is one for Madras. There is no special officer for Burma Occasionally the Madras officer goes over there.

Were these all brought out from the Excise department?—All except the Madras officer came only recently. It was on the work of the Madras officer that the Excise Committee decided that there should be similar officers in the other provinces.

What means have you of getting into touch with one another so as to adopt a uniform policy?—When I came to India, first I accidentally met the officer who was then Inspector-General of Excise for India. He originally was the Secretary of the Indian Excise Committee. That was Mr. Todhunter. I met him in Ajmer and I explained to him that there was no uniformity of policy and that it would be a good plan if we all met in yearly conference and discussed local conditions, and I asked him to move in the matter as he was the chief official concerned. The matter has not been taken up since then.

Nothing has been done to make you all meet in conference?—No. We occasionally correspond.

What officer of the Government of India do you come under?—We work entirely under local control. I am not in direct imperial touch.

You have no Imperial officer over you?—No. In fact, in my opinion, they took away the Imperial officer—the Inspector-General of Excise—just at the time when we wanted him.

You stay in the United Provinces for six months, in the Punjab for five months and in the rest of the provinces for one month?—The division of my pay is two-third for the United Provinces and one-third for the Punjab. The Frontier Province and Ajmer-Merwara pay nothing.

Can you tell us shortly what your duties are?—The whole idea of my appointment was this. The officers-in-charge of the control of Excise in India were not acquainted with the modern system of excise which has come to such perfection in England; after an evolution of nearly three hundred years. Our advice was more especially required in connection with distilleries.

Although the system is fairly well crystallised at home each officer has his own views on many questions. Is it not likely that you give to the Local Governments different views?—Naturally the views of men vary, but I believe they do not vary very much in the essentials.

Do you write an annual report for each province?—No. I consult with the heads of the excise administration of the different provinces as I go round and tell them what things would be of general interest for the annual excise report. That is purely verbal.

Are you of opinion that if we take up research work as well as administrative control of questions relating to sugar together with questions relating to alcohol, there would be enough problems in both industries to occupy an Imperial Department?—As far as alcohol manufacture is concerned, I would not have an Imperial Department, because it would not be in touch with local questions. You want something that is near you and works on the problems and conditions around you. The temperature for instance varies in different parts of the country and that is a great factor in alcohol manufacture.

Are there problems of research in connection with both alcohol and sugar?—So far as acohol is concerned it is one of the most scientific subjects that you could tackle.

What about sugar?—I know very little about sugar.

You would not approve of an Imperial Department so far as alcohol questions are concerned? What form of link would you like to have between you and the other distillery experts?—I would like a yearly conference between us. It might be twice a year.

Do you find that your work of inspection takes up the whole of your time and that therefore you feel you are not doing as much as you would wish to?—I am certainly much handicapped. It is no good going round as an expert unless you have some measure of control over the subordinates whose work you are supervising. For instance I cannot issue a single order and I cannot enforce it. That is the only real difficulty in this connection.

Do you find that, on the whole, the distillery work is conducted in a satisfactory way or is it primitive?—We have decidedly made very large advances.

Are the raw materials turned out to the best advantage?—In some cases, yes. In other cases, no. There is a considerable wastage of material through want of technical knowledge.

How do you propose to remedy that?—The great difficulty is to get a proper distillery manager. We cannot get him now. If you send to England for a man, he has been working on a temperature quite different from th t in Northern India. After all distillery operations depend on temperature; so it is very difficult for a man trained in the processes in England to adapt himself to Indian conditions. Labour conditions are also different.

Can you suggest any way by which people in the country could be trained?—I have dealt with the subject in a general sort of way in my written evidence.

What kind of training would you suggest? What should be the preliminary knowledge?—He must have a knowledge of chemistry, organic and inorganic. The ideal distillery manager must also have some knowledge of mechanical engineering. I should prefer a science graduate, about 19 or 20 in age.

How long will be the period of practical training?—Not less than a year.

Would he be able to manage a distillery after that?—He would have to go through all the different shades of climate during that time to learn his business.

Do you think there would be good openings in the country?—Quite good openings.

What is the reason that you think that young Indians do not take to this work?—My opinion is that they have no opportunity. Most of our modern distilleries are run by European managers, who have had to pay highly for their education and they are naturally not very prone to assist young men. There is jealousy, I believe.

You are of opinion that alcohol might be made use of on a larger scale for industrial purposes?—Yes; of course, but you must get the industries first.

Are there industries already which use alcohol?—Not in these provinces. We only sell about 18,000 gallons a year for domestic and industrial purposes.

Does the excise duty limit the use of alcohol in industries?—The duty has no reference to the points at all. We have no industries that use alcohol. We have an application from Mr. Silver for a small industry in perfumes.

Do the industries get alcohol duty free?—It amounts to three annas a gallon as compared with probably about 15 or 16 rupees of ordinary potable spirit.

Then it is nearly duty free for industries?—Yes.

What are the industries that use it now?—At present it is used by people for domestic purposes and in the bazar for making polishes for furniture. The use is very small at present.

Has a man got to get a license for taking alcohol duty free?—The men who sell it have to pay a small sum. A large tax on alcohol is not insisted on when it is going to be used for domestic and industrial purposes.

Who will certify that it is not going to be used for drinking purposes?—The alcohol is denatured. It is first rendered unpotable, then there is no danger.

What are the denaturants?—Caoutchoucine and mineral pyridine.

That renders the alcohol unfit for motor fuel?—I do not know sufficient to say that.

You think that there are no serious restrictions against the industrial use of alcohol in this country?—There are no restrictions.

What justification is there for the complaints that industrial companies in this country are unable to obtain industrial alcohol duty free?—I cannot say. The Government of India tariff levies a three annas duty.

President.—If anybody wanted to use alcohol for industrial purposes the amount he will have to pay would be only the price of the alcohol itself, plus the cost of the denaturant plus three annas a gallon?—That is the total.

There is no justification for a complaint that industrial alcohol cannot be obtained in this country duty free?—Not so far as these provinces are concerned.

I suppose for most processes used by manufacturing chemists pyridine and caoutchoucine would render the alcohol useless? Is it possible for them to be re-distilled?—Re-distillation would be of no use. There is only one method of taking out these denaturants at present. (Witness described the method.)

In that way I suppose the excise regulations could be defeated?—Yes. But very few people know that.

There is some difficulty in the way of the manufacturing chemists getting alcohol duty free?—We have no manufacturing chemists in these provinces. We have never had an application.

Did you never hear of any complaint from the Dixon Chemical Company at Dehra Dun?—So far as I know no complaint has come before me officially.

Supposing they could show that alcohol was necessary for their manufacture and that the imposition of the ordinary excise duty was enough to paralyse the industry dependent on alcohol, could you think of any way by which they could be given the privilege of getting alcohol duty free?—We would consider the manufacture of the particular article that was going to be taken up and would impose probably certain not very strict regulations as regards inspection of the factory and the use of a special denaturant.

You think that their application could be satisfied?—I think so.

You have never had any kind of application?—No.

Is it possible that your Government has received such an application?—Quite possible.

To whom would it go?—It would probably go to the Excise Commissioner. He works under the Board of Revenue.

Would the decision be given without your knowledge?—It is quite possible, but it is not very likely. It might have been made to the Government of India.

Have you heard of this matter indirectly from the papers?—No. I did hear of it indirectly from Mr. Hailey, the Director of Agriculture. He mentioned it to me once. I told him that so far as I was aware we had not been asked to do anything.

Have you seen the Dixon Chemical Works?—No.

Have you been able to form an opinion as to the value of alcohol for motor fuel in this country?—We did have an application from a local distillery here. It came to the Excise Commissioner, but he did not consult me on the point. He consulted the Chemical Examiner who deals with departmental analysis. I believe that the application was refused.

You have not formed an opinion yourself as to its suitability as motor fuel?—I simply take an interest in it. It is a question that is occupying the attention of every country in Europe. I am not speaking of it from a scientific point of view. I am only interested in it from the excise point of view. I cannot speak about its suitability.

Hon'ble Pandit M. M. Malaviya.—You say in your evidence "the high tax on alcohol used as a beverage prevents its unrestricted use for industrial purposes unless in a denatured or unpotable state." Do you think that if the tax on denatured spirits were removed it would be more largely used for industrial purposes?—Yes.

You have recommended to Government that this tax should be abolished?—Yes. I have recommended the abolition of the tax on denatured spirits.

In your note you compare the figures showing the vastly increased use of denatured spirit in Germany during a period of 20 years. Do you think that if denatured spirit were more largely available its use is likely to be increased for domestic purposes as well as for industrial?—It would increase, if you had the industries. We have practically no demand at present.

Will its cheapness stimulate the industry?—We could produce alcohol as cheaply in India as in any country in the world.

But you have said that the tax should be abolished?—I do not think there should be a tax on spirit that is not drunk. We should not handicap industries by imposing a tax on spirit used for industrial purposes.

You have strongly recommended the establishment of industrial research technical institutes for each province and you think that problems of sugar and distilleries and of alcohol might be tackled there. Again you recommend that postgraduate studies might be encouraged for practical work in up-to-date distilleries and you think that it will bring up a class of skilled managers. Are you aware that in England brewing is one of the subjects taught in the modern universities?—Yes, especially in Manchester.

Are these denaturants caoutchoucine and pyridine manufactured in the country?—I think caoutchoucine is made by Waldie & Co. of Cawnpore in this and in other places. It is made from used rubber.

You refer to the abnormal conditions which add three annas to the cost of the alcohol. Are these conditions due to the war?—The high price of denaturing material is due to the war. It did not cost so much before the war. It might be due to stoppage of import.

What about pyridine? Is it manufactured here?—It comes from England, I believe.

You do not know of any chemist who makes it here?—I do not know. It could be made in India.

Does the Indian Distillery Company at Cawnpore get large contracts from Government?—Yes.

Don't you think that a distillery which is patronised by Government should be bound to receive students to train them, a certain number of them?—So far as the Government contracts are concerned it is purely a business transaction. I do not think the firm should be called on to do anything privately without payment.

Hon'ble Sir F. H. Stewart.—You have referred to the difficulties about control and also to waste. Do you find these in both Government and private distilleries?—Yes, in the case of both.

Who is the officer with executive authority?—It is the Excise Commissioner.

If you report the cases to him, would he not exercise his authority?—As a rule he supports me. I do report to him. It is not very difficult for the man on the spot however to see that I have no power to enforce what I wish him to do. He does not look on me in the same way as if I had executive authority over him.

You recommend the elimination of the Government distilleries?—Do you think that would have the effect of improving the output?—It would give the really modern distilleries on which we have to depend for industrial alcohol a better output. At present their plant is not fully employed.

Can you tell us something about the *ad. valorem* tax?—One difficulty about the *ad valorem* tax is that it varies in different provinces. There the want of uniformity comes in. The tax is lower in Bengal than here. It is also lower in Bombay. If we had a uniform policy in India it would be better because there are complaints regarding the

variation in duty. The duty is 7½ per cent. *ad valorem*. The value factor varies in different provinces.

Would you consider these provinces particularly suitable for the use of alcoholic industries?—Yes. We have got the Himalayan forests.

Hon'ble Sir R. N. Mookerjee.—Do you think that a science graduate with one year's apprenticeship would be able to become a mechanical engineer?—When I speak of mechanical engineering, I mean some knowledge of mechanics, the method of running machinery. I want the learner to devote his attention only to distillery work during his training.

Do you not think that engineering students of Roorkee and Sibpur would be suitable candidates?—I think they would be useful men if they had taken chemistry in their course.

Dr. E. Hopkinson.—Your duties are entirely connected with excise?—Here, officially, I do only distillery work. I have had experience in England of other things.

Why are you in favour of the gradual elimination of the Government distilleries in favour of private distilleries?—The Excise Committee recommended the adoption of the contract system of supply for the supply of spirit to certain fixed areas. For instance in the case of the Cawnpore district, the Government issue tenders for the supply of spirit at a certain fixed price and the contracting distiller delivers inside that area and all the vendors get the spirit at the contract rate. Only one half of the province is under the contract system. The other half is under the Government distillery which is at the district headquarters and supplies the local vendors at whatever competitive price they can get. There are thus two systems alongside of one another. The modern distillery sells very little outside the contract area, the Government contract having got to keep them going. We are gradually adopting the contract system by the elimination of the Government distillery and when that comes, then the modern distillery will get a fairly good output. I therefore recommended that we should eliminate Government distilleries.

Mr. A. Chatterton.—You have got 14 distilleries in the provinces? Of these 10 are Government distilleries?—Yes, the Government distilleries are of the old-fashioned type.

What is the length of the period of these Government contracts?—Three years.

Are they sold by auction?—No, by tender.

What material do they use for the preparation of alcohol in the Government distilleries?—Mohua and sugarcane molasses.

What special denaturants can you suggest for industrial alcohol?—It all depends on the trade, whichever is most convenient to the trade is used. Germany has, for instance, a hundred denaturants suited to different trades.

As a matter of fact in these provinces no special denaturants are used?—No.

Is there no manufacture of vinegar?—It is made in the bazar.

By fermentation?—Yes.

Is that under inspection at all?—No. I recommended that it should be inspected, but they did not adopt my suggestion.

Are methylated spirits sold in the bazar?—Denatured spirit is sold. Methylated spirit is not sold.

Is there any regulation preventing the sale of methylated spirit?—Yes. The official denaturants are caoutchoucine and pyridine. Denaturation is done under Government supervision at the distillery and we should not allow the use of methyl alcohol as a denaturant.

That is the result of the Excise Committee?—Yes.

Do you know if there is any serious objection to the use of methylated spirit?—On that point I should like to take the opinion of the chemist.

If methylated alcohol was allowed is there any tendency for it to be used as a potable spirit?—I do not think so.

Is there any difficulty here in the storage of mahua?—It is a very difficult thing to store. It heats very easily. I know one distillery in which there was very nearly a serious fire.

Is the supply of mohua practically inexhaustible for the purpose of making spirit?—As we are at present, but it may not remain so. If we use a lot more industrially th supply may not be enough.

Government at present have ten distilleries. Instead of them if you had one central Government distillery would that be of any advantage in the administration of excise?—It would be a decided advantage.

Are you of opinion that it should be done departmentally or by contract?—I think it should be done by contract.

It is much the cheaper?—There are obvious difficulties in working a distillery departmentally.

What are the difficulties?—I do not think that Government could run a distillery or any other factory as cheaply as a private individual.

Supposing that a factory was started in which spirit will be used for the manufacture of ether or chloroform, how do the excise regulations provide for that?—You would have to use pure spirit of wine?—There is excise provision for that and there would be no difficulty in carrying on operations.

You would not have to keep excise officer permanently on the premises?—In very few cases would this be necessary. Only in the making of high explosives is this necessary. The excise regulations are not such as to hamper any industry.

If you want to use alcohol for industrial purposes there are no difficulties placed in the way of its use by the excise regulations?—I am of that opinion.

President.—Have you any other points which you desire to bring to the notice oy the Commission?—I should like to place before the Commission the question of the difficultf of getting plant in India for distilleries. In alcohol manufacture you use a large number of copper vessels. We have not got the men who know the secret of making copper vessels, stills and things like that properly. This is a very useful little industry that could be started by Government by providing some means of giving local coppersmiths the necessary training in the method of making tapering pipes and things of that kind. If the Indian coppersmith had a little guidance on the point he could, I think, do the work well.

WITNESS NO. 26.

Hon'ble Rai Bahadur M. Prag Narain Bhargava.

THE HON'BLE RAI BAHADUR M. PRAG NARAIN BHARGAVA, *Lucknow.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

Capital

Owing to circumstances which need not be recounted here it is a fact that cannot be gainsaid that we Indians with little capital and imperfect education cannot achieve anything substantial in the industrial field unless and until the Government is prepared to give us effective help. Capital is the first requisite for success in any industry, but in India it is not easily forthcoming. India's poverty is now proverbial, but what little money there is it is chiefly in the hands of those who lack in industrial enterprise. Owing to considerable lack of organisation, enterprise and confidence on the part of Indians, capital does not flow into industrial pursuits as it does in other countries or as it ought to do here. Then the capitalists shrink from investing their capital in industries which have not been tried so far and about the success of which, owing to diverse causes, there is hardly any certainty. The best means of raising industrial capital is by means of banks, but banks are also not doing as they ought to do. The crisis that took place just before the war has had a very chilling effect on the banking institutions from which it will take some time to recover. An attempt must be made to start banks where unspent savings of the public could go and which could help industrial enterprises Another way is to start industries as joint-stock concerns. The amount of individual shares should be fixed at as small figures as possible.

Government assistance.

In India, which is industrially by far the most backward country in the world, Government's assistance is most needed. Many an industry can be started and successfully worked only if the Government could give effective assistance. There are many ways of doing it. Of course different industries require different forms of assistance: money, grants-in-aid, bounties and subsidies, guaranteed dividends for a limited period with or without subsequent refund to Government of the expenditure incurred inf paying dividends at the guaranteed rate, loans with or without interest, supply of machinery and plant on the hire purchase system, provision of part of share capital o

companies on the same basis as public subscriptions of capital and guaranteed Government purchase of products for limited periods are all good in their way. Personally I am not much in favour of money grants and subsidies in this country. They are very helpful in encouraging the export of manufactured articles to countries which can produce them under more favourable circumstances. That day seems to be very distant from us when we will be able to send our products to other countries. For the present we will be content if we could supply our own requirements even partly with regard to commodities for the manufacture of which raw materials are available in our country. Besides money grants-in-aid and bounties and subsidies have, in the long run, a discouraging effect on the industries. Guaranteeing of dividends for limited period with or without subsequent refund to Government of the expenditure thus incurred is, to my mind, the most effective form of aid. This method attracts capital from capitalists, who are otherwise slow in investing it in industries and this is the main desideratum. Loans with or without interest are good in their own way. As an example I may mention the case of the paper industry in this country. The country-made paper cannot compete with the imported article for several reasons. There is no factory in India which could manufacture pulp under the most advantageous circumstances. A company was started a few years ago to undertake the manufacture of pulp at a place where it could prove most economical. This being an altogether new industry, the success of which was not a certainty, sufficient capital was not forthcoming. The outbreak of war added to the difficulties. The importation of the necessary plant has become extremely difficult. Now, if a company like this could be assisted by the Government by guranteeing a dividend like the municipal guarantee to some electric concerns for a limited period without or even with a subsequent refund, the success would be assured In the first place likely investors who are keeping themselves aloof from the enterprise will at once purchase shares as soon as the Government's help is announced. In the second place when Government will accord financial help to a concern it will demand a certain amount of control also, which will result in better management. Now, the question arises what should the Government control be in case an industry is financially assisted by it. I would advise the minimum of such control. In the first place the Government should see that the management of affairs is in the hands of experienced men of business who care more for the good management of the same rather than for their own personal gain. The Government might require regular accounts and reports submitted to it by the management of the concern. The Government might depute an expert to inspect the factory. A part of this expert's salary might be paid by the company.

Pioneer factories.

In the pioneering of new industries Government should proceed very cautiously. So far Government has acted mostly on the advice of non-expert officials and the result has been the reverse of satisfactory. The proposed project of an *ulla* grass factory and the cotton seed oil factory at Cawnpore are examples. The department of Industries must make thorough investigations as to the possibility of a certain industry being started as a paying one. When this has been done, it may invite the public to start a company to undertake it, itself of course giving every help, scientific and technical, in the beginning. If, owing to the newness of the industry, people do not come forward, let the Government start the industry itself.

If it is a success private capitalists will come forward to subscribe shares. These shares, as many as there is demand for them, should be sold to the public. When all or most of these shares have been disposed of and the public demand that the management should be placed in their hands, Government might gradually shift their control to the public—of course till the concern has proved a complete success Government must keep a part of the powers in its own hands; for example, the power of inspection of the machines, power of checking the accounts, and so on. Till that time one of the Directors should be a Government expert, a part of his salary being met from the funds of the concern. Care must be taken that Government pioneers only new industries and that too in the way of demonstration only, so that there is no competition with existing private concerns. I do not believe in Government being the permanent owner of concerns which can be run or conducted by private capitalists or joint-stock companies. I should be glad indeed if even the railways are owned by joint-stock companies with Government control in certain respects, but the country being a poor one it is almost an impossibility for a very long time to come for the people to own big railways.

Financing agencies.

Banks might advance money, but they cannot create confidence in the minds of the public about the success of the industry. Government's assistance will do both.

Co-operative societies.

Co-operative societies have been doing a great deal to help our industries, but they have been helpful only to small industries, specially dairy, cattle breeding and agriculture. The co-operative workshops at Bareilly are, I hear, an unqualified success. They are well organised and I feel sure they are destined to play an important part in the industrial regeneration of the country.

II.—Technical aid to industries.

It has been pointed out above that capital is the chief requisite for industrial enterprise, but none the less it must be admitted that no industry can be successful unless the technical side of it is completely under control.

Government's assistance in this direction has so far been very little. Take the paper industries. Bleach is an indispensable material in this industry. We are told that raw materials for the manufacture of bleach abound in our country, yet we cannot manufacture bleach on industrial scale. If Government could provide research institutes and technological institutes at important industrial centres of the country, our industries would receive considerable impetus. In case this is not done it will be very helpful if Government could lend the services of technical experts to industrial concerns on easy terms. For instance if a chemical expert is lent to the paper mills who could carry on experiments for the manufacture of bleaching powder on commercial scale, the mills would be too glad to bear a moiety of the expenses incidental to his deputation. The question will arise about the publication of the result of researches made by Government-paid expert while attached to a private business. Surely such result should not be made public unless and until the firm where the research has been made expresses its willingness to do so, unless the research is of a description the publication of which does no harm to the firm, but even then the firm must be consulted before publication. In these provinces the proposed technological institut e must be started as early as possible. This should carry on research work chiefly with regard to existing or new industries that may advantageously be started here.

III.—Assistance in marketing products.

Commercial museums and exhibitions.

Commercial museums serve a very useful purpose for advertising local manufactures. Even now many a good and useful article is manufactured in India, but consumers do not know where they are available and manufacturers cannot find consumers. Indian manufacturers fight shy of advertising their goods; consequently any step taken by Government for such purposes is bound to prove useful. Commercial museums must be started at several important centres in every province. In the United Provinces for instance one at Cawnpore, another at Benares, a third at, say, Meerut will prove of great utility. If these museums can be made peripatetic the degree of their utility can be i reased. Commercial museums can be made permanent institutions while holding of periodical public exhibitions will surely result in wider advertisement of the articles exhibited. I am not recommending such an expensive exhibition as was held at Allahabad in 1910, but smaller exhibitions will be less expensive and equally useful. The principal Government departments would do well if they will publish lists of articles which they import and exhibit them in commercial museums. In addition to this they may offer handsome prizes to the firms which can manufacture articles equally useful. This will create competition which will result in the production of the best article.

IV.—Other forms of Government aid to industries.

Supply of raw materials.

Government can also help certain industries by supplying raw materials on favourable terms. For instance, bamboo and grass can be supplied at very cheap rates for some time to those who undertake the manufacture of pulp for paper industry. Similarly, if a rebate is granted on salt, the paper mills can take advantage of the situation.

Training of labour and supervision.

General.

We observe daily that both hand and power productions of India are much inferior to those of Europe, America or Japan. They are poorer in design, poorer in execution, and poorer in finish and consequently they fetch less value and are much less appreciated.

Our labour is inefficient and lacks in skill. Had our labour been efficient there would have been several avenues where decay could be arrested, standard of production improved, and new manufactures akin to existing industries introduced. I am not blind to the fact that people have done very little to improve the technical skill of the labour but Government also cannot be let alone. Government has not taken up the question in right earnest as yet. To improve the standard of labour I think the first requisite is that primary education be made compulsory and free for those whose income is below a certain standard. For training of higher labour there are, no doubt, civil engineering colleges, medical institutions, agricultural and forest schools but that is not enough. In these provinces there are schools at Gorakhpur, Benares, Lucknow, and Bareilly where some crafts are taught; such schools must be started at other important towns and there should be a network of them. The department of technical education and training of labour should, I think, be organised on the lines similar to those for secular education.

Primary education.

Industrial schools

VI.—General official administration and organisation.

In our provinces there is a Board of Industries under the headship of the Hon'ble Mr. A. H. Silver, a business man of the first class. Its constitution seems to me to be

satisfactory. Only under the present rules the Board, by itself, can do very little. It has to send its recommendations to the Local Government in every respect. It would be better if the Board could be given powers to spend up to a certain amount of money of its own accord. Beyond this I have practically nothing to say against the Board of Industries in my province. The Director of Industries is a capable and sympathetic officer and the personnel of the Board is not unsatisfactory. The Board has during the period it has been in existence achieved substantial success in the work of investigation. But there remains much to be done. In fact, we have only touched the fringe so far. We have to do a great deal yet and I feel sure that the present Board, with Mr. Silver as its head, is equal to the task.

ORAL EVIDENCE, 9th NOVEMBER, 1916.

President.—I understand that you are a Member of the Board of Industries of the United Provinces?—Yes.

And also of the Legislative Council of the Lieutenant-Governor?—Yes.

Could you in a few words just indicate to us the industrial enterprises that you have had experience of here?—Up to this what I have seen and what experience I have had is mostly about the paper industry.

Are there any other companies in which you are taking an active interest?—None other except the Newal Kishore Press. The company is in its infancy and the shares are being subscribed, but up to this we could not get the proper amount of money to get the machinery out, so it is not under operation as yet.

Where do you propose to work?—In the midst of the forests by the Nepal hillside.

So that, among the industries, you take a greater interest in paper than in any other subject?—Yes.

Are you also interested in banking to any extent?—I am. I am the Director of two banks, the Oudh Commercial Bank and the Bhargava Commercial Bank.

Hon'ble Sir Fazulbhoy Currimbhoy.—When you say in your first paragraph.—"We Indians" I suppose you mean the people of your province?—I have had experience chiefly of my own province, not outside, not Bombay for instance.

You say, "The amount of individual shares should be fixed at as small figures as possible." Do you think the small shares will be taken up by the very poor people?—Not very poor people, but they will certainly be subscribed by people of average means.

What is a small amount, a rupee share?—No, say a pound share.

Do you think the whole share capital should be paid up?—Well, other conditions being favourable, I think it will.

Then you say, "I am not much in favour of money grants and subsidies in this country. They are very helpful in encouraging the export of manufactured articles to countries which can produce them under more favourale circumstances." How do you think that when other countries are producing under very favourable circumstances that you are encouraging exports? Suppose they don't take your goods?—What I meant by not being in favour of money grants was that in the case of articles manufactured and consumed in the country, if the State helps us by money grants, it will have a demoralising effect on ourselves, but if the articles manufactured are for purposes of exportation, in that case the money grants from Government will be just suitable to enable us to compete in the foreign markets.

Then later on you say, "A company was started a few years ago to undertake the manufacture of pulp at a place where it could prove most econmical. This being altogether a new industry the success of which was not a certainty, sufficient capital was not forthcoming." You mean the people were not sure of its success?—Yes.

Then the people would only subscribe money where there was only profit and no loss?—I may just explain the position of my own province which is slightly different from other provinces, and that is in my province people are not very speculative; they only subscribe when they believe that the business to be started will prove a success, otherwise they don't.

Otherwise they will only lend money and not put it into industries?—Not until they see some sort of guarantee coming from Government or receive any other help so as to make success sure. They are very shy to put in their capital.

You therefore wish the Government should risk the money and not the people?—It is not that; (the Government's resources are superior to the people's and if the former, taking

full advantage of their resources, financially help an industry there is very little chance of risking money). In the case of the pulp industry the Government published a note which had a very injurious effect on our private project. They published a note about the *ulla* grass factory which was proposed to be opened by them at Gorakhpur, the result was that private capitalists did not come forward to subscribe to the private concern which was thus to compete against odds.

Because their statements were wrong. The figures which they quoted were not the proper figures?—I do not go as far as that but certainly private capitalists thought that as the Government was going to open a factory of its own they did not come and put their money in the private company.

Then you say, "now if a company like this could be assisted by Government by guaranteeing a dividend like the municipal guarantee to some electric concerns for a limited period without or even with a subsequent refund, the success would be assured." You wish that the Government should give help in the shape of a guaranteed dividend?—Yes.

Then you say, "In the first place the Government should see that the management of affairs is in the hands of experienced men of business who care more for the good management of the same rather than for their own personal gain." Suppose a man like you starts a concern. With the reputation that you have with your other successful concerns do you not think that the capital will come to you, the public knowing that the management is good, without Government help?—Well, the nature of our countrymen is such that they only come forward to subscribe to those industries which they have seen flourishing, and even with a man of repute in charge of it they won't come forward to join a company of a kind of which they have no experience.

Then you say, "When all or most of these shares have been disposed of and the public demand that the management should be placed in their hands, the Government might gradually shift their control to the public; of course till the concern has proved a complete success the Government must keep a part of the powers in its own hands." Do you think when the people have taken shares you will still want Government control over it?—Well, a sort of advice for sometime.

Advice, not control?—Yes.

Can you give any example where the Government have pioneered industries which they handed over to private concerns after working them successfully?—I have had a very sad experience. The Government pioneered an oil cake industry in Cawnpore, but I am very sorry to say that as the Government did not have expert advice and simply acted on the advice of its councillors, the industry came to a sorrowful end. It had to shut down the factory and sell the machinery piecemeal.

Your experience is that the Government have not pioneered any industry successfully?—Not so far in these provinces, because they did not take expert advice and did not put the right man in charge of it.

Then any pioneer industry started by Government has not been successful yet?—That was the result of the proposed pulp project also. The *ulla* grass has, I believe, been condemned by chemists in England for making fine paper.

Then you say, "The co-operative workshops at Bareilly are, I hear an unqualified success." Have you visited the place?—I have not visited the place.

Do you know the person who conducts these co-operative workshops in Bareilly?—I cannot say much about it.

Are you in favour of co-operative societies being given money for these workshops instead of the agriculturists who need it most?—The agriculturist's claim is prior, no doubt, but in some cases this help given to workshops has also proved beneficial. For instance in some cases, as in Benares and other places they have been very successful.

You have no knowledge of these Bareilly workshops?—No, I have no personal knowledge.

Do you want Government technological institutions in important Government centres; do you want one in your province?—Wherever some special industry or industries is or are to be developed, an institute dealing with such industries at the place will be of great help—not technological institutes of a combined nature everywhere.

You don't believe in a central institute for the province, you believe that there ought to be different institutions at different places?—Yes.

Then you speak of "a chemical expert to the paper mills who could carry on experiments for the manufacture of bleaching powder on a commercial scale," and you say that

"the mills would be too glad to bear a moiety of the expenses incidental to his deputation." Is the paper mill not working very successfully? Are they not making good profits?—They are working very satisfactorily, no doubt, but still they do not get chemicals in sufficient quantities so that the mind of the management is never relieved. We think that if the chemical industry could be started in our province, the difficulty would be overcome. Failing that the temporary advice of a chemical expert will be very helpful.

When your paper mill is working so successfully financially, why do you want that Government should bear a moiety of the expenses?—Because the mills would like to entertain his services for only a limited period, afterwards he will go back to Government with additional experience which will be of use to Government.

Then you say, "such results should not be made public unless and until the firm where the research has been made expresses its willingness to do so?"—For the reason that they have paid for them.

You think that if Government lends you the services of an expert and you pay for the expenses that the secrets which he discovers ought not to be made public?—Yes, unless we permit it.

You don't think that if Government makes a condition when lending an expert, that whatever new things he finds out must be published, then the firm won't have the expert?—They may or they may not. The conditions might be settled between the Government and the firm beforehand.

You say, "Indian manufacturers fight shy of advertising their goods." In what way? Fight shy of the expense or something else?—The expense

Then you say, "Commercial museums can be made permanent institutions, while holding of periodical public exhibitions will surely result in wider advertisement of the articles exhibited." What do you mean by periodical?—Say, once in three years, small district exhibitions like what we had in Allahabad. We had two exhibitions, one a district and the other a provincial one. I advocate the former.

You don't want big public shows?—I think they cost too much.

Then you say, "The principal Government departments would do well if they would publish lists of articles which they import and exhibit them in commercial museums. In addition to this they may offer handsome prizes." What do you mean by handsome prizes? Is that in money?—Yes, in money.

Not medals or certificates?—They are good in their own way but money is preferable because they have to spend money over it.

You say, "In our province there is a Board of Industries under the headship of the Hon'ble Mr. A. H. Silver, a business man of the first class. Its constitution seems to me to be satisfactory." Is the consitution very satisfactory?—Well, to me it looks to be satisfactory.

All business and industrial people are there?—There are all classes of people necessary to make a useful Board.

What do you mean by all classes?—For instance, practical and theoretical. We have got people who know the views of those all round the world and can express them.

What do you mean by "all round the world"?—They study the papers and know from them what is going on in the world.

Do the people who have got connections with industries not read these papers?—Not many papers. Everybody, except a journalist, has a special line of interest and he generally studies matters bearing on his own industry or trade.

Referring to the constitution being satisfactory, would this be so even though it contained all nominated members by the Government and not elected ones?—We have no system of election here as far as the industrial line is concerned.

Do you prefer the nominated system or the election system?—I think at present we have no sound basis for election.

Do you know conditions in other provinces?—I have not studied the question. (Hon'ble Sir Fazulbhoy Currimbhoy detailed to the witness the arrangements prevailing in Bombay and asked)—Would you like to have a Board of that kind?—I think the existing Board of Industries suits the province very well for the present.

Mr. A. Chatterton.—Have you been connected with the Upper India Couper Paper Mills since their start?—My father was a promoter and I only joined it in 1895.

Do you know when they started?—In 1879.

Was any Government assistance given at that time?—The Government specially made the condition that the paper for the use of Government was to be bought from the paper mills. This was in 1882.

The whole of the capital of these mills is Indian?—Now a portion of it is European capital but it is a very small amount.

You have no technical assistance, no chemist or technically qualified man in the mills?—Up to this we have had none, but now we are feeling that we might get some sort of chemical assistance or employ a chemist ourselves.

Have you any particular objection to employing a chemist yourselves?—The objection is that it might be too expensive.

Don't you think it would be a good investment to get a certain amount of technical assistance in that way?—The large profits that we are making are only temporary profits, but we don't think they will prove a permanent income. It is only on account of the War that foreign paper is not coming in and that has increased the demand, otherwise in normal times we do not make much profit.

Do you think it desirable to lay aside part of the large profits for this purpose?—We are just putting by some of our profits for the purpose.

Apart from the question of cost, do the Directors of the company experience any difficulty in deciding this question of getting technical assistance?—Up to now we have been able to get chemicals either with difficulty or by paying very large prices in England, Japan or America, but we could not get the proper technical help with regard to the making of chemicals here.

These mills have been in existence for 36 or 37 years, and during that time it must have been necessary to purchase new machinery and to undertake various new processes of manufacture from time to time. How do you get any advice in these matters; do you go to the manufacturers of the machinery?—We have the assistance and advice of the manager, and also the advice of the manufacturers from whom we buy the machinery.

Has your manager any experience of paper mills outside the mill he is now working in?—Yes, he has been twenty years in the paper industry in England and has also been in Spain.

Hon'ble Pandit M. M. Malaviya.—You say, "the best means of raising industrial capital is by means of banks but banks are also not doing as they ought to do." Will you kindly explain what that means; what banks have you in mind which are not doing what they ought to do, in the way of offering help to industrial enterprises?—I mean that the small industries don't get the same sort of help from the banks, which the other big industries—especially those industries managed by Europeans—get from them.

From which banks?—For instance the Presidency Banks or other very big banks, such as the National and the Alliance.

Do you mean Indian business firms do not receive the same assistance from these banks as European firms do?—Yes, I do.

And you feel the need of banks which would offer assistance to both kinds of business, viz., those managed by Indians as well as those by Europeans?—Yes.

Then you say, "an attempt must be made to start banks." Do you think industrial banks, which will especially offer assistance to industries and industrial enterprises, should be established in several places in every province?—I think, yes.

You say, "besides money grants-in-aid and bounties and subsidies have, in the long run, a discouraging effect on the industries." But when you find that some foreign industries are receiving Government subsidies in their own country and the products of those industries are being imported into our country, do you not think that in such a case Government would be justified in offering bounties to counteract the bounties offered to foreign industries?—I think I have explained that to Hon'ble Sir Fazulbhoy Currimbhoy. What I mean is that articles consumed in our own country ordinarily do not require any subsidies but in cases like the one mentioned by you subsidies may prove useful.

Then I understand you to say that if the Government of Japan or America is giving a subsidy to some industry, and that industry is competing with one of our Indian industries

then in such a case Government should help the Indian industry?—Yes, otherwise the case would be similar to that of the Tirhoot Button Factory. They were selling buttons at a very fair price, but no sooner did the Government of Japan find that the Indian button factory was in their way than they subsidised their own factory which consequently undersold here the product of the button factory of Tirhoot, and the poor factory has had to be shut down.

About this paper pulp manufacture, how long is it since the matter was first referred to Government when assistance was asked for?—It was three years ago.

Where was it proposed to start this manufactory?—At Tulshipur near the Nepal Forest.

Has Government any control of the land there?—Yes, land which yields very nearly a lakh of maunds of forest grass yearly

What is it that the promoters of the company applied for?—To get grass on favourable terms. A lease was granted by the Government but the War came on and the machinery that was advised by the expert was found to be chiefly of German make and could not be imported, and so the thing is hanging fire.

Has the capital been subscribed?—Not yet, because the industry is a new one and so many counter-views were published by Government and others, that capitalists became very shy of putting their money in.

Did the Government publish any views of its own regarding this?—Not regarding this exactly, but they wanted to start their own factory with a capital of six lakhs of rupees to encourage manufacture of pulp from *ulla* grass.

Was the Government proposal published after the application was made?—After the lease was given.

And that you think acted as a damper to the promoters?—Yes, it did.

You say that when the Government has ascertained that a certain industry can be started with a fair hope of success, it should make the results of its enquiry public. You are not in favour of any such project being haned over to any private firms without sufficient information to the general public?—No.

You say that the shares of the company which should be held by Government should be sold to the public. Would you make it a condition that they should be offered preferably to the people of the province where the industry is to be started?—What I mean is that the Indians have the prior right to buying the shares. For example, the Baroda State started a cotton mill there as the sole property of the State. No other cotton mill could be started, but when the Darbar found that the people fought shy of the State competition they sold the concern and now Baroda is a big centre for the cotton mill industry. There are five or six mills all subscribed privately.

You say that you will be glad if the railways were held by joint stock-companies. Don't you know that the railways are becoming more and more nationalised, i e., owned by the Governments of the different countries. Don't you want the profit of the railways to get to the general revenues of the country? Would that not be preferable?—Yes I know that, but still what I mean is that if any scope could be found for Indian private ownership, then we might put in the money.

You want to encourage private companies to start railways?—Yes, private Indian companies.

In the manufacture of bleach did you make any application on behalf of your mill to the Government to give you the assistance of a chemist?—We did, and they gave us the loan of two chemists, but, owing to the circumstances under which the experiment was made, though it proved successful, the product did not come up to a commercial standard.

Did you ask for the continuance of that help or did you give it up as hopeless?—No, we have not given it up; we are going to try it again.

You have spoken of a rebate on salt. Have you made any representation to Government in that behalf?—Yes, we had some correspondence, but have not gone up for the reason that we are awaiting the result of our experiments on bleach.

You say, "to improve the standard of labour I think the first requisite is that primary education be made compulsory and free for those whose income is below a certain standard." Would you not also recommend that in addition to primary education there should be a wide system of technical education? I see you have already said you want a net work of technical schools started in addition to primary schools?—Yes.

You say, "the department of technical education and training of labour should, I think, be organised on lines similar to those of secular education." Do you want really another department of technical education or only a system of technical education worked on lines similar to those of general education ?—A system only.

WITNESS NO. 27.

Mr. A. B. Shakespear. MR. A. B. SHAKESPEAR, C.I.E., *Merchant, Cawnpore.*

(NOTE.—*The evidence written, and oral, of this witness was confidential.*)

WITNESS NO. 28.

Mr. T. Gavin Jones. MR. T. GAVIN JONES, *Managing Director, Empire Engineering Co., Ltd., Cawnpore.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

Capital. I know of no difficulty whatever in raising capital for sound and sufficiently attractive undertakings.

In these provinces the principal source from which capital is drawn to establish manufacturing enterprises is the commercial community.

The cotton ginning mills, flour mills, brick and lime kilns, and small oil mills, are largely financed by the Indian trading classes, and in these industries the tendency is to over-production and a ruinous cutting of prices. While on the subject of competition, I may say that there is a great tendency in Government departments to multiply workshops which are not really required. I notice now a suggestion has been made that Government should subsidise municipal workshops. Apart from this being a direct interference with private enterprise, it is not economical. Economy of production is attained by centralisation and increase of output. Moreover, workshops established by private enterprise, which have to work at a profit or go under, are naturally run on more sound economic principles and are better training grounds for mechanics than Government workshops.

Government assistance. As regards Government assistance, I am strongly opposed to any Government grants loans, or direct monetary assistance of any kind, as I think it needs to lead to unsound finance and management, also it may induce capitalists to invest in unsound financial undertakings without enquiry, relying solely on the fact of Government support. An industrial bank might be useful.

I think the Government should concentrate such resources as are available for industrial development on guaranteed purchase of products. A very large quantity of Government orders still go to England and the Continent for goods which with a little encouragement could be produced in India. The system of indenting through the India Office should be abolished as soon as possible, and British firms who supply the India Office hereby compelled to establish branch offices and possibly factories, or to appoint agents in India. The Indian Engineering Association, I believe, are fully representing this aspect of the question to your Commission.

Pioneer factories. Regarding pioneer factories, if Government do contemplate starting such factories, they should not be undertaken before they have been submitted to the careful consideration of a Board of Industries constituted mainly of business men. Immediately such factories have been proved to be a sound commercial proposition they should be handed over to private enterprise. But even with pioneer factories, I consider the better course for Government to pursue is to guarantee purchase of products for a period; there will be no lack of capital for such factories if this is done.

II.—Technical aid to industries.

General. My experience of Government technical aid has not been conducive to confidence. I pioneered a match factory under Government technical advice which was valueless and most misleading. Excepting for village industries and small industries, such as glass-work, I consider the so-called technical experts now employed by Government are not required. Sugar, cotton, leather, wool, and engineering employ their own experts and are not likely to allow Government experts to pry into the secrets of their trade.

What is required by the larger industries is scientific advice. The whole system of technical and scientific research requires to be organized, for there is no organization at present. The agricultural, forestry and industrial departments of research require to be co-ordinated

and centralised under an efficient Imperial Research Institute. By this I do not mean the abolition of provincial or departmental research work but co-ordination of this work with a real live central body of authority.

IV.—Other forms of Government aid to industries.

Land policy. Q. 41.—This is a big question which requires a commission in itself if a broad view is taken of the subject. It is not quite clear from your query whether you include land for agricultural purposes.

For manufacturing purposes only, the amendment of the Land Acquisition Act will probably put matters right in this respect. Personally I have had no difficulty in this way, so I will leave this aspect of the question to others in Cawnpore who, I know, have had difficulty.

The economic basis of India is agricultural. If the agricultural classes cannot produce a surplus for export, all manufacturing industries are gravely affected, and indeed, during famine years actually suffer most severely.

A number of manufacturing industries are retarded in their development owing to the backwardness of agriculture. To begin with, the purchasing power of the people is very low, which of course affects all manufacturing industries. The cotton industry requires a better staple of cotton, the leather industry a better quality of hides, and improved methods of handling them before they reach the factory. In these provinces tanning materials are required which could be very easily grown, but neither the Agricultural nor the Forest department have yet moved in the matter, although the suggestion was put to them years ago. Why should woollen mills have to import wool from Australia? The sugar industry was steadily dying till the war broke out and Government clapped a duty on imports of sugar. A better quality of cane and a reformed land policy is, I believe, what this industry wants.

In my own business here are our engineering works situated in the heart of an agricultural country, and in spite of much effort the work to be done for agriculture, is infinitesimal. I venture to say that in no other agricultural country in the world, China excepted, could an engineering works be established without receiving a large measure of support from agriculture.

I have had the experience of working in a Colony before coming to India, and from the economic point of view, what has struck me more than anything else in India is the hopeless backwardness of agriculture and the utter poverty of the agricultural classes. Their condition is no doubt better than it used to be, and it is improving, but in comparison with other countries the progress is very small.

The surplus agricultural produce per head of population, which an agricultural country is capable of exporting, is a fair criterion of the prosperity of the people, and a comparison with other agricultural countries is illuminating.

I have taken the figures for exports of agricultural produce only, and the percentage per head is approximate, but accurate enough for the purpose of comparison.

British India can only export a 7*s.* 9*d.* value per head of population; New Zealand £17 per head, Australia £11, Canada £10 and Argentine £12. Of course, these will be considered new countries and not a fair comparison, but here we have some old countries, Denmark £10 per head, Jamaica £5, Egypt £2-7, Russia, a notoriously backward country exports 12*s.* 3*d.* value per head, *plus* a large value in minerals and manufactures. South Africa with a population of a little over a million Whites and 4 million Negroes (notoriously indolent) is largely engaged in the production of minerals, and yet exports £1-10, value per head of agricultural produce. China is the only country whose economic conditions are worse than in India.

Is it not an anomaly that here, where oil seeds naturally grow better than in any other country, the oil pressing industry is hampered because the agricultural population do not utilise the oil-cake, which is greedily taken up by other agricultural countries to the tune of 140 lakhs of rupees worth per annum, and oil-seeds to the value of 2,560 lakhs are exported per annum? Also that bones and manures are exported to the tune of 100 lakhs per annum, which ought to be utilised in the country to produce better crops?

The system of land tenure is such that in many districts it paralyses all progress, the holdings are so small that the unfortunate cultivator after paying his rent can hardly eke out a living. He is frequently a sub-tenant ground down by an occupancy tenant who, in his turn, is squeezed by the landlord who pays the Government the land revenue. How is it possible for agriculture to prosper under such conditions. I will not venture to suggest remedies without adequate knowledge of the intricacies of the subject, but I venture to say

that if the agricultural department were made efficient, some useful suggestions would come from them.

In my opinion what the industries in this country as a whole require as much as anything else, is a real live Imperial agricultural department, managed by men whose life work has been agriculture, and not by men who, clever as they may be, have only the experience behind them of the law courts and of the collection of revenue on the old principles as was practised by Akbar. Much more money should be expended in the improvement of agriculture, in the distribution of seeds, manure and implements, in the extension of well-irrigation, and improvement of cattle.

V.—Training of labour and supervision.

Training of supervising and technical staff.

What industry requires, in my opinion, is the training of the artisan and not the supervisor.

Mechanical Engineers.

There is a great want of uniformity in the standard of examinations for Mechanical Engineers. Such tests should be made uniform and the certificate applicable all over India. All Government boilers should be under Boiler Act and the same laws applicable to their mechanics.

VI.—General official administration and organization.

I think the soundest organization is Provincial Directors of Industry with the status of Secretaries to Government, with Boards of Industry whose functions should be advisory, and who should be largely composed of business men and not as it is at present in this province with four business men on a board of 17.

I also advocate an Imperial Industries department separate from the so-called Commerce and Industries department, whose function will be to co-ordinate the work of the provinces.

VII.—Organization of technical and scientific departments of Government.

My reply to this is contained in my reply to heading II.

IX.—Other forms of Government action.

Patent laws.

The patent law administration in India is a farce, and a patent right is not worth the paper it is written on. Little or no attempt is made at a search. The patent laws in Great Britain are also hopelessly defective and no doubt will be amended after the war, when I suppose the Indian Laws will come into line. This is an Imperial matter which should be made uniform, all over the Empire, so that a patent in one part of the Empire can be valid in another. The American patent law administration is the best.

While on this subject of patents, I consider a hardship is imposed on Government servants by their not being permitted to take out patents and obtain the pecuniary benefit of their ingenuity and enterprise. Not only is it an injustice, but it is also a check on initiative, enterprise, and progress.

In my experience, Government departments have little respect for patents and the Patent laws. One department has attempted to purloin no less than three patents we have been instrumental in pioneering and placing on the market.

Hydro-electric power surveys.

Little progress can be made in this direction till Government are more sympathetic towards commerce and industry. Unless Government agree to utilise the powers on reasonable terms how can any effective hydro-electric scheme on any of the waterfalls in the Himalayas be introduced?

My partner, Mr. D. Macbeth, spent over two years surveying such a scheme and negotiating with Government on behalf of a powerful Syndicate which was backed by some of the biggest financial houses in London.

Power was to be distributed at high tension throughout the Punjab from Peshawar to Amritsar, for railway irrigation, and industries, which are now hampered by the high price of coal. And what one would have thought would have appealed more than anything else to Government, for the distribution of cheap power for fans and lights in all the many barracks in the Punjab and the N.-W. Frontiers. But the Government departments could not be brought into line, and one of the finest hydro-electric schemes ever surveyed in India was eventually crushed and had to be abandoned by the syndicate, owing to the long delays and the narrow-minded policy of the Government.

I happen to know that sometime afterwards, with a change of *personnel* in the Government departments concerned, great regret was felt that the scheme was not encouraged and strongly supported at the time, but it was too late; and India lost not only the foundation of a beneficial scheme, but also the confidence of important financial houses in London

whose resources went to develop other countries where industry was better understood. One of the directors of the Syndicate came from London to impress upon the Government the comprehensive and beneficial nature of the scheme which they were prepared to finance, so that it was not for want of endeavour to fully inform the Government that the scheme failed. An efficient Industries department would have helped such a scheme to go through.

I am afraid my written evidence has extended a great deal further than I originally intended but I hope some information of value to the Commission may be gleaned from these notes.

ORAL EVIDENCE, 9TH NOVEMBER, 1916.

President.—How long have you been in this country?—Fifteen years.

I understand your father was here before you?—Yes. He pioneered most of the industries, wool, cotton, etc., in Cawnpore.

You are a member of the Advisory Board for Industries?—Yes.

And you are a trained mechanical engineer?—Yes.

In your note you say, "while on the subject of competition I may say that there is a great tendency in Government departments to multiply workshops which are not really required." I suppose you will admit that in some cases it will be necessary for Government to maintain a reserve of workshops and certain manufacturing concerns for the purpose of having a safeguard for the manufacture of munitions?—Yes, but I saw the other day a suggestion made that other workshops should be subsidised, for instance, municipal workshops. Once Government starts giving money grants for that purpose it means a considerable extension of workshops and coming into direct competition with private enterprise.

You are not prepared to formulate what you would regard as a suitable recommendation bearing on that particular question?—Well, I should say that excepting the Ordnance department and the railways any workshops established by Government should be purely restricted to repair work.

That is the kind of recommendation you would like to see us make?—Yes.

You also say that the system of indenting through the India Office should be abolished as soon as possible. What do you mean by "as soon as possible"?—I mean that this cannot be done all at once. You can take certain articles and say that these will no longer be ordered through the India Office, and as it is found that suitable supplies are available by calling for tenders in India only, gradually reduce the indents through the India Office. I think that if it was understood that tenders would be called for and placed in India for everything before going to the India Office, you would find British firms would establish their agents or branch offices, or perhaps in some cases factories in India.

What system of Government machinery would you suggest for the purpose of replacing the India Office Stores department?—I would like each department to be independent. For instance, the railways can purchase their own stores and their own requirements and call for tenders in India. The Public Works Department in each province will do the same. In any case even as matters now stand before going to the India Office, lists of all requirements should be referred to the Director of Industries to see whether they are obtainable in India?

But would the Director of Industries be ordinarily in a position to say? Take a simple case like this,—if I wanted to order a theodolite, would he be able to tell me whether I can get it?—He can tell you whether it can be got in his province or not.

Supposing I was going to get a theodolite how am I to check the quality of the article? The Director of Industries may not be an expert in theodolites?—Your department, I take it, will know what they are buying. You have men in the department who know what they should buy.

Would this system not be liable to abuse?—I do not think so.

It may be that an officer may want a particular kind of article, but when he is replaced by somebody who is acting for him, he may want a different kind of theodolite, and with a few such changes in the officers you may have as many kinds of theodolite?—The whole thing would be done departmentally, not by individual officers. For instance, this Government up in Naini Tal would be quite capable of purchasing all that is required for the province, and have men who can pass the articles. I think under the present system there is too much centralisation. I would decentralise.

If you have decentralisation, you lose the privilege of buying at contract rates?—Why?

Because you would be buying on a small scale. If all the department requisitions were put together it would make a sufficient order to warrant a firm producing on a large scale and thus supplying at a lower rate?—I take it that each department purchases on quite a large enough scale to buy at the cheapest rate

It is impossible. Take my own old department, for instance, of 21 officers, we imported hundreds of different kinds of things each year, but not one of them was a big article?—Manufacturing firms purchase just as cheaply as the Government do and probably cheaper.

You won't then get the benefit of co-operation, Government implies the co-operation of all Government departments?—Whatever benefit you get by co-operation in buying on a very large scale through the India Office, I think, is more than counterbalanced by the disadvantage of not being able to buy departmentally.

That is to say, you compare purchasing in this country with purchasing through the India Stores department?—My idea is to purchase as much as possible in this country and that the Government should be induced to buy in this country.

That is already the spirit of the Government rules, but how can these rules be put into practice more effectively?—It would be more effective if the purchasing power were to be decentralised. I recognise the difficulties but I think they can be got over. It is a question of organization.

It is quite obvious that if you have different purchasing officers asking for the same article, they would be charged each of them, a rate which would be greater than what would be charged if the separate orders were lumped together because a company would then be able to lay out its plant to manufacture on a large scale?—I do not think that follows, because each department would be able to get tenders on the best terms.

They may ask for hundreds of small things but not one of them worth making a contract. When they are all lumped together you cannot only make a contract but forward contracts for years to come?—This may apply to a very few articles which can be left out of consideration when viewing the whole subject. The bulk of the materials are required departmentally in large enough quantities to enable them to purchase at the most favourable rates.

You do not think it is possible to establish in this country for the Government of India a department that will purchase and test stores of all kinds in the same way as is done by the India Office?—I think that might be done. That would be a move in the right direction; but I would prefer to see it decentralised more. There would be no difficulty in that department getting its supplies from any province because they would have their agents throughout India?—That would certainly be a move in the right direction.

Would you prefer that or the Local Governments buying their stores separately?—The Local Government doing it separately.

What would you do for Coorg, the Andamans, Delhi and the North-West Frontier Provinces?—You will have to make separate arrangements for small provinces. For instance, the Andamans would purchase through the Bengal Government. I take a broad view that the purchasing power should be decentralised. I have not gone into details.

You are not prepared to distinguish between these two proposals—a purchasing department for the Government of India as a whole, or a purchasing department for each separate Local Government?—In principle I prefer purchasing provincially and departmentally.

I understand that the general trend of your written evidence is that you would prefer to see in this country greater expenditure and more concentrated effort on the part of the Government towards the development of agriculture?—Certainly.

You think that with the increase of prosperity among the agricultural population there would be greater purchasing power and indirectly therefore greater support for other forms of industry?—Yes. It is the crux of the whole thing.

Had you in your mind the fact that this country gets its spare pocket money from the balance of exports?—Yes.

Would you consider this correct that the development of manufacturing industries in this country would not appreciably affect the total of exports or imports?—No. You think that the increase of wealth due to the development of industries would in the same way give the country greater purchasing power from abroad; that is, it would be able to purchase other articles that are not now imported?—If you develop manufacturing industries it will increase the purchasing power of the people. With a few exceptions, such as jute and hides, I do not think that the manufacturing industries are capable of very

great expansion for export, but they can be developed to replace certain imports, which would, of course, give you a better balance.

After all what you have in mind, I believe, is not the total quantity of exports or the total quantity of imports but the balance in our favour?—Yes.

You have given us an illustration of a hydro-electric scheme that fell through because you think the Government did not look at the proposal in a sufficiently broad-minded way. Am I to understand you to suggest that if you had industries more conspicuously represented by Government machinery with the Government of India, schemes of that kind would receive more symathetic consideration?—I think so.

You are, in fact, in favour then of an Imperial Industries Department?—Yes.

What functions would you give that department?—I would give it the care of industries and advising the Government in matters of duties, taxes, facilities for transport, land laws, etc., and the duty of bringing pressure to bear on other departments that may be hindering the development of industries.

What kind of officers would it be composed of?—I would prefer to see business men in it.

Is it to be a department of the Local Government or a department of the Government of India subordinate to one of the Ministers?—I think I have stated my idea in my written evidence. My idea is that such a department should co-ordinate the work of the provinces and that there should be a Mininter of Industries in direct communication with the Government of India and not subordinate to any other Minister.

Hon'ble Sir Fazulbhoy Currimbhoy.—You are the Managing Director of the Empire Engineering Co., Ltd.?—Yes.

Was it started by you?—Yes.

You say, "I am strongly opposed to any Government grants, loans or direct monetary assistance of any kind....."?—Yes.

Do you know that foreign countries have become industrially great because their Governments have supported their industries?—The usual way is the fiscal way which we are not allowed to discuss here.

Do you, think that if machinery is given on the hire-purchase system it would help the industries of the country?—No. I think that if an industry is worth starting or developing you will find that private enterprise would do that.

Do you know that many an industry in this country is not being started, because the people do not know about it or have not confidence, because they do not know about it, although having a good deal of capital to invest?—Except in the case of very large industries requiring a very large amount of capital I do not think that it is so.

What match factory under Government technical advice did you start?—The North India Match Factory. I was the pioneer of that factory.

Where was it?—At Bareilly. Mr. C. T. Allen is managing it and he has taken it over.

You say, "If the agricultural classes cannot produce a surplus for export.....". What do you mean by that?—A certain amount of agricultural produce is required for the country to consume and the surplus produce is exported.

Do you think it should always produce a surplus for export?—Yes. The people always do so and must do so in order to live.

You talk, in the 4th section, of a better quality of hides. Can you explain?—Growing a better quality of cattle and employing better methods of flaying and handling the hides before they come to the factory. I was in the Government Harness Factory and remarked on some excellent leather straps being made and was informed by the officer in charge that that leather came from Australia. Cows with hides like that are not grown in India.

Is that not due to climate also and pasture?—I am not capable of giving a reply on this subject. I think that the cattle are capable of improvement.

You say India is hopelessly backward in agriculture and the agricultural classes are utterly poor. What is the remedy for it?—I leave this question to the Agricultural department.

You talk of India's exports. Can you tell us about the internal trade of the country and how much is consumed?—I could not. Three hundred millions of people eat a good deal.

It has a big population compared with New Zealand and Australia?—Yes.

You recommend provincial Directors of Industries with the status of Secretaries to Governments. You would need a Secretary for the Forest department too?—That I would not like to answer.

Can you tell us why your hydro-electric scheme fell through?—We wanted the Government to utilise the power, but we could not get them to come to terms. Without Government support the scheme could not go through.

Hon. Pandit M. M. Malaviya.—You say that you are opposed to the multiplication of workshops by Government. Do you think that private workshops will take in a sufficieiently large number of young men to be trained in them?—Whatever work has to be done in the country in this way requires workshops. If you have Government workshops you have got to do away with private workshops. They cannot live together. I think the private workshop is a better training ground than the Government one.

Have you seen the Government workshop at Bareilly?—Yes.

Don't you think that it is turning out very good trained young men?—Yes.

Better than those trained by private workshops?—I would not like to say that.

You are not prepared to dispute it?—I could not compare the two. It is a carpentry school. We do not do much carpentry work.

Have you seen the Government technical school at Lucknow?—Yes.

You know that they train young men?—Yes.

Have you had any experience of such young men?—I had one or two men sent to me. Some of them are all right, most of them are no good.

How many have you had?—I cannot say from that school particularly, but from various schools, I have about a dozen of them. I do not recollect having one from that school particularly. I have had them from Roorkee.

You know of no difficulty whatever in raising capital for sound and sufficiently attractive undertakings. Have you had occasion to raise capital many times?—I had to obtain capital when I first came out here. It was fifteen years ago.

Where did you raise it from—the European community or the Indian community?—European community almost entirely.

You have no experience of raising capital from Indians?—No.

You say, "The cotton ginning mills, flour mills, brick and lime kilns and small oil mills are largely financed by the Indian trading classes." Have you had anything to do with them practically?—I am always in touch with these people. I have never financed or run a ginning mill. I have not had any share in them or in their management.

You have spoken about their tendency to over-production. Is that remark based on actual experience?—In the engineering business we come in touch with every industry in the country.

Do you speak from personal knowledge when you say that the difficulties are due to the ruinous cutting of prices?—I think so in some cases.

You say, "Even with pioneer factories I consider the better course for Government to pursue is to guarantee purchase of products for a period; there will be no lack of capital for such factories if this is done." Do you here also mean European capital and not Indian capital?—European or Indian. As a matter of fact, in pioneer industries Indian capital does not come forward readily, but as soon as the industry is established you can get plenty of Indian capital. For instance, you can get Indian capital for cotton mills, but for a pioneer industry as a rule Indian capital is very shy.

In the established industries of Cawnpore which are under European management is there large Indian capital employed?—There are some. Some of the factories here are owned by Indians? Take the sugar mills. There are three sugar mills here owned by Indians.

What about cotton mills, weaving mills, or ginning mills?—The bulk of the capital is from Europeans, but Indians also invest in them and buy shares. Yes, I am a Director in the Muir Mills.

You think that if agriculture were developed there would be greater purchasing power among people?—Yes.

You have compared what people in several other countries are able to send out. You have not compared the yield per acre?—I have compared population with exports.

But do you know that generally the yield per acre in other countries is very much greater than here?—I believe that is the case.

What do you think would lead to greater improvement in agriculture—more agricultural and general education?—I do not think that education has much to do with it.

Surely scientific education has something to do with the improvement of agriculture?—To a certain extent.

How can you bring about scientific agriculture without education?—It is more by demonstration. It does need education, but not college education.

Agricultural school education?—Yes. Material assistance they want, more than anything else.

In what form?—I have stated in my written evidence: distribution of seeds, manures and implements, improvement of cattle, more demonstration farms, an improved land policy, and a reformed Agricultural department.

You say, "What industry requires, in my opinion, is the training of the artisan and not the supervisor." Where would you get supervisors from?—You can get the supervisors from your artisans. You can always pick your best men and train them. What we want to do is to improve the artisan.

You do not want men of better education as managers?—If you get artisans better educated then you can pick your supervisors from them.

You do not want supervisors and managers who have had a regular training?—There is no big demand.

For what area was the hydro-electic scheme intended?—For the whole of the Punjab, Peshawar and Amritsar.

Hon'ble Sir F. H. Stewart.—Has not demand increased for skilled workmen and artisans generally and the demand become greater than the supply?—I do not think so. We do not find any difficulty. There is always difficulty in getting first class men.

You do not find difficulty in getting trained workmen for your own shops?—There is great difficulty in getting first class men. There are plenty of carpenters, blacksmiths, tanners, and artisans generally, but they are indifferently trained.

Is the object of these Government schools and workshops which you have suggested to increase the supply of these trained men?—I do not think it is the idea. My idea is to improve the quality of the present artisan.

You do not think that Government schools and workshops would tend in that direction?—I think they should be more in touch with the actual manufacturers.

You would not grant the proposition that the object of Government is not to interfere with private enterprise but to help it?—That is what I hope the object is.

You will agree that it is likely to be the result—that is, help it?—I think a school for artisans would help.

With reference to your remarks about the imperial department of industries which you advocate, would you give the head of it any executive functions at all, or would it be merely co-ordinating and advisory?—I do not think it could be anything else but advisory.

You leave the executive control in the hands of the provincial authorities?—Yes.

(Witness here gave confidential evidence.)

Hon'ble Sir R. N. Mookerjee.—You talk about Government subsidising workshops. Every Government is bound to help municipalities by giving grants-in-aid?—Municipalities can do what they like with their own money.

Water works or drainage works are all subsidised by Government. Municipalities cannot do without help from Government?—That is a question of finance. If municipalities want to they can put up their own workshops with their own funds however they raise the money. There was a suggestion that municipal workshops should be subsidised by Government in order to train mechanics, that is to say, specific grants for workshops for educational purposes.

The Government is doing it with the object of training more men?—That may be, but it would mean establishing workshops for municipal work which would compete with private enterprise. Technical schools are quite different from manufacturing workshops.

A technical school cannot be maintained without a workshop. There cannot be a technical school without a workshop attached to it?—Only a workshop on a very small scale for demonstration purposes and not to manufacture and compete with private enterprise.

You say that Government assistance would lead to unsound finance and management and there is the question, if the Government give assistance to any industry what control the Government should have in such cases? If the Government give any assistance to any industry they would naturally have a proper control. How then will there be mismanagement and bad finance?—That is one of the difficulties. Government should not give any money or advance at all. You do not want Government control in private enterprise. It is quite possible to have mismanagement and bad finance under Government control.

You say that Government should not help any industry?—Should not give any monetary advance.

How can it help then?—By purchase of products.

You have no experience to tell us that it has led to unsound finance and mismanagement from your past experience?—I won't mention names, but the other day a small tanning industry which was admittedly unsound was given a loan of Rs. 5,000. That Rs. 5,000 may be expended and may induce other persons to put in more. What guarantee have we that all that money will not be lost?

You are one of the Board of Industries?—Yes.

You agreed?—I disagreed.

Have you made any sugar machinery in your workshops?—Yes.

Does the Agricultural department place any order with you?—They do not use much in the way of sugar machinery. If they want agricultural tools and other implements they do come to us.

You said that they never give any such help?—I simply say that it is difficult. They do not withhold work from us. What I mean is that the industrial development is very small.

Dr. E. Hopkinson.—How many men do you employ in your workshops, and how many of them are skilled?—We employ 600 men in our workshops. Three-fourths of these are skilled.

How are the skilled men recruited?—They are taken on in Cawnpore. Sometimes we have to go to other places for them. We do employ boys, none under 14 years of age.

You have no apprenticeship system in your workshops?—We have a few apprentices.

They are not indentured in any way?—We do not indenture them but we have an understanding.

You have an understanding that they shall stay for sometime?—We do not give them any certificate unless they have served three years.

Do you move them from one workshop to another?—Yes.

You undertake to do so?—Yes. If a man turns out a smart man we try to bring him up for higher work.

These apprentices, are they educated boys?—I could not say. Our best apprentices are men who have not attended any technical school at all.

At what age do they come?—About 16.

And you give them a systematic training in the shops?—Do you give them any theoretical training—No.

Do they get any other training in any other way?—I do not think so. There are no night schools here.

Do you say that without any theoretical training in course of time they turn out to be competent men?—That is where the technical school would come in, to give them some sort of education and improve their work. Our great trouble really is to make these artisans understand what accuracy means and also finish. They should be taught to think more and not to work purely mechanically.

From your own point of view as an employer where do you want the technical school to come in?—I think if you have a technical school you could take such men as have proved themselves adaptable to any particular craft and allow them to go away for a period for training.

Do you want to get men in your shops who have been through the technical school, or do you want to retain them in your shops till the age of 19 or 20 and then allow them to enter the school?—We have no further interest in the men who leave our shops. As fa as we are concerned we want to get artisans trained and made capable of doing better work.

Can you suggest any means of getting them?—If technical schools are established in places where artisans are required, I think they can get the training, and the mills will be only too glad to assist in giving the men some theoretical training, that is while they are working, by means of night schools and letting them leave work early with an inducement that when they improve they would get higher wages.

Would you allow your promising fellow to stop for two days in the week and then go to a technical school?—A certain number of hours every day.

That you will be prepared to do?—Yes.

That would benefit you and these men?—Yes.

About the draftsmen you employ, how have they been educated?—We get them from firms in Calcutta.

In turning out men to be supervisors, you mean foremen in the workshops or men to go out erecting and starting plant?—As a rule we have to depend on Europeans for supervisors.

Is not that the exact contrary of what you were saying? I think you said in answer to a question of the Pandit that you can produce out of your own shops from your own artisan class suitable and competent supervisors?—Then I meant for Mistries, a foreman of gangs of men. For the higher work you have to employ Europeans.

Where is the line to be drawn? What do you mean by higher work and lower work?—You have supervisors for certain gangs of men and for that we generally employ Indians—those picked from the best of our artisans. Then to supervise a whole department you want a European. That is the usual practice in India.

Take a concrete instance. You are erecting a pumping plant somewhere up-country. Can you trust the supervision to an Indian or must you have an European?—Personally I find I have to send an European.

You would not feel satisfied that the work would be done properly if entrusted to an Indian?—That is so.

With regard to the hydro-electric scheme do you say that the Government of India would be justified in instituting a general hydro-electric survey of the whole of the country? Or, would you leave it to private enterprise to select and survey any water supply which they might wish to take up?—I do not know. A Government survey might be useful, although I cannot help thinking that private surveys have pretty well covered the ground.

Hon'ble Sir R. N. Mookerjee.—Don't you think that there would be difficulty in private enterprise making a general survey of hydraulic power for generating electricity, on account of land question, the rights of possession, etc.?—Yes.

Practically without Government help no private enterprise or firm could make such a survey?—Well, I find that in most of these big schemes the surveys have been made by private enterprise.

But with Government permission?—Certainly.

Government must give permission to enter into land, on a river, etc.?—Government must come in but the whole thing is done by private enterprise. How long did your survey take?—It took two years.

That was not for general information ?—It was for our own information.

Mr. A. Chatterton.—Have you any experience of the Indian trained engineers from Roorkee?—I have.

Do you think that they are satisfactory men to be put in charge of a department, or branches of your engineering work?—I have not got any.

Would it not be practicable to utilise them to a certain extent?—I have tried them.

They have proved satisfactory?—Not so far.

You say you are opposed to assistance being rendered to industries by various methods, one of them being the supply of machinery on hire system. You also say "Here are our engineering works situated in the heart of an agricultural country, and in spite of much effort the work to be done for agriculture is infinitesimal." Would you approve of Government assisting land-owners and agriculturists to obtain machinery on hire purchase system?—Certainly.

That is to say, to a certain extent you withdraw your opposition to Government assistance being rendered by the supply of machinery on hire purchase system?—Agriculture is very different from manufacturing industries.

Your remark about the supply of machinery on hire purchase system is intended to apply mainly to the larger industries?—Yes.

And not to the smaller industries?—Not to village industries.

For instance, supply of pumping plants, supply of village oil-mills, and sugar-crushing plant?—I think that could be done.

Has it been done in this part of the country?—No.

Government do not purchase from you machinery and sell it again on the hire purchase system?—I do not think they do. I do not know of any case.

You would not object to that?—No.

As a matter of developing the industries of the country?—No. That is rather the development of agriculture.

In Cawnpore there is no school for the training of mechanics or engineers employed at the mills and factories here?—No.

There is one at Lucknow?—Yes.

Do you think it would be better if that school were started at Cawnpore?—It is a better place.

You know that in Lucknow the boys spend three years in the school and then two years in the workshops?—Yes.

You would prefer them to get technical education at the same time as they are getting workshop practice?—Yes.

Hon'ble Sir F. H. Stewart.—You are a member of the Board of Industries. How often does the Board meet?—The Board meets once in three months.

Is it also doing work by circulation?—The Director of Industries circulates documents. He is the Secretary of the Board.

What is the term of appointment of the ordinary members of the Board?—I could not tell you.

Lifetime?—I could not tell you.

It is an honorary appointment?—Yes.

Do you think that the Board is doing useful work?—No.

You want to make certain specific recommendation with reference to making it more alive, more useful?—Yes.

By reducing its numbers?—It is unwieldy enough already. I think I should make it smaller. I should have a large proportion of business men on it.

Do you think that the Chairman should be nominated?—I think the Chairman should be elected.

Witness No. 29.

Mr. J. G. Ryan, *Secretary, representing the Upper India Chamber of Commerce, Cawnpore.*

Written evidence.

I.—Financial aid to industrial enterprises.

Capital.

Q. 1.—Stated broadly, and as a general rule, the experience of the Committee goes to show that no difficulty is experienced or can reasonably be expected in raising capital to finance industrial enterprises where such are sound propositions put forward by persons of stability and experience and the management of which is to be entrusted to Directors and Managers trained in business and possessing knowledge and experience.

Government assistance.

Q. 5.—Of the methods suggested in question 5 whereby Government can afford assistance to existing and new industries, the seventh, *i.e.*, "guaranteed Government purchase of products for limited periods" appears to my Committee the most reasonable and valuable.

Pioneer factories.

Q. 7.—In regard to Government pioneer factories, the opinion of the Committee is that these, in the case of certain industries new to India, and of which, from seasonal, climatic or other reasons, experience in other countries is not reliable as a guide, are of the utmost value, and the Committee would cite as an example the pioneer factory established in Cawnpore for the manufacture of cotton-seed oil and oil-cake.

Q. 8.—The establishment of pioneer factories by Government should only be undertaken when it has been shown to the satisfaction of the Board of Industries, where such exists, and of Government that private enterprise will not embark on the venture, and under no circumstances should Government establish a pioneer factory which is likely to prove competitive with any established industry or existing private venture to which the new industry might be held to appertain or of which it may reasonably be considered a branch.

A pioneer factory should, generally speaking, be closed as soon as it has been conclusively shown that the industry is not remunerative, but this conclusion should only be arrived at after the results of the working have been carefully gone into and examined by competent industrialists, whether in Government or private employ, and thereafter pronounced as hopeless by the Board of Industries or other similar organization which would have the care and supervision of such factories as one of its most important duties.

On the other hand, such pioneer factories should be handed over to private enterprise as soon as it has been shown that under normal conditions success is reasonably certain.

Only under exceptional circumstances should a successful pioneering experiment be converted into a permanent Government enterprise.

In expressing this opinion my Committee are not unmindful of the fact that they have quite recently recommended the retention by Government in its own hands of the Bhowali Turpentine Factory.

The reasons underlying this recommendation are not inconsistent with the opinion now expressed inasmuch as the dependence of the turpentine factory on the exploitation by Government of the forests from which the raw material is obtained must remain a governing factor so long as the present transport difficulties of Kumaun continue. It may in fact be said that until these transport facilities are very greatly improved the Bhowali Turpentine Factory is still in its experimental stage and the conditions governing it are, from the lack of transport, not yet normal.

II.—Technical aid to industries.

Technical aid in general.

In considering the broad question of Government technical aid to industries, the Committee note a reference in questions 17 and 18 to Government experts, and in this connection they feel that any scheme of assistance based on the importation by Government of an expert must, to be successful, be based on the obtaining by Government of thoroughly practical exponents of the industry on which they are supposed to advise. Mere theoretical knowledge obtained in a laboratory is worse than useless. What is wanted is thorough practical experience under varying conditions, and adaptibility to circumstances; failing this the expert can merely serve to experiment and theorize at the expense of the business to which he is attached to assist.

At the present time a feeling prevails that some of the so-called Government experts who have been employed in the past do not seem to have inspired confidence or obtained credence among industrialists.

Research abroad.

Q. 21.—The Chamber's experience of the aid afforded by the Imperial Institute in the past has been negligible, but there is no reason why, if the Committee of the scientific and technical department of the Institute is properly constituted, it should not be of considerable value to Indian industry.

Surveys for industrial purposes.

Q. 25.—Yes, in the opinion of the Committee there would seem to be a necessity for supplementing the existing knowledge of the available resources of the country,—agricultural, forest and mineral,—by further surveys.

Q. 27.—To be useful to industry all such surveys should be made public by Press *communiqués* and through the various chambers of commerce as soon as conclusive results have been obtained.

III.—Assistance in marketing products.

Commercial museums.

As an outcome of the exhibition of samples of Teutonic products and of competing Indian manufactures which visited Cawnpore in January-February, 1915, the Committee of this Chamber recommended to Government the establishment, somewhat on the lines of the exhibition, but on a permanent basis, of a bureau of commercial samples. The recommendation was made subject to the ability of Government to devote adequate funds and a competent staff to the collection of samples and their maintenance, and it was pointed out that such a bureau, to be successful, should be thoroughly up-to-date and that representative catalogues giving prices, addresses, etc., should be made available to the public.

The subsequent establishment in Calcutta of the Commercial Museum would seem substantially to bear out the recommendations of the Committee, but the use of the term "Museum" seems to the Committee to be of doubtful advantage, and even misleading, and they prefer the term "Bureau of samples" as better calculated to effect what they regard as the essential purpose of such an institution, namely, the making available of information as to the sources from which the products which the samples represent can be obtained.

Sales Agencies.

Q. 30.—In the opinion of the Committee sales agencies or commercial emporia for the sale as well as the display of the products of minor and unorganised cottage industries are desirable, and when developed on proper lines it seems certain that they would be valuable.

In regard to the lines which this development should follow the Committee cannot do better than express their approval of the lines on which "Village Industries," a sales agency established at the end of last year in Cawnpore, has been organised.

Exhibitions.

Qs. 31-32.—The Committee consider that in its present stage of industrial development India is not ripe for industrial exhibition, *per se*, but they suggest that more advantage might be taken than at present for utilizing village fairs for the exhibition of local and provincial manufactures. To be effective, however, the utilisation of the opportunity afforded by village fairs for this purpose should be arranged by the district authorities in close consultation and co-operation with the provincial Director of Industries.

Trade representatives.

Qs. 34-36.—The Committee strongly deprecate the appointment of trade representatives to represent the whole of India in Great Britain, the Colonies and Foreign Countries and also the appointment of inter-provincial trade representatives in India itself.

Government patronage.

Q. 47.—The Committee strongly advocate the publishing by the principal Government departments of lists of imported articles used by them. These lists should show the prices, including such charges as a private importer would have to pay in importing similar articles, e.g., packing, freight, insurance, customs duty, and landing and clearing charges, and which, it is understood, are not ordinarily reckoned or stated in computing the prices or stores imported by Government.

Q. 38.—The general opinion prevails that the present rules relating to the purchase of stores by Government departments do not ensure with sufficient stringency the utilization to the fullest extent of India's own resources in the production of such stores, and it is held as a grievance that many articles obtainable in India are, with quite insufficient reason, procured through India Office from home.

IV.—Other forms of Government aid to industries.

Land policy.

Qs. 41-48.—The Committee are of opinion that the acquisition of land for industrial purposes should be facilitated so as to obviate subsequent litigation with previous owners. The present law for the acquisition of land on behalf of companies, as contained in part VII of the Land Acquisition Act, 1894, would seem to be framed more with the purpose of assisting in the acquisition of land for railways and similar works than for industrial purposes.

The Committee do not suggest any drastic change in the present enactment, but some change in the provisions of sections 40 and 41 seems necessary to render more elastic the comprehension of these sections, particularly in so far as they deal with "the terms on which the public shall be entitled to use the work." In recommending the affording of facilities by means of the Land Acquisition Act of land for industrial purposes the Committee have in mind cases which have occurred locally in which the title to land which has long been in possession of the present industrial owners has been imperilled after many years by an alleged flaw in the original purchase, and they feel that where land is required for industrial purposes, and more particularly for the establishment of new industries, Government, being in a far better position than any private purchaser to investigate the title under which land is held, could most usefully assist and protect the purchaser by undertaking the acquirement of the land under the Acquisition Act, transferring the same on payment of the cost, and under suitable guarantee, to the industrialist.

V.—Training of labour and supervision.

Technical and industrial schools.

The Committee desire generally to support the technical training of artisans by means of technical and industrial schools. As a parallel it may be observed that in the experience of employers of labour, the type of foreman and overseer imported from home has of late years very greatly improved, this being ascribable mainly to the great spread of technical training at home.

Mechanical Engineers

Q. 50.—The Committee are emphatically of opinion that all industrial schools should be under the control of the Department of Industries, the Department of Education being merely represented on the Board of Control of such schools by one or two members.

Q. 54.—There certainly is a want of uniformity in the standard of examinations for mechanical engineers held in the various provinces where engineers are required to be certificated. The one essential measure necessary to make such tests uniform is the introduction of an "All-India" Boiler Act to replace the present various provincial Acts. This step the Chamber has consistently advocated in the past, and the Committee desire now to emphasise again the necessity for one universal Act with provision made to meet varying local conditions by provincial rules under the Act adaptable to such conditions.

VI.—General official administration and organisation.

Q. 56.—There exists in these provinces a Board of Industries. In criticising the constitution and functions of this Board the Committee support most cordially and emphatically the criticisms recently put forward in the following note to the Secretary to Government of the United Provinces, Industries department, by Mr. T. Gavin Jones, one of the Chamber's reprentatives on the Board of Industries.

Copy of a letter, dated the 19th September, 1916, from Mr. T. Gavin Jones, Cawnpore, to the Secretary to Government, United Provinces, Industries department.

At the last meeting of the Board of Industries, I made certain criticisms regarding industrial organization, and as His Honour the Lieutenant-Governor very kindly expressed the wish that I should address a note on the subject to the Government, I now have the honour to enclose a copy of my speech to which I would like to add the following explanatory remarks:—

The subject of my speech might possibly be considered out of order at a meeting of the Board. I felt, however, that something ought to be said on the subject, and that a Board meeting where all concerned were present and the proceedings not published, was the most suitable place to say it, and I thank His Honour and the gentlemen present for having patiently listened to it.

I hope that His Honour will realise that, although I criticised the Government, I did not do so in any spirit of antagonism to the Government, but rather to bring to bear on the subject a view from outside the Government which I hoped would be helpful.

The industrial community have always received the greatest sympathy, and as much help as possible, from His Honour. The forward step he has taken in appointing a business man as a Director of Industries and in nominating some business men to the Board has been greatly appreciated and I think the results have amply justified the policy. The fact, as stated by Sir Thomas Holland, that the United Provinces Board of Industries is more progressive than other Provincial Industrial Boards, is due to this policy, and it is mainly the extension of this policy that I advocate.

I hope that the members of the Board will not misunderstand my remarks about the constitution of the Board, these remarks were by no means a personal attack on any of the members, whose eminent abilities in their own spheres of usefulness I would not dare to

criticise. From the remarks made by Sir Thomas Holland, I am afraid that he, at any rate, did not understand my meaning after eulogizing the constitution of the Board, which he said was composed of scientific men and administrators with varied experience, he perfectly rightly added that it was impossible to consider at one sitting an agenda of such a wide range of scientific subjects as was placed before the Board at that meeting. I may be wrong, but my idea of the Board is that it is not appointed to consider scientific subjects or enquire into the intricacies of research work, the solution of such problems is the province of scientific men to unravel with due consideration and deliberation The Board of Industries is quite incapable of criticising such decisions but can only make use of them in their practical application to plain straight-forward business propositions. Scientific investigations on any particular subjects can all be, and in fact are, collated by the Director of Industries to assist in the formation of sound opinions on commercial undertakings. Eliminating then the purely scientific aspect of the question I do not think that the agenda before the Board was so colossal as to be beyond the capacity of a Board composed of a fair proportion of business men accustomed to deal with commercial matters, what I would suggest is that in addition to the representatives of the wool, sugar, paper, and metal industries, now on the Board, representives from the tanning, cotton, banking and other interests be added.

These are only my personal views. I believe the Chamber of Commerce originally approved of the constitution of the Board but at that time the functions and possibilities of a Board of this kind were not fully realised by the industrial community any more than by the Government.

Q. 57.—The functions of the Board of Industries, in whatever province established, should be purely advisory.

Q. 58.—A Board of Industries should be constituted mainly of business men and of the heads of technical departments of Government, and it is, in the Committee's opinion, absolutely essential that the President should be a senior business man.

Q 60.— In these Provinces we already have a Director of Industries who is a business man and the work which he has done during his tenure of office absolutely justifies the appointment of a business man as Director of Industries.

Q. 61.—The Director of Industries should be a member of, and the executive agent to, the Board of Industries. The Board of Industries should be regarded as the supreme provincial authority on industrial matters and should, through its executive agent, have direct access to the head of the Local Government. This would necessitate the position of the Director of Industries being equivalent to that of a Secretary to Government.

Q. 62.—There should be established an Imperial Department of Industries, separate and entirely distinct from the department of Commerce. The functions of such a Department of Industries should be, in the main, to correlate the work of the provincial Boards of Industries and to deal with matters of Imperial, as distinct from Provincial importance, e.g., transport.

VII.—Organisation of technical and scientific departments of Government.

The Committee advocate the establishment of provincial laboratories to deal with local provincial questions, and of a central research institution to co-ordinate the working of the provincial laboratories and to check their work.

Colleges of commerce. Q. 80.—The Committee do not think that the establishment of a college of commerce is either necessary or desirable in these provinces.

VIII.—Government organisation for the collection and distribution of commercial intelligence.

Commercial intelligence. Q. 83.—With the separation of the department of Statistics from that of Commercial Intelligence, the Committee are ignorant as to what useful functions are performed by the Director-General of Commercial Intelligence.

Industrial and trade journals. Q. 84.—In the opinion of the Committee the *Indian Trade Journal* serves a very useful purpose in epitomising trade information.

IX.—Other forms of Government action and organization.

The Patent Laws. Q. 95.—It has been remarked that a patent obtained in India is not worth the paper on which it is written. While not prepared to support this sweeping assertion the Committee consider that there is much room for improvement in the existing patent laws and they indicate as a solution that the Government of India should press for the unification of the Law of Patents throughout the Empire.

In these days of the inter-dependence of the various units of the Empire the necessity for concerted action towards mutual aid in industry and commerce becomes imperative and there is therefore every reason for uniformity in the laws governing patents.

Registration of partnerships. Q. 96.—The Committee consider that it is desirable, and should be made practicable in the interests of trade to introduce a system of registration of partnerships.

Railways. Qs. 97-99. This Chamber has consistently pressed in past years for improvements in railway facilities generally. As affecting these provinces particularly the Committee have advocated the early doubling of the line from Allahabad to Ghaziabad, but they are prepared meantime to accept the less pretentious scheme of doubling the section between Allahabad and Cawnpore, and they take the opportunity of again pressing for this most necessary facility.

In regard to the general question of the improvement of railway facilities, it may be apposite to quote the following paragraph from a letter, addressed by this Chamber, on the 23rd August last, to the Secretary, Railway Board, dealing with the question of the comparative advantages of the management of railways in India by Companies and directly by the State :—

"The Committee hold very strongly that the present system under which Indian railways are financed is in need of reform. The position of Indian railway administrations is considered to be sufficiently strong to justify their financial arrangements being severed from the general finances of the country and their requirements provided by loans raised either on the London or Indian markets, according to where conditions are most favourable."

Forest department. Q. 105 —In regard to the working of the Forest department the Committee suggest the creation of a separate sub-department or branch of the Forest department to deal with the business side of the department and with industrial requirements and the marketing of forest produce

Jail competition. Q. 108.—The Chamber has in the past made many representations to Government on the subject of the competition of jail manufactures with private enterprise. On the whole, the response of Government has been sympathetic and satisfactory and in more recent years few complaints, if any, have been made. The Committee ascribe this to a more reasonable and accommodating attitude on the part of jail superintendents who have latterly been at pains to ensure that the industries carried on in their jails do not clash or compete with the free industries of the district.

The Committee can only hope that this attitude will be maintained and they trust that the Government will put a premium on the cordial relationship of jail superintendents with the manufacturers of the vicinity, and where friction arises will restrain the enterprise of any superintendent who may fail to realise his responsibilities in the matter of abstaining from competition with private manufacturers.

Speech delivered by Mr. T. Gavin Jones at Board of Industries meeting on 14th September, 1916.

GENTLEMEN,—We welcome Sir Thomas Holland at this meeting of our Board, and as this is a special occasion and we have great hopes of good results of the investigations of the Commission of which he is President, I hope you will all excuse me if I indulge in what I believe to be a little constructive criticism of this Board and of the general organization of industry in this country.

In order to improve the welfare of the people and raise their standard of living it becomes more and more evident that the State must not only provide for the maintenance of order, protection of property, and education of the people, but must also direct and assist the organisation of the industries of the country. I use the word industries in the broad sense, including agriculture and all means of production. This has been realized and put into practice in varying degrees by all Western States. India more especially requires the State direction, because the people are lacking in initiative and are accustomed to look to Government for guidance.

The formation of the Commerce and Industry department, and these provincial Boards of Industry with Directors of Industry is the first attempt made by the Government to co-ordinate information on industrial and commercial problems, with a view to assisting their development.

This is a move in the right direction. This first effort at industrial and commercial organization on the part of Government, I am afraid, gentlemen, was amateurish. Governments are not infallible and are generally lacking in imagination. They did their best

according to their lights, but they were ignorant of commerce and industry and appointed officials to run the departments, who were also ignorant of commerce and industry and had to spend their time in learning. The greatness of the problems before them was not imagined by Government; but I think it is now beginning to dawn upon them, and it is up to us gentlemen, to help them to solve them.

I have served now for 18 months on this Board, and a survey of our past work as a Board makes me feel we have done very little. Mr. Silver, our energetic Director of Industries, has done a great deal, and I think great credit is due to him for the grasp he has succeeded in acquiring over so many problems in such a short time. His last note on tanning industry and hide and skin trade is most illuminating, and shows how closely he has got into touch with those who are interested in the tanning industries in this country, and has obtained their confidence and sympathy, which must be done by any Government official who really wants to know the intricacies of any particular industry.

But gentlemen, the bulk of this work done by Mr. Silver would have been done just the same by him if this Board had not been in existence. What have we done? We have discussed the pioneering of a number of industries, mostly of minor importance. We have dabbled in educational matters. The only industry we have really done anything for (I speak now of the Board and not of the Director of Industries personally) is the oil pressing industry, for which a small loan has been sanctioned to a firm, and what, I think, a totally inadequate sum of Rs. 5,000 has also been sanctioned for popularising the use of oil-seed cake for cattle-feeding. We have also sanctioned Rs. 20,000 for a research laboratory. I think Sir Thomas Holland would smile if he had been offered Rs. 20,000 to establish a research laboratory. I don't wish to disparage the work done by Mr. Silver and his young chemist, they have done a lot with the very slender resources at their disposal, but I cannot help thinking that it is like trying to empty the sea with a thimble.

I remember when the subject of a loan to assist starting a glass factory was discussed; I think it was a question of lending Rs. 5,000 or Rs. 10,000 and Sir Alexander McRobert made the pertinent remark that he had heard of glass factories costing 10 lakhs to start. I think that short sentence, which passed at the time almost unnoticed, exactly depicted the difference between the mental attitude of this Board towards industries and that of the man of affairs, who knows what the development of industry really means. Gentlemen, we have not been thinking big enough; our scope of vision has been narrow. This is not altogether our fault; Government have limited the scope of our activities; they have limited our discussions and proposals; nothing can be put forward that cannot be dealt with by the Local Government with the very limited funds placed at the disposal of the Board. Hence we have only been playing with the subject.

I cannot quite follow what the Government's intentions were when they first constituted this Board. Now I put it to you, Sir Thomas Holland, had you not known of the existence of this Board, and you had been told that the United Provinces Government had formed a Board of the following gentlemen:—

One representative, Public Works department Engineer,

Ditto Financial department,

Ditto Educational ditto,

Ditto Agricultural ditto,

Ditto Forestry ditto,

One Registrar, Co-operative Societies,

One College Principal,

Three College Professors,

Two heads of railways,

One Indian journalist,

One Indian gentleman of means,

One Indian industrialist,

Two representatives, Chamber of Commerce,

would you have guessed that such a Board was a Board of Industries? I don't think so; personally I would have racked my brains considerably, and eventually made a wild guess at its being a Board of Education. Such was the composition of this Board at the commencement; since then one College Professor has been replaced by a business man.

Gentlemen, I would like to see more business men on this Board; it should be largely composed of the most influential business men in the province who are interested in the industries in the province; we want our representatives of Agriculture, Forestry and Co-operative Societies, but the major influence on the Board should be the men who are interested in the development of industries. A strong Board of this kind, with a Director of Industries, who, I think, should always be a trained business man, and should be the ambassador of the industrial community to the Government. From such a Board, Government would obtain the best advice on each separate problem.

I think the Board should be allowed the widest scope in their deliberations, and be in close touch with the Agricultural, Forestry, and Geological Survey departments, whose work should be co-ordinated by the Board for development into practical industrial undertakings. At present there is a slight tendency towards opposition between some of the departments, whose work, to obtain the full value, should be co-ordinated. For instance, the Agricultural department mothers the sugar industry; that is all right up to a certain point, but when any particular experimental work comes to a head and is about to be tried as a commercial undertaking, I think that undertaking should be submitted to the Board for their opinion.

I think the Board will have quite enough to do in studying the development of industries without dabbling in educational matters; these should be left to a Board of Education. I fully realise the importance of technical education, but I think it is a mistake to imagine, as many do, that the creation of a host of technically-trained students is going to create industries. Let us enlarge our present industries, and create new ones where possible, and then there will be openings for these students. There is a tendency in India to consider education a panacea for all evils.

My previous remarks might lead you to think that I advocate large sums of money being allocated by Government to the Board. That is not my idea; the point I wish to make is that these doles are, in my opinion, misplaced: they are not sufficient to really cut any ice, and the giving of loans to private individuals by Government I don't think is sound. If an undertaking is worth trying—and Government determine to make it worth trying—money can always be obtained from private individuals, and the business is much more likely to be run on sound lines. Government can do this, by bounties, guaranteed purchase of products for a period of years by insisting on Government departments purchasing goods guaranteed interest on capital for a period of years, giving transport facilities and, above all, by fiscal re-arrangement and export and import duties. A dreadful word this word *fiscal*: it makes everyone put up their hands and say in hated breath "don't mention it." I am sorry, very sorry, that Sir Thomas Holland has had his hand tied in this respect; it is rather like going to open a safe with the key locked up in another safe. I am afraid he will bump up against the fiscal question at every turn in India. Here we have a concrete instance in front of us now, in the well-considered note put up by Mr. Silver on the tanning industry. After carefully going into every aspect of the problems the only solution apparent is an export duty on hides and skins. Only the other day the Board were discussing a means of preventing adulteration of certain edible oils, and the obvious and simple solution was an import duty on the mineral oil which was being used for adulteration, but this was ruled out of court, because it was a fiscal question. The abolition of the excise duty on cotton goods, an import duty on mild steel plates to encourage the establishment of plate-rolling mills in India (a crying need at present) or to encourage the establishment of the tin-plate industry: these, and many more, are matters of vital interest and importance which a Board of Industries should be allowed full scope to consider as each problem comes up for discussion.

Opinions thus formed by a strong Board, such as I have in mind, would have some weight and could be put forward by the Local Governments to the Government of India through a properly constituted ministry of commerce who should be able to co-ordinate the proposals put forward by the provincial Governments, and advise the Government of India of the most suitable policy to pursue. And here we come to one of the most important points in an efficient organization. The ministry of commerce must be a real ministry of commerce, with *personnel* who are business men and have an intimate knowledge of commerce and industry, and are in close touch and sympathy with the industrial community; a *personnel* who would be anxious to see the industries of the country progress, and would not be prejudiced against the men who have already established industries and made money; for these are the men who will develop the industries of the country. A *personnel* who can appreciate the difference of outlook between the export or import merchant and the manufacturer or producer. Gentlemen, I could name many mistakes that have been made and opportunities lost for the development of India owing to there being no efficient ministry of commerce to advise Government in commercial matters when they came up for decision. It is a difficult problem, but I think it is the root of the matter. These are merely my personal views and I state them for what they may be worth. There are always two sides to every question and I think the points I have brought up should be carefully considered.

ORAL EVIDENCE, 9TH NOVEMBER, 1916.

President.—I understand that you are representing the Upper India Chamber of Commerce?—Yes.

And consequently you do not feel free to deal with any question, except in the way of elucidating the answers already given in writing by the Chamber, without the consent of the Chamber Committee?—Unless they are questions on which I am aware of the Committee's views.

A suggestion has been made to us that it would be advisable to have in this country some kind of stores purchasing department, a department to which all requisitions for stores would be sent from the individual officers of the different departments and these orders would be gathered together in that department so as to be able to purchase on a larger scale, sometimes even to make forward contracts, and the department would be provided with experts whose duty would be to see that the Government got full value for its money. As a subsidiary question it has been considered whether this stores department ought to be a department of the Government of India or whether each province should have its own purchasing department. You, of course, cannot express the views of the Committee on that point?—It is a point that they have not considered, but it seems pretty obvious that a provincial department would hardly fill the bill in the matter, say, of railways, which cover several provinces.

And also the provincial departments would necessarily have smaller purchases?—Yes.

And therefore there would be difficulty in maintaining the right kind of staff to examine and approve of the purchases?—Entirely.

Would you ask your Committee to consider that point, because the matter has been raised by one of the members of your Chamber and we should like to have their views on, first of all, whether such a department would be an advantage to India, and, secondly, if so, whether that department should be Imperial in character or provincial?—We shall forward our views on that point in a supplementary note.*

With reference to the constitution of the Board of Industries, you think that the Board should be constituted mainly of business men and heads of technical departments of Government, and that it is essential that the President should be a senior business man Is your Committee able to give us any advice as to how that Board should be formed. whether by nomination as at present, or whether commercial bodies and industrial bodies should have the power of electing representatives to the Board?—I have no doubt that they would welcome an opportunity of doing so. It is necessary perhaps in this connection to refer to the copy of letter, dated the 19th September, 1916, from Mr. T. Gavin Jones, to the Secretary to Government, United Provinces, Industries department, in the Committee's evidence Mr. Gavin Jones says there that he believed that the Chamber originally approved of the constitution of the Board, but he is not quite correct in saying this. The constitution of this Board was first suggested at the Naini Tal Industrial Conference in 1907, and it was then proposed that it should be constituted of seven members, viz., the Director of Public Instruction, the Director of Land Records and Agriculture, the Registrar of Co-operative Credit Societies, Secretary to Government in the Irrigation department, two non-official gentlemen, and "the Director of Industrial Inquiries," which post it was then proposed to create. The next this Chamber heard was the accomplished fact, so to say, of the constitution of the Board, and it is necessary to remark that the President of the Chamber in his Presidential address two years ago very severely criticised the constitution of the Board.

Hon'ble Pandit M. M. Malaviya.—In regard to the constitution of the Board of Industries, is it not conceivable that in laying down its constitution the Government have been guided by the consideration that the problems which are to come before the Board of Industries are such that they require that the members should be in touch with the different departments, that is, public works, engineering, finance, educational, agricultural, forestry?—That is, of course, obvious from the constitution of the Board.

And don't you think that there is some advantage in having a Board of Industries which has to solve problems of labour training, sales agencies, marketing of goods, and encouragement of people by the supply of machinery—is it not desirable to have representatives of these departments on such a board?—That is, of course, quite understandable. It would be of immense value if these interests were represented. The point we urge on the Government is that the proportion of businessmen should be greatly increased. The Committee would not, I think, argue from this that the Board should be increased in numbers. A Board of 18 is sufficiently cumbrous.

* Not received at time of going to Press.

What you desire is not the exclusion of the representatives of these various departments but the inclusion of a larger number of business men?—That they should have a greater say, and a main point is that the Chairman of the Board should be a business man. The feeling is that there is too much official dictation, as it were to the Board. You have got to realize that we regard official interference from that point of view as partaking somewhat of amateurism.

I quite understand your resentment. Provided you have a larger number of business men represented on it, you have no objection to the constitution of the Board?—If that is compatible with a Board of workable dimensions.

You do not think it is too large in number?—I think it is.

Having regard to the fact that so many points of view have to be represented educational, engineering, agricultural, forestry, general business, do you think that the Board is too large?—I do think so still, because each one of these interests should be represented by one representative.

Is not there only one representative of the Engineering department, one of the Finance department, one of the Educational department, and one for Forestry?—There are several professors also representing education.

Having regard to the fact that you want problems to be referred to colleges—technical problems and research problems—do you not think that the presence of these professors also on the Board is an advantage?—Hardly in a case like this. The views of the department interested might be represented by one representative, but I realise that a person like Dr. Hill would be of considerable value to the Board, being himself an eminent and practical scientist.

So long as you have practical scientists you do not object to their presence on the Board?—Always compatible with a board of workable dimensions.

Would not the presence of the Registrar of Co-operative Credit Societies on the Board be an advantage in order that he should know where and how such societies might be helpful?—That is rather involved by the functions which the Board ought to serve. If it is a question of considering established industries, then yes; if it is a question of new industries in the abstract, no.

Would it serve the objects of your Association if you had sub-committees of the Board of Industries constituted to be in charge of special departments? When a new industry has to be considered you might refer it to the sub-committee of business men who are, in the opinion of the Board, most competent to express an opinion about it and when you have an educational problem, say the training of labour, you might refer it to a sub-committee consisting largely of educational men. Don't you think that such an arrangement would meet your objections?—I am not prepared, without considering it deeply, to accept that suggestion as desirable, because it seems to me a case of *imperium in imperio* and the matter might just as well be discussed by the Board of Industries. I am sure my Committee would not recommend a multiplicity of sub-committees on matters which the Board itself ought to decide straight off.

In expressing that view are you not confining your attention almost wholly to questions of help for industries which might come up before the Board, apart from every other question of the training of labour and providing sales agencies, facilities for the marketing of goods, etc.?—I do not see how we can dissociate them.

So you do not think that the arrangement of sub-committees would be of any advantage?—I am not prepared to meet it. I can as a supplementary question ascertain the Committee's views on this point.*

President.—Will you kindly do so?—Yes.

Hon'ble Pandit M. M. Malaviya.—Your Committee want greater facilities in the purchase of land for industrial purposes and you propose that the Government should acquire land under the Land Acquisition Act and transfer the same on payment of the cost and under suitable guarantees to the industrialist. Don't you think that if your suggestion were accepted the persons whose interests may be involved in the acquisition of the land, will be deprived to some extent of the facilities which the law provides for them of having the value of their land properly determined?—I do not think so, because that would imply that Government assessments under the Land Acquisition Act are unfair.

The Government at present acts as a judge between the parties?—It acts as more than that. The acquisition officer is himself the valuer.

* Not received at time of going to Press.

But the matter goes on appeal to the District Judge?—The valuer has to give his value after considering the attendant facts in the neighbourhood.

In saying that the Government should transfer the land acquired under guarantees to the industrialist, you do not contemplate that there should be any restriction on the right of appeal to the civil courts?—None whatever. The application of the Land Acquisition Act to industrial companies is distinct from that to railways. At present the Act seems to be designed for railways. I am aware that in Cawnpore the Act has been applied to assist industrial companies in acquiring land for industrial villages. But that is a "work" which is rather different from, and not quite on a parallel with, the acquisition of land for the erection of a factory, because it is recognizable that the creation of a village means the reduction of congestion in the city and is therefore essentially a public work, and from that view the present state of the law seems to be perfectly applicable; but whether it would be equally applicable to assist a man to get land for his factory I have doubts.

Do you not think that the needs of industry would be met by the Government granting a lease of Government or *nazul* land?—If the leases are *in perpetuo*, the object would be met.

You say "The Committee are emphatically of opinion that all industrial schools should be under the control of the Department of Industries." You know what the existing arrangement is?—The Committee are aware that at present the schools in these provinces are under the management of the Director of Public Instruction, and they are aware of the extremely cordial relations between the Director of Public Instruction and the Director of Industries, but they are not satisfied that these conditions may always obtain.

Then until you have any reason to be dissatisfied with the existing arrangements, would your Committee be in favour of continuing them under the Director of Public Instruction?—I should say that in this province there would be no objection to the existing conditions continuing, other things also continuing the same.

Have your Committee considered the requirements which a college of commerce is likely to meet, in expressing the opinion they have done about it?—No. The fact has not been presented in a form such as to enable them to do so. As it is, they do not think it desirable mainly because they do not think it is necessary. There is nothing, as far as they are aware, to be gained by the establishment of such a college.

They have not considered the various aspects in which a college of commerce would be useful, for instance, in training managers of banks and persons who would take up the co-operative movement? A college of commerce would give instruction in banking, accountancy, actuary work, commercial geography, economics, transport business, exports and imports, international and commercial law, etc. Don't you think that a young man put to a three-years' course of study in one of these branches would be more likely than one who has not been to prove a suitable man to be placed in charge of the work of a factory or company as manager? I only want to know whether your Committee has considered this aspect of the question?—The Committee have not so considered it. But arguing on analogy, I think they would be inclined to say that the best school is the factory or the bank.

Would you put this aspect before your Committee?—Certainly.*

Hon'ble Sir F. H. Stewart.—Your Committee say "The Committee strongly deprecate the appointment of trade representatives to represent the whole of India, etc." Is this a general reply to the Commission's question or have your Committee been into the subject in detail at all?—It is a specific reply to the question of the Commission.

In section VIII, you say "With the separation of the Department of Statistics from that of Commercial Intelligence the Committee are ignorant as to what useful functions are performed by the Director-General of Commercial Intelligence." He, of course, represents the Commerce and Industry department in Calcutta. Do you think that that appointment should be done away with?—I should like to answer that by saying that since the separation of the Department of Statistics, it has always been felt as a fifth wheel to the coach.

With regard to the question of patent laws and trade marks, has that question previously come up for the consideration of your Committee in detail?—Not in detail. They are voicing the feeling which is generally entertained that the patent laws are unsatisfactory. No question has, to my recollection, come up before the Committee for the revision of the patent laws. It has not come to us except in connection with the problems arising out of the War. We have, as far as I am aware, no particular file on the subject which would be useful.

With regard to the registration of partnerships, the Committee consider it desirable that a system of registration should be introduced and should be made practicable. Have

* The views of the Committee not received at time of going to Press.

they any specific recommendations as to how it could be made practicable? They realize that there would be difficulties in Indian partnerships, but they feel that the law should be adjusted to compel it.

They had not that under detailed consideration?—On that point I am not prepared to give a definite statement. The Committee would add a note* on the subject in the supplementary note if desired.

President.—Would they please do so?—Yes.

Hon'ble Sir F. H. Stewart.—As regards banking legislation, the Committee made express recommendations three years ago in 1913?—Yes.

Has the question whether the East Indian Railway should be allowed to assimilate the Oudh and Rohilkhand Railway come up for the consideration of the Committee?—We have been asked to consider whether the East Indian Railway should be allowed to continue. That we have cordially supported. The other point has not been raised. It has at least not been raised for many years. (It is a point I could look up if desired.)

In answer to a further question the witness said that the Committee would strongly favour the earmarking of railway profits for railway purposes.

President.—You say, quoting from a letter, dated the 23rd August last, from the Chamber to the Secretary, Railway Board, "The position of Indian railway administration is considered to be sufficiently strong to justify their financial arrangements being severed from the general finances of the country and their requirements provided by loans raised either on the London or Indian markets, according to where conditions are most favourable." I understand that refers to the fact that Indian railways cannot be financed except with the sanction of the Government and consequently in your opinion railway projects are now neglected that might otherwise be profitable and into which private capital could enter?—Partly that and partly also because any surplus from the railway revenues is not devoted to railway expansion. We would like to devote railway finance to railway extension.

I should like to know if you can say specifically whether the recommendation to separate the finances of the railways from the general finances of the country is due to the fact that you object to the railway profits being made use of?—That is the main objection. Take the question of facilities. Facilities are lacking because revenues are lacking, being devoted elsewhere.

The Indian railways ought not to make a profit beyond a certain amount sufficient to cover interests on the capital outlay?—Not until their facilities are completed.

Do you regard the present profits being made by railways as another form of indirect taxation?—Seeing that it is devoted to other purposes, yes, and railways suffer from the deprivation.

Is it the opinion of your Chamber that all profits of this kind made by the railways should be devoted towards further extensions of railway?—Yes.

Or further equipment?—Yes.

In fact, all the money should be earmarked for that purpose?—Yes.

Hon'ble Pandit M. M. Malaviya.—Do you know that Indian railways have cost the Indian taxpayer five hundred millions and more?—Yes.

Then you would deprive him of the benefit of the investment entirely?—No.

Until the railways are themselves complete and the facilities are complete and adequate I would not allow the revenues from railway to be devoted to other objects.

Can you contemplate any time for the railway facilities to become complete?—It is a question which I cannot answer offhand.

Do you think that the arrangement you propose is fair to the general taxpayer?—Yes, because railway investments are generally beneficial to the whole community.

President.—Are there any supplementary remarks which you wish to make?—There was one in regard to the question of making the Boiler Act uniform. It is probably necessary to supplement that with a note that the present United Provinces Boiler Act itself does not contain regulations for the examination of mechanical engineers. They are conveyed in the rules. Of course, it was felt that things of that sort should be incorporated in an all-India Act.

* Not received at time of going to Press.

Even if it is not actually in the Act, it would satisfy you if some provision were made for making these rules for examination more uniform in character?—I should not like it to be made *more* uniform, but I would like to make it *quite* uniform. Take a candidate appearing for a certificate as second class engineer. In Bombay he is qualified to appear for examination after three years' apprenticeship. In this province he has got to put in four years' apprenticeship and one year's practical work, that is five years.

WITNESS NO. 30.

MR. E. F. TIPPLE, *Indian Educational Service, Professor of Mathematics, Thomason Civil Engineering College, Roorkee, United Provinces.*

WRITTEN EVIDENCE.

This statement is prepared with special reference to the subjects and questions embodied under headings V and VII in the instructions issued to witnesses summoned before the Commission.

V.—Training of labour and supervision.

In connection with the training of labour, the object in view is to provide a more intelligent class of workmen and to increase the supply of skilled labour.

The instruction supplied must be such as can be reared on foundations laid in the primary schools and must be suitable for those who early in life are compelled to become wage-earners. It is a training in the routine practice of a particular trade, and any scientific instruction given is mainly elementary or of a popular character, calculated to rouse interest in the technical work undertaken. It may conveniently be specified as industrial or low grade technical training.

Industrial schools.

From their nature the courses of instruction at industrial schools must be arranged to dovetail with the work done in the primary schools, and for this reason such schools should be organized under the Education department, with proper safeguards to ensure the technical training being kept in close touch with the conditions of actual industry. So far as possible, factory hours should be kept and the practical work conducted under factory conditions, the technical teachers themselves being mainly drawn from the better class of artisan.

For these reasons these schools should be situated in the industrial centres where the trades taught are actually practised. Such a location further ensures that the pupils shall mainly be drawn from those sections of the population having association with the trades chosen. It should be the duty of the Industries department to specify the most suitable centres, when it is desired to establish an industrial school.

Such schools, so organized, would serve a doubly useful purpose; they would provide skilled labour and also tend to give a technical bias to primary education in the districts concerned. If such schools in India be definitely separated from the Education department the present cleavage between primary and technical education will continue and there will be a danger of its becoming more pronounced, whereby technical training will itself suffer since it must be built upon primary education as its foundation.

(For fuller details on these points see the appended note* on the co-ordination of technical and general education.)

Finally, the professional staff of technical institutions of University rank could give valuable assistance in the supervision or inspection of low grade technical schools and would ensure that the two classes of institutions should not encroach one upon the other. Experience shows that it is unsatisfactory to attempt to provide both high and low grade training at the same institution, and Government has recognized this by recently transferring the Mechanical Apprentice class from Roorkee to Lucknow. When low grade training is provided at a high grade technical college, the low grade students are tempted to place too high a value upon the type of training they have gained and this is apt to unfit them for the only class of work for which they are initially competent. Moreover, the presence of the low grade work at Roorkee caused the Thomason College to be in some ways a rival of the Industrial School at Lucknow, and this acted detrimentally upon both institutions.

VII.—Organization of technical and scientific departments of Government.

The type of institution here under reference is that required to provide high grade technical education. This grade is required for the training of skilled managers investigators and so-called captains of industry.

For the instruction here needed the foundations must be laid in the secondary schools and the educational courses must involve a thorough training in the scientific principles

* Not Printed.

underlying the practice of a particular profession or the skilled management of a particular industry.

The functions of a high grade technical college are to provide training of this type; to undertake scientific and professional investigations; and scientifically to examine technical questions generally. Technological institutions.

Special qualifications are required in the staff of such an institution and these should comprise a thoroughly scientific education combined with technical and educational experience. Practical experience of industrial or professional work alone is not of itself a sufficient qualification. Such experience is too apt to lose sight of the fact that it cannot itself be acquired at any technical insitution; it can only be gained on works or in factories. No technical college, however efficient, can turn out the finished professional product; the college course must be accompanied by a period of apprenticeship on works. This applies equally to high and low grade technical institutions; no industrial school, for example, can produce foremen fully competent for immediate employment as foremen in factories. The advantage of technical training of either grade lies in the fact that it enables the recipient to acquire sound practical experience on works more rapidly than is otherwise possible.

The educational details involved in the organization of a high grade technical college are of a complex character, and to deal with such details in a satisfactory manner educational experience, combined with technical training, is essential. The conflict on this point in the past has lain between the man with purely practical experience on the one side and the man with purely scholastic experience on the other; between these two the case for the man of educational experience, combined with technical training, has been overlooked. On this point Sir Edward Buck in his report on "Practical and Technical Education," dated 1901, stated that "educational officers, however able and accomplished they may be, have themselves had no practical training, are not brought by their profession into contact with industrial occupations, have *no technical knowledge.*"

This statement is extremely misleading, since it entirely fails to discriminate between educational officers brought out for purely scholastic work and those recruited for service at technical institutions. All four educational officers at Roorkee, for instance, were possessed of, and selected for their, previous technical training before coming to India.

The conclusions of Sir Edward Buck have produced a settled conviction in certain quarters that technical education must be divorced from general education and placed under entirely distinct control. This overlooks the fact that those technical institutions which have done most for industrial development in Western countries have been institutions in charge of educationalists possessed of technical training and experience.

Such institutions, in order that they may take their proper place in the industrial expansion of a country, should be allowed to develop unfettered. This is shown from the research activities of such institutions; any attempt to define the field of work would tend to restrict the mentality of the workers and would be unsound in principle; for example, had Mr. Chatterton as Professor at the Engineering College, Madras, been restricted to engineering problems alone, Southern India would not now possess its chrome leather and aluminium industries. The only useful purpose to be served by any attempt at restriction would be to prevent unnecessary overlapping. This is ensured in the West by ordinary professional etiquette aided by notification in professional journals; in India, Government help would be necessary to give publicity to such notifications. In this connection the establishment of well-equipped reference libraries at all high grade technical institutions is essential; at Roorkee inconvenience has at times been experienced from a lack of scientific and technical journals, although a large general library is available for public use. Valuable help in a somewhat similar direction would also be afforded by a well-organized central bureau of industrial information. It is the industrial chemist, however, who is most intimately concerned with these further details and such witnesses would be better qualified to express opinions upon these points.

ORAL EVIDENCE, 10TH NOVEMBER, 1916.

President.—I understand you are a Professor of Mathematics at the Thomason College?—Yes.

How long have you been in the college?—It will be 20 years next April.

You have spent the whole of your Indian service in the college?—Yes.

You also acted as Principal of the college?—Yes. On two occasions.

Could you give us an idea of the kind of students that are usually passed through the college and what becomes of them afterwards?—Different types of students are educated. There are three types in civil engineering, the first is the Civil Engineer class for the provincial service, the second the Upper Subordinate class, and the third the Lower Subordinate class. The Civil Engineer class corresponds to the type of training given at home in a Civil Engineering College.

Is the Civil Engineer class qualified to become assistant engineers, executive engineers and superintending engineers?—Yes. Six or seven appointments in the provincial service are given to this class yearly.

How many Roorkee boys take high positions in the Public Works Department?—Several of them have attained to high positions, but that was before the introduction of the provincial service.

On account of the introduction of the provincial service are they unable now to become superintending engineers and chief engineers?—I think that in the provincial service they have to serve somewhat longer than is the case in the Imperial service before attaining to the executive grade.

Are your boys eligible to apply direct to the Government of India for appointment to first class posts in the Imperial service?—I do not think so. The Imperial service is recruited entirely from home. Some of our students have gone home, joined a college at home and on completion of that course come out into the Imperial service.

Do you consider the standard of training that a boy gets when he leaves Roorkee followed by, say, an apprenticeship of one or two years with a practising civil engineer would be sufficient to qualify him as a candidate for the Imperial service?—Personally I think it would. The qualifications of our students vary somewhat, but taking the best of them I should think they would be so qualified.

Does the final examination correspond to our "honours degree" at home?—It is perhaps scarcely up to that standard. I think that what is wrong with the courses is that the actual work in civil engineering has never been brought into line with the other portions of the work.

In other words, they are primarily designed to suit the requirements of the provincial service?—I think there is a tendency that way to turn out men who will just immediately be useful to the department. I am inclined to think that some of the Roorkee men hardly get fair treatment in the Public Works Department, because the department is inclined to compare them with men of the Imperial service who have just passed in from home. I consider this is not quite fair because a man from home has had a certain amount of practical experience on works and the first year of a student from Roorkee in the Public Works Department is an apprentice year and should be recognized as such.

I am asking you these questions to give us an idea as to what you think should be done in the way of developing industrial and technological training in the country and I suppose you agree that unless you give a boy the hope of getting the very best post we are not likely to produce an institution of a high standard?—The whole system tends to drive the boys out of their country for their best education.

In the old days there were several Roorkee boys who obtained distinguished position, in the Public Works Department as Chief Engineers. Why should they have had a better chance in the old days than now?—Roorkee dates back before the time of Cooper's Hill The men who passed from Roorkee in the old days joined the Imperial service directly, but enough men were not forthcoming and it was necessary to recruit also from home.

You think it was the scarcity of candidates that started the Cooper's Hill College at home?—Yes.

Hon'ble Pandit M. M. Malaviya.—There was an attempt to modernize the course of instruction at Roorkee some years ago when a technical class was started?—That was an attempt to introduce mechanical engineering, electrical engineering and industrial chemistry. The educational staff knew nothing about it at all. No preparation had been made to lay down courses. So far as modernising courses at Roorkee is concerned, this has been the continuous endeavour of educational officers since such officers were first appointed to the college in 1897.

Then the scheme did not receive a fair chance?—I do not think so. As soon as the educational details had been worked out the class was abolished. The class has been abolished on two distinct occasions. The educational staff have always felt sure that a class of that nature could be developed if it were encouraged. The development at Roorkee was somewhat handicapped by a desire to start a technological institute at Cawnpore.

Was not there an element of opposition at Roorkee itself to the development of a department of technology at Roorkee?—Not amongst the educational staff.

You think that if a scheme is given a fair chance with a competent staff to work it it has every chance of success?—I hand you a note on the subject. I think it gives full details.

You think then that there is no difficulty in modernizing the course of instruction but that more financial assistance and sympathy are needed from Government?—Personally I do not think there is any difficulty about modernising the courses. The necessary financial assistance and sympathy would be required if the college were under the Education department. I do not think things will be satisfactory until this is so.

If the control of the college is placed in the hands of the educationalists, do you think you could work up to the honours degree?—I do not see why we should not.

You get students who would work up to that standard?—Of course. As a matter of fact we do not get students of the same type that used to come forward before the provincial service was introduced.

The institution of that service has acted as a damper upon the spirit of the students?—Those students, if they possibly can, get their education out of the country.

Until the Imperial service is thrown open to the men at Roorkee you do not expect to attract the higher class of students?—My point is that the existing system tends to compel students to obtain their education out of the country.

You say in your note that the instruction supplied must be such as "can be reared on foundations laid in the primary schools and must be suitable for those who in early life are compelled to become wage-earners." I take it that you are in favour of compulsory education?—My remark refers to industrial schools.

Do you think that the lack of general primary education is an impediment to industrial efficiency among the people?—It must be.

You say in your note that the scientific instruction given in these industrial schools should be mainly elementary or of a popular character. Do you think that if there was a system of adding elementary scientific instruction to the ordinary primary education that would promote industrial efficiency among the people?—Only those students who had a particular learning for technical education would take it.

Are you aware that students' families which did not follow manual trades are attending the carpentry school at Bareilly?—Yes. I suppose those students have a desire to follow that particular line.

Are you aware that in Japan they have a system of education which supplements the instruction given in the ordinary primary schools with elementary technical instruction?—I am not familiar with the conditions in Japan.

In addition to a high grade technical institute do you think a higher technical school in every division of the province will be helpful?—The industrial schools should be situated in the centres where the industries are carried on.

You think that such industrial schools could train up supervisors and managers on works?—It seems to me there are two grades. The industrial school is for the workman, including foremen, the higher grade institute is for skilled managers and scientific workers.

In your note you say that those technical institutions which have done most for industrial development in western countries have been institutions in charge of educationalists possessed of technical training and experience. Are they generally men of University training?—I was thinking of people in charge of a modern engineering department at a University, such as Cambridge University, or at the City and Guilds College, Finsbury, or the Victoria University. I should say they are generally men of University training.

Hon'ble Sir R. N. Mookerjee.—You said in old days students from Roorkee rose to be Chief Engineers and now they do not get the opportunity to get those posts?—I won't say that they do not get the opportunity, but it is difficult for them now.

That is due to the introduction of the provincial service?—Yes.

They are marked as provincial?—They are kept on the same list. The only difference lies in pay.

If the provincial service is abolished they will rise to higher posts in the Imperial service?—I should think so. They did so before, I do not see why they should not do so again.

You prefer that your institution should be brought under the control of the Education department?—It is supposed to be under the Education department.

Don't you think there will be risks of transfer? Your college is a technological college?—I do not see why there should be unnecessary transfers. I *am* in the Education department and have spent all my service at Roorkee.

Have you any objection to a professor who has no practical experience of the work first serving an apprenticeship before he is appointed in the teaching staff?—I think a professor of engineering should have served an apprenticeship before appointment. Our professor of mechanical engineering is a very good man. He has served an apprenticeship.

Don't you think that higher engineering and lower grade training should be separated?—I do. It is a mistake to have different grades at the same institution.

Dr. E. Hopkinson.—Is Roorkee affiliated to any University?—It was affiliated to the Allahabad University, but it was disaffiliated later on. I do not think that the Allahabad University ever exercised any control over Roorkee.

What is the governing authority at Roorkee?—There is a committee of management consisting of the Chief Engineer to Government, Buildings and Roads, the Director of Public Instruction, the Director of Industries, the present Vice-Chancellor of the Allahabad University, Dr. Sunder Lal and an official from the Oudh and Rohilkhand Railway, probably Mr. Gregson.

They are appointed by Government?—Yes.

Is there any diploma given?—There are two certificates, higher certificate, and ordinary certificate for assistant engineers given in the Civil Engineer class.

Are these certificates recognized by the Institution of Civil Engineers?—No.

Has any application been made for recognition?—I do not know that it has ever been made. Some of the Roorkee students were making enquiries, but whether anything has come of them or not I do not know.

Has the Mechanical Engineering class been dropped?—It has been started again for the third time. First it was started without any preparation at all. Then it was abolished. After that a professor of mechanical engineering was appointed and the class was re-started and again abolished. Now it has been started a third time.

Have you any laboratories or workshops there?—Very well-equipped workshops, indeed. Professor Jordan has been installing a certain amount of hydraulic apparatus for a hydraulic laboratory.

Have you any Indian teachers there?—Yes. There are several M.Sc.'s and B.Sc.'s of Allahabad as demonstrators.

Have you sent any students to England for further training under the educational scholarships?—I could not answer that straight away. No student from the Civil Engineer class, but possibly some of the old Technical class.

Do your students readily find employment?—They do. We keep a register. We never have a large number on the rolls waiting employment, certainly not of the Civil Engineer class.

How many students do you turn out each year?—Civil Engineer class about 20. It is a three years' course. Upper Subordinate class about 40. It is a two years' course. The Lower Subordinate class about 40. That is also a two years' course. The Mechanical Apprentice class has been removed to Lucknow. The Technical class, which has been started for the third time, has about 8 or 9 students.

Mr. A. Chatterton.—Some years ago the Secretary of State laid down in a despatch that the engineering training provided at the Indian Engineering colleges should be equal to that provided in English colleges?—I think the civil engineering courses are not quite up to the standard at home.

Do you think there is any disadvantage in having the courses for upper and lower subordinates in the same institution as the college classes?—Personally I think there is. If you have different grades like that it is difficult to draw a line between students of one class and students of another. It causes ill-feeling among the students. You cannot always grant the same privileges to students of the lower classes as to students of the higher classes, for instance, in the use of the library, etc. I think the two grades of technical

education should be kept quite distinct.

Does it lead to the dissipation of energy of the professors?—There is a separate staff for each grade.

Roorkee is under the Director of Public Instruction?—It is nominally under the control of the Education department since 1893?

Do you think that the college suffers in any way from that?—I do not. I think it has improved since then.

Would you prefer to have the college under the Director of Industries?—I think it should belong to the Education department.

For higher teaching at Roorkee what professors have you got?—There are professors of mathematics, electrical engineering, chemistry, an Indian professor of physics, a professor of civil engineering, who has never been an officer in the Education department and who until quite recently was always a Royal Engineer. The professor of mechanical engineering was trained at Manchester.

Does the Principal do any teaching work?—Colonel Atkinson never did any teaching work; Colonel Clibborn did not do any. I do not know about Mr. Wood, he has only just come.

Do the professors of electrical engineering, civil engineering and mechanical engineering engage in research and experimental work?—The professor of mechanical engineering occasionally gets references to carry out investigations on materials. The professor of chemistry has references made to him in connection with building stones, bricks, earths, etc., at times.

They are not of any practical value?—At one time I think that work would have developed pretty considerably, but it stopped because the Government stopped the professional fees for it. It was undoubtedly of practical value.

Years ago a great deal of such work was done at Roorkee, for instance, the well-known hydraulic experiments on the Ganges canal?—They were carried out by Captain Cunningham. There has been nothing of that nature recently.

There were other investigations at a later date?—Yes, some experiments on percolation by Colonel Clibborn. I do not know much about it.

That kind of work is entirely stopped?—I do not know of anything in that way being done lately.

Is it a fact that under the present régime the professors, not merely of the engineering classes, but also of the subordinate classes, have so much work that they have no time to take up original investigation?—I think they probably have time for it. It is difficult to get money to carry out these experiments. Possibly that is the difficulty. There are no definite funds available. There is a small grant for running each laboratory for carrying on the routine work of the students.

Was any application made for funds for research work?—Mr. Sedgwick made such an application some time back, but I do not know what became of it.

Have you a higher course of electrical engineering?—That has been started for the third time.

Are there any guaranteed appointments?—There are no guaranteed appointments such inducements are only offered to the civil engineer class.

The Government offers no inducement to students to join the mechanical engineering class?—There are no guaranteed appointments. Government endeavours to fix up apprenticeships with some firms.

How many students are there in the electrical engineering class?—In the new class just started there are eight or nine students. There were 35 students when it was first started.

Is the professor of civil engineering a military officer?—One civil engineer has just been put in since Captain Sands reverted to military duty. Previously we always had a military officer.

How long does he stay in the college?—Since I came out about 19½ years ago there have been only two professors. The first was Captain Campbell who left the college when he became a Major and Captain Sands was appointed six or seven years ago.

Now you have got a civil engineer from the Public Works Department?—Yes. Mr. Lacy was trained at the Central Technical College, London.

Have these professors of engineering any opportunity of keeping in touch with practical engineering when they get into the college?—I can't say what opportunities they have. I am not in charge of that department. There was on a recent occasion some reference made on technical points.

Have you got a press at Roorkee?—There is a lithographic press. It does a certain amount of printing work for the college, but it is mainly a commercial institution.

It has no organic connection with the college?—They train lithographic pressmen and bookbinders, and so on. It is an industrial school for training.

President.—By whom is the lithographic press financed?—It is included in the college budget. The Principal is the head of it. It is a part of the college, but it is somewhat of an extraneous growth.

Do you train any sanitary engineers?—There is a course of lectures given but not a special class. Lectures are given to the third year civil engineer class students, partly by Dr. Phillips and partly by the professor of civil engineering.

Do you think there are a good many openings for sanitary engineers in this country?—I could not say, but I think the training given is useful.

Hon'ble Pandit M. M. Malaviya.—Would you wish this annexure to be treated as part of your evidence?—Yes.

I see from it that it was recognized in paragraph 2 of the letter of the United Provinces Government, no. 601, dated the 20th March, 1909, dealing with this question, that it was wrong to place foremen, supervisors or overseers, on the same plane as managers and investigators, and that the Government had then decided that the Technological Institute (at Roorkee) was to be the industrial Sandhurst, and its object was to train the officer class of the industrial army, the men, who by status, education, or possession of capital, were fitted to be leaders. That idea has not yet been carried out?—It has been hampered by the idea of starting a technological institute at Cawnpore. The idea ultimately was that the institute should have two branches, one at Roorkee and the other at Cawnpore. Roorkee was to be restricted to engineering and Cawnpore to chemistry.

But it has neither been carried out at Roorkee nor at Cawnpore?—The idea of separating the institution has hampered the development at Roorkee. The chemical section at Roorkee has been kept back.

Did what was called the higher division of the department of technology and which was sanctioned in 1909 meet with fair success?—We had very few students.

Was there any difficulty in finding suitable employment for your two students who passed the mechanical engineering examination?—They have both found employment.

You think that the scheme for the higher department of technology did not receive sufficient trial?—I think it is being handicapped by this perpetual changing. The desired changes might have been introduced by less drastic measures than actually abolishing the class.

And the Government has now sanctioned this third proposal of establishing what is to be known as the "improver grade" of engineer?—It is the same thing. It is a quarrel about terms. It was not necessary to abolish the class.

Do you think that the "improver grade" will attract more students than the mechanical and electrical engineering class?—The "improver grade" did not afford sufficient information as to training.

You have not seen the report of Colonel Atkinson and Mr. Dawson in which they have defined the "improver grade"?—I have seen it. It was the mechanical apprentice class. Government decided to remove it, but there was no point in doing so if you were going to start it under another name.

Mr. A. Chatterton.—What became of the cotton spinning and textile department? Have you any students?—It is still at Roorkee. There are four or five boys every year, but that, I understand, is merely a temporary arrangement. It is recognized that ultimately it will have to be removed to Cawnpore.

Am I to understand that the mechanical engineering and electrical engineering class which you have now is for the training of the highest grade of electrical engineers?—I could not say that. We endeavour to give them a training as mechanical and electrical engineers as distinct from artisans.

Is there a professor of electrical engineering?—Yes.

Do the students who join this class possess the same educational qualifications as those students you are attracting to the civil engineering class?—Not quite. They have not carried their studies so far. You must bear in mind that the civil engineering class is really a class competing for entry into Government service. They very often come from the Universities. The men that we get for the mechanical and electrical engineering class mainly come after taking the school-leaving certificate, which more or less corresponds to the matriculation.

Then the course of instruction in mechanical and electrical engineering is not such as would train men suitable for taking charge of large power stations?—Mr. Jordan certainly has it in his view to train men who would ultimately be fit for that. I understand Mr. Thick has been put in charge of a small station in connection with the Simla hydraulic scheme within a couple of years of his leaving the college.

President.—Would it be a correct impression to derive from the general trend of our conversation that, except as regards the classes recruiting for the Public Works Department, for many years the scope and curriculum of the Roorkee Civil Engineering College have been frequently varied and there is still no well defined policy regarding the other technical classes of the college and no clear definition as to the type of student to be trained in these classes or of the standard to be attained?—Yes.

WITNESS NO. 31.

MR. N. A. S. BOND, *Divisional Traffic Manager, East Indian Railway, Cawnpore.*

WRITTEN EVIDENCE.

IX.—Other forms of Government action and organization.

Roads and Railways.

Q. 97.—As far as my knowledge goes, there is no lack of transport facilities by road, nor have I received any complaints from traders. My experience goes to show that the feeder roads leading to the several railway stations are well maintained.

Q. 99.—Numerous projects have been considered in the matter of railway extension necessary in the United Provinces of Agra and Oudh, but I am not in a position to make any definite recommendations.

President.—Your note mainly deals with the question of transport facilities. Are you generally satisfied with the present state of affairs in this area?—Yes.

The Upper India Chamber of Commerce has advocated the doubling of the line from Allahabad to Ghaziabad, but they are prepared in the meantime to accept the less pretentious scheme of doubling the section between Allahabad and Cawnpore and they take this opportunity of again pressing for this most necessary facility? Are you, as Divisional Traffic Manager, satisfied that the present railway line between Allahabad and Cawnpore is sufficient to meet the present traffic?—I do not naturally come into close contact with matters of railway transport. That is dealt with on the operative side of the railway. I only deal with the non-operative or commercial side of the railway, and I would not therefore be in a definite position to say whether the existing line is sufficient or not.

Which officer would be best able to give an opinion on this question?—The General Traffic Manager, Calcutta.

You have no views on general knowledge to offer on that?—As far as I know there has been congestion of traffic set up owing to the abnormal quantity of coal that was being carried through this country to Bombay and Karachi, which before the war was being shipped.

The coal traffic you speak of as abnormal is due primarily to the disturbance of shipping?—So I understand.

I have heard it stated in Bombay that much of this so-called abnormal traffic will, after the war, become normal?—I have no information on this point.

Hon'ble Sir Fazulbhoy Currimbhoy.—Are you aware of any grievances of consignees?—No complaints have been made to me.

If the goods are damaged how is the value settled?—If both parties agree we bring a member of the Chamber to arbitrate; if not, we each bring our own arbitrators.

Is there any differentiation between different classes of consignees?—Not to my knowledge. It is the same for everybody so far as I know.

Hon'ble Pandit M. M. Malaviya.—You are a Divisional Traffic Manager of the East Indian Railway and in that capacity you have to travel up and down the line?—I travel from Moghalsarai to Kalka including all the branch lines.

Have you many opportunities to travel on roads?—Yes, I visit the main markets and interview the merchants who live at some distance from the railway stations from time to time. I ask them whether they have any cause for grievance or any complaints.

You said that you received no complaints. Are you the proper authority to whom such complaints would be made?—They generally address me or the Traffic Manager, Calcutta, on commercial matters.

Regarding difference in freight are you aware of the difference in the rates charged, for instance, on raw cotton from Cawnpore to Bombay and on yarn for the same journey? Have you heard any complaint on the point?—That concerns the Great Indian Peninsula Railway. The complaint in this case would not come to me.

Are you aware that the rate charged for a distance of 655 miles from Delhi in the case of flour is greater than that for carrying grain over a distance of 903 miles from Delhi?—I believe so. That very question has, I believe, been raised by the Hon'ble Mr. Currie, President of the Punjab Chamber of Commerce, to the General Traffic Manager. No decision has been arrived at so far as I know, but I think that Sir Robert Highet and Mr. Pearce were looking into the question.

Similarly, are you aware that in the case of leather the rate of charge from Delhi to Cawnpore is greater than that in the case of hides from Delhi to Howrah. Have you heard any complaints on the point?—No complaint has been made to me.

Could you help us with any explanation on this point?—I could not give an explanation straight away.

Mr. A. Chatterton.—Is the system of out-stations largely developed here?—We have only one out-agency.

Do you use motor vehicles for bringing any goods?—No, only country carts.

WITNESS NO. 32.

MR. T. GREGSON, *Loco. and Carriage Superintendent, Oudh and Rohilkhand Railway, Lucknow.*

WRITTEN EVIDENCE.

Training of labour and supervision.

General.

Q. 44(*b*).—The sons of Indian employés of the railway between the ages of 15 and 17 years are engaged as apprentices for a period of four years. Each boy is trained in the special branch he desires to take up in after-life. Most of the boys trained in the railway workshops remain on after completing their apprenticeship.

Q. 45.—To improve the efficiency of the working man I would suggest that boys, while serving their apprenticeship in a workshop, should be permitted to attend technical classes at an industrial school, say for three days a week, and that the period of apprenticeship should be for five years instead of four years as at present. To give effect to the above system it will be necessary to hold lectures in the vernacular as the sons of workmen, as a rule, cannot read and write English and, moreover, I do not consider it essential for an Indian to know English to become an efficient workman.

Apprenticeship system and industrial and other schools.

Q. 47.—Only a few of the boys who have passed through a course of instruction at an industrial school are employed in the railway workshops and then after a further practical training, have become useful mechanics and I may say are above the average. I understand that the majority of boys from industrial schools find employment in mills or factories.

Q. 48.—The full course of training for a mechanic should include three years' practical training in some recognized workshop after a boy has attended classes at some industrial school instead of two years as at present. As an alternative, I would recommend the system as proposed under paragraph 45(*a*) above which, I consider, is the best that can be adopted.

Q. 49.—The industrial school at Lucknow has a night class for railway employés, towards which the railway pay Rs. 240 per annum. At the present time there are 62

workmen attending this class. More men desire to attend the night class than can be accommodated by the industrial school, indicating that the men who attend this class derive some benefit by the course of instruction given and that there is a desire on the part of the working man to improve his knowledge of the work in which he is employed.

Night classes for workmen should receive further consideration in cities where large works are situated.

ORAL EVIDENCE, 10TH NOVEMBER, 1916.

President.—I understand that you are Loco. and Carriage Superintendent at Lucknow?—Yes.

How long have you been there?—Six years.

That gives you an opportunity of forming an opinion as to the way technical and industrial schools have assisted your young boys?—Yes.

Have you any kind of industrial school attached to your workshops?—Not for Indians. We have one for European apprentices.

What is your idea of distinguishing between Europeans and Indians?—Indians go to the industrial school, where night classes are held for the purpose of instructing workmen.

Do you find night schools satisfactory?—Yes.

Could you tell us to what extent you relieve your young men of day duty in order to attend the night school?—We do not relieve them. They go there after working hours; on Monday, Wednesday, and Friday from 6·30 to 8 p.m.

How many hours do they work in the shop?—Eight hours.

Do they attend the night schools throughout the year?—During the time the school is open. They have vacation of about two or three months in the hot weather.

Are the night schools opened during the rains?—Yes.

What subjects do they study at night schools?—Mechanical drawing, reading, writing and arithmetic. They are also instructed in the working of machines in the shops.

How long has that system been in operation?—For the last four years.

Is it too early for you to judge of the results?—I think it is a little early. Still, the men are very keen on going there.

How many actually attend at present?—Sixty-two.

They are all Indians?—All Indians.

What do you think they will lead up to?—They will become mechanics and supervisors in the works. They will become more useful members of the Profession.

Is it from that class of boys that you hope to raise foremen and men for the higher posts in the locomotive and carriage department?—Not exactly.

You have no hope of raising men for these posts in India at present?—Not at present.

Are you practically forced to recruit your officer class from home?—Yes.

You have no other way of raising the right kind of man here?—No.

These young men who come out from home to serve you in the locomotive and carriage department, do they specialize at once, or are they merely brought out after general railway experience?—They specalize at home before they are appointed. They get their training in railway shops or large mechanical works at home.

Do you often get men with University degrees?—We have a few men with the B.Sc. degree.

You remember what University they came from?—One from the Manchester College and another from the Central Technical School in London.

Hon'ble Sir Fazulbhoy Currimbhoy.—Would you tell us what are the terms of Indian apprentices employed in your workshops?—They have to pass through a four years' course.

Is it the system on your railway to send a boy to England after finishing the term of his apprenticeship?—No.

Indian apprentices after finishing their term are employed under Europeans?—Yes.

Don't you think it is necessary for these apprentices to know English if they serve under a European?—Not necessarily: not for their work.

Hon'ble Pandit M. M. Malaviya.—What arrangements have you for the education of European boys?—We have a technical class, two days in a week.

Where is it?—It is in a building within the workshops. The classes are held by my chief draughtsman.

What is the standard for admission to that class? What degree of education must a boy before he is admitted have received?—There is no fixed standard. We try to get boys who pass the 7th and 8th standards at school.

How long do you keep them there?—It is a five years' course.

What instruction do you give these boys?—We give lectures in mechanical drawing steam, metallurgy, geometrical drawing and mathematics.

What do you train them for?—To become mechanics. If they are fit they eventually rise to the position of foremen.

Do you charge any fee?—No fee. They attend these classes during their apprenticeship.

Do you see any objection to Indian boys being admitted to that class?—None, if they are qualified to attend.

You have no provision for the education of Indian boys employed by the railway?—No. They can attend these night classes.

The railway authorities do not concern themselves about their education?—No.

From your experience would you say that these boys will derive better benefit by their attendance at these industrial schools if they had had a general primary education?—I think they would.

What difficulty is there in arranging for more accommodation for the boys who want to attend the night school?—I think it is a question of staff and building accommodation.

Is it not easy for the Oudh and Rohilkhand Railway to provide that?—We do not provide that at all. It is done by the industrial school.

The railway pays only a fee for carrying on these classes. If you pay them a higher fee would not the industrial school authorities arrange for teaching for more boys?—Possibly.

Hon'ble Sir R. N. Mookerjee.—Do you take outside boys other than the sons of your employés?—We take sons of outside persons, but sons of employés are given preference.

Is there any difference in the training between Europeans and Indians?—None whatever.

Do you sometimes come across an Indian boy whose primary education is as good as a European boy?—Very rarely. That class of boy does not come to our workshops.

Are there any Indian boys in your workshop who get the same status as Europeans or is there any difference in pay?—If they are qualified, they get the same pay and footing. I have two such men in my mind who are drawing the European scale of pay.

Dr. E. Hopkinson.—Have the Indian boys who come to your workshops reached any standard of education?—No.

Are they absolutely illiterate?—I should think so.

Do you observe any difference in the progress made as between illiterate boys and others?—A lad who knows vernacular and a little English probably turns out better than the other, if he is industrious.

Do you pay wages to your apprentices?—Yes.

What do they become afterwards?—Mechanics.

Have you had any experience of an Indian graduate who has been sent to England for further education?—No.

Mr. A. Chatterton.—Your Workshops are in Lucknow?—Yes.

How many men are there in the locomotive and carriage workshops?—About four thousand.

You have got a drivers' colony?—We have.

Are any special arrangements made for elementary education in this colony?—No. We have a school attached to our running department.

Are there any elementary schools maintained by the Education department within the railway colony?—No.

How many apprentices have you under training?—We have thirty apprentices in the locomotive workshops and eighteen in the carriage and wagon department.

Have they got regular indentures?—They sign an agreement form.

The term is four years?—Yes.

And what is the scale of pay?—They start on four annas and end at ten annas.

They are then taken on as journeymen?—Yes.

What do they get?—The pay ranges from ten annas to Rs. 2-8.

They are apprenticed to the trade to which they wish to take up?—Yes.

Government do not send any boys to your railway shops?—The boys from the industrial school after their training have to remain two years in our shops.

How do they compare with the average English lad who goes through a similar course of instruction?—They do not come to us. They go to factories and mills. We have a very few good boys.

After three years' training in the industrial school and two years with you going through the workshop apprenticeship, are they fit to be employed as chargemen?—No.

Would you keep them as workmen?—I would. They would have greater opportunities for improving their knowledge. They have to specialise.

Witness no. 33.

Mr. Vikramajit Singh—*Vakil, High Court; Director of the Punjab National Bank, Limited; Director of Newspapers, Limited; Director of Messrs. Ramchandra Gur Sahai Mal Co., Limited; and Secretary, Director, and Representative of the United Provinces Chamber of Commerce, Cawnpore.* Mr. Vikramajit Singh.

Written evidence.

Financial aid to industrial enterprises.

Capital.

Qs. 1-2.—I have helped others in raising capital for various industrial concerns. As to difficulties in raising capital I have found that in the first place the great majority of people are incapable of subscribing anything. The landed aristocracy have large funds but most of them do not appreciate the necessity of industrial development. Thus it is only the higher middle class composed of successful professional men, superior Government servants, and well-to-do merchants from whom capital is principally drawn. But the capital even of this class is very shy, firstly because those who float companies have not sufficient commercial or industrial knowledge and secondly because the failures of industrial enterprises, owing largely to want of industrial and commercial knowledge, training, and experience have given a shock to the confidence of the people in the success of new industrial schemes.

Government assistance.

Q. 5.—The Government should, in my opinion, resort to all the methods that are pointed out in the question to help Indian industrial enterprise; of course the circumstances of each individual case will have to be separately considered. The policy to be pursued in this matter should be very liberal as without substantial assistance and help of the Government no tangible results could be achieved. This aid, however, should be confined to the industrial concerns started and worked by Indians.

Q. 6.—In case where aid is given in forms 3 and 6 of question no. 5 the Government should exercise control by being represented on the directorate; where in form no. 5, through

periodical inspection; and where in form no. 7, through periodical inspection to see that the goods are of the proper pattern. In case of loans if there is sufficient security no Government control is necessary. But loans may be advanced even without security and in such cases the Government without unduly interfering with the concern should have a right to see that the business is properly conducted.

Pioneer factories.

Qs. 7-8.—I have no personal experience. I am however of opinion that the Government should start pioneer industries for which promising and favourable conditions exist but which private enterprise has not taken up. Thus the commercial feasibility of these industries will be demonstrated and private enterprise encouraged. They should be closed in case they are found to be losing concerns. When they have attained their object they should be handed over to some individual or company. The Government should not, as far as possible, turn a pioneer factory into a permanent Government enterprise.

In my opinion, every big municipality should try to make its workshop serve the purpose of a model demonstration factory and should teach and train a number of apprentices. The Government should make liberal financial provision for the purpose.

Co-operative societies.

Q. 11.—The furniture workshop of Bareilly, the Sandila and Tanda weavers' societies are instances of the development of industries by means of co-operative societies.

The supplying of raw material and having a lien on the manufactured articles are the methods employed by these societies. The Bareilly furniture workshop also sells the manufactured articles. The results obtained are satisfactory.

Q. 12.—The following industries can be developed by means of co-operative organisation:—

Leather-work, dairy, carpet-making, carpentry, weaving, cottage industries, hand-looms, cane-crushing business, etc. The organisation of these societies need not differ in any external respect from that of the existing primary societies in these provinces under the Co-operative Societies Act.

It will be necessary for the Government to appoint qualified inspectors to adviso and help these societies.

Limits of Government assistance.

Q. 13.—The question does not arise at present; when it arises it should be dealt with in the light of experience gained by that time.

Q. 14.—No limitation need be provided.

III.—Assistance in marketing products.

Exhibitions.

Qs. 31—33.—So long as there is not wider diffusion of general and technical knowledge and practical experience in conducting industries these industrial exhibitions on large scales serve no useful purpose, but local exhibitions on a small scale accompanied by practical demonstrations of local industries and handicrafts which artisans, craftsmen, and others may be persuaded to attend will prove useful.

Trade representatives.

Q. 34.—No trade representatives to represent the whole of India in England, the Colonies and foreign countries are wanted at present.

Q. 35.—There is no objection to having temporary commissions for special enquiries provided the Indian element is adequately represented.

Q. 36.—They are not wanted at present.

Government patronage.

Q. 37.—The Government should always publish detailed lists of the imported articles used by the various departments.

Q. 38.—The Government should give preference in purchase to the articles manufactured in India even at some sacrifice of the quality or price. When purchases are made in England the Government patronage should be extended to those firms which admit Indian students for training.

V.—Training of labour and supervision.

General.

Q. 45.—Millowners working with a large capital and giving a certain minimum percentage of dividend should be required to provide suitable sanitary dwellings for the mill-hands and free and compulsory education for all the boys and girls employed. The Government should make a contribution towards the cost of the latter. Arrangements should also be made to improve the general, and technical knowledge of the mill-hands by means of night schools, demonstrations and popular lectures.

The Government should prohibit the opening of any liquor shops within a certain distance of the factory or of the settlement provided for the workmen. Provision for adequate medical relief, free of any cost, should also be made for the workmen.

Industrial schools.

Q. 47.—I have had no opportunities of personal observation, but there can be no doubt that persons who have received instructions in an industrial school will be better and more skilful workmen and command higher wages.

Q. 48.—As far as possible an industrial school should impart instruction in the industries which are practised in the locality in which it is situated.

Government should endeavour to arrange with the owners or managers of factories including railway workshops to receive some students of industrial schools for a term of apprenticeship settled between the Government and the factories. The apprentices should receive a reasonable remuneration. I understand there is some such arrangement between the Bengal and North-Western Railway and the Gorakhpur Industrial School.

Q. 50.—The Education department has already to perform a multitude of duties connected with the various branches of education and cannot command that expert knowledge and experience which are essential for the right management of technical schools. Industrial schools should therefore be under the control of the department of Industries. There should be no divided control.

Training of supervising and technical staff.

Q. 51.—Higher grade technical schools should be established to impart instruction of a nature suitable for the work of supervisors and managers.

Q. 52.—A large number of scholarships should be provided to enable technical experts of private firms to study conditions and methods in England and other foreign countries and the India Office should see that they are given all facilities in being admitted into suitable industrial firms.

Q. 53.—Such concerns should be required to train a fixed number of men recommended by the Government or by certain recognised public bodies such as the chambers of commerce.

VI.—General official administration and organisation.

Qs. 56—61.—At present there is an Advisory Board of Industries consisting of some two dozen members partly officials and partly non-officials all nominated by the Government. The body as it exists at present is rather unwieldy and possesses no powers of initiating or carrying out any definite plan of industrial development. The Government should, in my opinion, lay down the general principles of its industrial policy and leave its execution entirely in the hands of the Board of Industries. The Board should consist of not more than 15 members of whom not more than seven should be officials to be nominated by the Local Government and not less than one half of the total strength should be Indians. The United Provinces Chamber of Commerce should be given the same right of nominating members as the Upper India Chamber of Commerce. The Director of Industries should be under the control of the Board and act as its executive officer. He need not necessarily be a business man or an expert. His chief qualification should be an active sympathy with Indian industrial development. He should possess a wide general knowledge of industrial matters.

The money allotted by the Local Government for industrial progress should be placed at the disposal of the Board.

The Board should give financial aid to various industrial concerns as it thinks fit, start and control pioneer factories, control technical experts, start, maintain and control industrial schools, publish information in English and vernaculars about various industrial matters and generally guide the industrial development of the provinces. It should in short be a living controlling force.

VII.—Organisation of technical and scientific department of Government.

Imperial department.

Q. 63.—As far as I am aware there is no such department at work in my province.

Q. 64.—No new Imperial department is wanted. The member for Industry and Commerce of Government of India can very well perform the functions which such a department may perform.

Provincial departments.

Q. 68.—The Provincial Governments may engage experts whenever the need arises, provided that where an Imperial department, such as the Geological Survey exists, they need not employ any experts of their own.

Q. 69.—They should be placed under the direct control of the Board of Industries, the constitution of which has been outlined above.

Are not firms in a better position to send their own men at their own cost. Should not Government send outside scholars who can come back and aid the starting of other industries ?—I do not mean to say that it should be done in every case, but only in those cases where Government aid is necessary. This may take one form of aid.

About the Advisory Board you say "The Board should consist of not more than 15 members, of whom not more than seven should be officials to be nominated by the Local Government and not less than one half of the total strength should be Indians." If you have seven officials and nearly seven Indians, then no other European interest can have any members there ?—The officials may not all be Europeans ; they may be Indians also.

But if Government do not get half the total number of Indians as commercial men, who have got a proper knowledge of these industries, should they not appoint others on the Board ?—I do not think it is improbable that the Government can get seven Indians to represent on the Board of Industries.

The Board of Industries hold their meetings at Cawnpore or somewhere else ?—Either at Naini Tal, Lucknow or Allahabad, and the members go there.

And they are paid their fees ?—Probably they get travelling allowance.

Do you want these Boards to be only nominated or elected?—I prefer the elective system, if that is granted.

Don't you think that different bodies can appoint different people ?—I say that the right may be given to the different chambers and associations and some may be nominated by the Government.

Then the election will be by the different bodies ?—Yes, recognized bodies.

Then you say that the Director of Industries should be under them ?—Under the control of the Board of Industries.

The Board of Industries will be the executive body ?—It will be a controlling body.

Will it be an executive body ?—Yes, and execute its orders through the Director of Industries.

You do not want its function to be advisory ?—It must be a controlling and executive body.

Don't you think that it would not be practicable, under the present administration, for the Government to arrange that the elected body should be an executive body ?—The general policy should be laid down by the Government and it is within that policy that the Board should work.

It cannot work as an executive body with the Director of Industries ? If the Board is an Advisory Board to the Government, there are less difficulties. In Bombay we have considered the question of an executive Board and we found difficulties ?—It would be a sort of department of the Government.

You would have elected members coming in as a department of the Government ? Yes.

You say " The provincial Governments may engage experts whenever the need arises provided that where an imperial department, such as the Geological Survey, exists they need not employ any experts of their own." It shows that you are not for an imperial department of the Government ?—No.

Don't you think that if the different Governments of the provinces appoint different experts, there would be overlapping ?—I think one expert would have quite enough work for one province.

You say that a separate college of commerce may be, in course of time, established. At present there is no need, you think, of giving commercial education ?—I say there is, and classes should be opened at once. But as it will probably take some time to establish a college of commerce, I say that classes should be opened. I do not mean that the college should be delayed, but before it is opened classes should be opened in existing colleges.

You say that Government need start no trade journal of its own but should assist any trade journal which is found to be serving some useful purpose. Don't you think that Government have a lot of statistics and also facilities to collect all the information from the different provinces and would be able to give us more information than private people ?—My idea was that if this information was supplied to the papers which are vastly read it would be more helpful. These trade journals are very rarely subscribed by people and are read by a few people.

Then you want for different provinces different trade journals ? Or do you want for the whole of India one journal giving all information to all provinces ?—My idea was that if this was communicated to the papers which are generally read and was published there a larger number of people would be able to obtain information.

A paper which is read by your people, may be read by few of our people ; and conversely a paper which we read largely may be read by very few of your people. Don't you think that an imperial journal started by the Government of India would be more useful for the whole of India ? Getting every information on each point at the same place is much better than going to the different newspapers ?—The same information may be communicated to the leading papers in India.

Would there be any necessity for a special trade journal if you say that the information should be communicated to the various newspapers ?—I do not want trade journals at all.

Even now, there are very many important newspapers in this province. Do they give any commercial news. We get it from the papers that are published in Calcutta, such as *Commerce* and *Capital*.

Commercial news is not generally wanted by the general masses and the papers cannot afford to give it ?—There are many people who want to know, say, the rates of cotton in Bombay. If it is given in the newspapers they can get it. But these papers cannot afford to spend money for a few people who want this information ?—If such news is disseminated through the vernacular papers they would be useful.

If vernacular journals are issued by the Government on all the different industries, don't you think that they would give useful information for the whole of India ?—Yes.

Hon'ble Pandit M. M. Malaviya.—You say " but the capital even of this class is very shy, firstly because those who float companies have not sufficient commercial or industrial knowledge and secondly because the failures of industrial enterprises, owing largely to want of industrial and commercial knowledge, training and experience have given a shock to the confidence of the people in the success of new industrial schemes." Do you think that a system of promoting commercial knowledge, both through the medium of English and of the vernacular, would improve the present state of things ?—The opening of industrial and technical schools and the dissemination of commercial and industrial information, through leaflets both in English and the vernacular, will improve the situation.

You think that the imparting of knowledge of matters relating to commerce through the medium of the vernaculars will lead to the Marwaris and other people who take advantage of the existing conditions of trade investing their money in industrial enterprises ?—It would be helpful because they would be able to understand the thing. At present they are not in a position to understand most of these commercial problems.

There is a large class of such men who are not in touch with English?—Yes. Very large

But who do a great deal of business ?—Yes.

Both in this province and in Calcutta for instance ?—I know mostly about this province and the Punjab.

In this province itself there is a large class ?—Yes.

Referring to your remarks about the Bareilly Co-operative Society apart from the case of that particular society have not co-operative societies in the beginning to invest some of their capital in buildings and purchasing raw material and for the stock in hand ?—The money is generally spent on buildings and the supply of raw material.

With regard to your answer that the Government should give some preference to articles manufactured in India even at some sacrifice of the quality you do not mean a great deal of sacrifice but some sacrifice only ?—Yes.

You think that it will be an advantage to industry if Government will show such preference to articles produced in this country ?—I am certainly of that opinion.

And you think that what the Government might lose in doing so would be compensated by the progress of the industry ?—Yes.

Are you aware that a similar policy has been pursued in some other countries ?—I am not in a position to make any statement on that point.

You advocate compulsory education for all boys and girls. Is it your opinion that the lack of general primary education is an impediment to industrial progress ?—Yes, because the masses are absolutely ignorant.

So that the majority of your members are really connected with commerce or industry?—Yes. There are 69 members.

In answer to a question with reference to the difficulty of raising capital for industrial enterprise, you state that the landed aristocracy do not appreciate the necessity of industrial development, and other classes are shy of investing their money in any enterprise. Can you tell us very shortly what, as a rule, these other classes do with their money?—Whatever surpluses they have they put it generally in banks in fixed deposits.

What interest do they get on the fixed deposits?—Four or 4½ per cent.

And they would rather take 4½ per cent. interest than put it into an industrial concern of which they are not very sure? What gives them confidence in the bank?—Stability. If a bank has existed for 30 or 40 years and has always been paying dividends and profits they think it safe to put their money in.

Are these Indian banks or British founded joint-stock banks?—Most of them the latter. There are also some Indian banks in our provinces, but their capital is not very large, and they have existed for some years. Their working capital is not large.

Most of this spare money goes to the British joint-stock bank?—Yes.

I notice in answer to some questions, you say you have no personal experience on some of the subjects raised by the questions, for instance pioneer factories?—Yes.

Would it not be wise if you in revising your proofs cut out your answers dealing with those questions, because otherwise we shall not be able to distinguish always between answers based on personal experience to which we must give great weight, and other answers that are due to general knowledge which we, of course, cannot take in the same way?—May I point out that it is put down there "What are your experience and opinion of Government pioneer factories?". I say experience I have none, and this is my opinion, and if it had been said, only with reference to experience, I would have omitted that question. As it said opinion also, I have stated that I have formed an opinion by observation and getting information from various sources. Wherever I had no experience I have stated so.

Would you mind going through the answers when you get your proofs and remove altogether any answers that you think are not based on personal experience or knowledge?—Very well.

Dealing with the question of industries assisted by co-operative societies, you state that the results of the Bareilly furniture workshops are satisfactory. Can you tell us very shortly what the results are financially?—I am not in a position to give that.

On what do you base this statement?—On the general information that I have received from people who are in the management and others who are concerned with the factory. I also attended a conference of co-operative societies in which furniture from the Bareilly workshop was exhibited.

Do you know how many members there are in that co operative society?—No.

I think I am stating it correctly if I say that there are 53 members, of whom about 30 attend the work daily. The shares are valued at Rs. 50 each, so that when the total capital is paid there will be 53 times 50 rupees, and on that capital they have overdrawn their account from the Co-operative bank of the district by Rs. 28,000, which is placed against the value of their buildings and stock. They have a large stock on hand—a stock that amounts to something equivalent to a year's working which they are unable to sell. So, unless they can realise that stock and realise the full value placed on the books against their buildings, the society, as it now stands, would not be solvent?—Quite so.

You would not call that satisfactory?—If they are not in a position to sell the stock. What I have said in my answers is the general impression that I have received from people who have visited the workshop, and when I attended the co-operative conference in which this workshop was represented, people spoke very highly of the management and declared it to be very successful.

In answer to another question, you say "No trade representatives to represent the whole of India in England, the Colonies, and foreign countries are wanted at present." Can you tell us shortly your reasons for objecting to trade representatives abroad?—My reason was that our Indian industries were practically in infancy so far as our provinces went and therefore I thought that it was not necessary in the present stage to appoint any trade representatives in other countries and that the information that we were getting was quite enough for our purposes.

Every business man wants to find a customer for his goods?—Yes.

And if we had trade representatives abroad, don't you think that India would be able to discover better markets and these trade representatives would obtain for the people of India information which would enable them to manufacture goods to suit the different markets?—We have only raw products for export.

We are exporting large quantities of cotton goods that are manufactured as well as more unmanufactured material?—We have only raw material. My point is, that we ought to be able to turn our raw materials into manufactures and send them out.

In the meanwhile we must live on external trade. There would be no money at all if we did not keep up our external trade?—No.

You are familiar with the arrangements made by Japan for trade abroad?—Yes.

You know that the Japanese have trade representatives here?—Yes.

And in the various parts of the world?—Yes.

Don't you think that they help Japan greatly to push their trade?—They have a large number of industries and factories and they are in a position to send out exports in large quantities.

Their trade representatives abroad were appointed before their manufacturing industries obtained anything like the present scale and there are a good many people who think that the present manufacturing progress of Japan is due largely to the fact that there were trade representatives abroad pushing their articles in India to the disadvantage of the Indian manufacturers?—Of course, it is very nice when one is in a position to see the things there and produce similar things and be able to send them out. But we do not expect to do this for some years to come and therefore I thought that at the present stage they would be unnecessary.

Don't you think that it is time to begin to have trade representatives abroad?—I consider it premature because there are other things which ought to be done before we can send out our representatives to find out the conditions and circumstances of those places.

We have trade representatives now belonging to the so-called consular services of the British Government?—Yes.

Do you think that it is likely that these consular agents are more inclined, not through any ill-will but because of their position, to push British goods than Indian goods?—Yes.

Don't you think for a country of the size of India and the wealth of India and the external trade of India that it would be better to have somebody abroad in the bigger markets to take care of its interests?—That is my view of the question, because I thought that we are not in a stage when we can send out our exports and trade representatives would be useful to us.

Do you know whether this is also the view of the majority of the members of your Chamber of Commerce?—I could not be sure of that, because I had no discussion with them on this particular point. This question has not been discussed by the Chamber.

Again you say "The Government should give preference in purchase to the articles manufactured in India even at some sacrifice of the quality or price." Have you read the Government rules on the purchase of stores in India?—Yes.

Do you remember any feature in the rule which gives preference to articles manufactured in India?—No.

When did you read them last?—Some time ago. It may be last year. I did not read them now.

Do you think it is an advantage for the Government to buy articles at high price of a low quality?—In order to help the indigenous industries I thought that this preference might be given in the matter of purchasing stores as it would be a great incentive to the development of the industries of India.

Would it not be better in the interests of the country for Government to do something else to encourage industries as an independent proposition, and would it not also be good for the industries if the Government patronized those articles that were made of high quality?—I thought that even if this concession was given it would not be necessary to keep it up for a long time, because the people would be in a better position to turn out things which the Government wanted.

You don't think that it is good for the country to supply a low standard of quality?—I do not mean that. I merely say, at some sacrifice of the quality or price, making some

concession to the indigenous industries. That merely puts it strongly that Government should give preference to indigenous products.

The Government rules at present favour the purchase of articles manufactured in India. You would not wish the country to be guilty of manufacturing a low quality of article?—No.

You say with reference to the Indian Science Congress, "As far as I am aware no practical results have as yet followed from the institution of the Indian Science Congress. The experts working under the Board of Industries and Technical Institutes may freely refer their difficulties to the Congress which should appoint a standing committee to deal with them." Do you know the constitution of the Indian Science Congress?—I have only learnt of it generally.

Do you know of its assistance in any way by the Government?—No.

Do you think it is practicable from what you know of them to form a standing committee of any kind?—I thought that if some committee was formed they would be able to refer these matters to their experts and they could obtain opinions and communicate them in the manner suggested.

The Congress meets once a year?—Yes.

And as far as I know it discusses purely scientific questions. There is no organization in connection with it. It has no constitution at present. It has no money. It will be unable, therefore, to deal with those problems of scientific research?—Well.

Would it not be well to cut out the answers on science and technology of which you have no experience?—Yes.

We value very much your evidence on the points on which you have special experience and we do not wish that your evidence should be diluted by other things?—Very well.

The Hon'ble Sir Fazulbhoy Currimbhoy—You say that the landed aristocracy do not appreciate the necessity of industrial development? They do not think that industries can develop the country. As far as my experience goes of these people they invest their money on landed property or lend it on interest and that too on mortgages and so forth. They know very little about industries and they do not wish to invest any money in them because they are not sure that they will bring a good return to them. There is a lack of general understanding.

Is it only risk of which they are afraid?—Yes.

They appreciate industries?—They appreciate no doubt.

You say that where Government aids an industry they should have periodical inspections to see that the goods are of the proper pattern. Do you think that Government should employ experts as directors in every concern?—I have said that where either a share of the money is subscribed by the Government or dividends are guaranteed the Government may have an option then of being represented on the directorate so that they may be able to see that the thing is worked alright and the money is safe.

Do you want the director to be an expert? If several concerns or different industries are started do you want the Government to have so many experts on the Boards?—The director may be a commercial man, or an expert acquainted with the industries, but it is unnecessary to have one expert for each separate industry.

If the industries are of different kinds then you need different experts?—Of course you do. Unless Government have got experts to help the various industries by advice the work of these industries cannot be pushed forward.

A private concern ought to have its own expert? With the Government expert there will then be two experts on the Board?—I do not specially say that the Government director should be an expert or a non-expert. The Government may have one of its official on the Board who may not be an expert.

He can see to the financial side?—Yes. He need not interfere with the management.

You have no personal experience of pioneer industries but you must have inquired and must know that in this city a pioneer industry was started and it failed?—I have heard so.

Have you heard of any pioneer industries started by Government in your province which have succeeded?—I do not know unless you can call the Harness and Saddlery Factory a pioneer industry. That is a Government concern.

You say "In my opinion every big municipality should try to make its workshop serve the purpose of a model demonstration factory and should teach and train a number of apprentices." Have you got any municipal sanitary schools teaching sanitation, or any sanitary association?—There is one at Lucknow where they train sanitary inspectors for the municipalities.

You have stated in answer to a question of the President that at present you do not think that any step should be taken to send men out as trade representatives?—Yes.

Do you know the figures of export and the manufacturing trade of this country?—No.

Do you know that the Bombay Indian Chamber of Commerce has been always asking for it and it is a crying need all through that we should have representatives in other countries?—I am not aware of that.

Don't you think they will be in a better position to give an opinion than you?—Certainly they are, because our Chamber is a new one.

President.—The question was not discussed by your Chamber?—They would be in a better position to understand this than I.

Your answer does not represent necessarily the views of your Chamber?—No.

Hon'ble Sir Fazulbhoy Currimbhoy.—You say that the mill hands should have free and compulsory education for all boys and girls employed. Do you want only to penalise the industries? In a city like Cawnpore where you have factories which employ small children and boys and girls, do you want that these factories should be penalised while in the city education is not given free and compulsory?—I am in favour of compulsory free education all round. As I had to restrict myself to this question I suggested this methed.

If education is not general, do you want to penalise industries only?—Even then I say that, so far as boys who are employed in the mills are concerned, they should, at any rate, receive education.

That is, that the industries should be penalised?—I do not call it penalising the industries.

It amounts to a penalty, because outside boys do not get education?—I say that the Government should contribute towards educating them and I have stated above that I would rather have free and compulsory education all round.

About medical aid, have not the mills in your city got their own medical officers?—They have.

And they give medical relief free to their people? I believe so.

Then you say "Government should endeavour to arrange with the owners or managers of factories including railway workshops to receive some students of industrial schools for a term of apprenticeship settled between the Government and the factories. The apprentices should receive a reasonable remuneration." In Bombay our experience is that we get apprentices free without giving any remuneration. Why should the factory people be asked to give something to them?—Because here the people are industrially very backward as there is no industrial or technical education worth the name, and therefore it is necessary that in order to induce people to take up to these things they should have some remuneration.

You say "Higher grade technical schools should be established to impart instruction of a nature suitable for the work of supervisors and managers." Where do you want these schools to be established?—In every district.

One or many?—I would say in all the large cities of the province.

Are you in favour of having a central technological college in your province?—Yes.

And these higher grade technical school should be feeders?—Yes.

You say "A large number of scholarships should be provided to enable technical experts of private firms to study conditions and methods in England and other foreign countries and the India Office should see that they are given all facilities in being admitted into suitable industrial firms." Don't you think that if the Government help these private firms by giving scholarships advantage would be taken of by the firms and not by the outsiders?—That will in the long run help the people. The more industries are multiplied and people take to them the more will it help the people.

Are not firms in a better position to send their own men at their own cost. Should not Government send outside scholars who can come back and aid the starting of other industries?—I do not mean to say that it should be done in every case, but only in those cases where Government aid is necessary. This may take one form of aid.

About the Advisory Board you say "The Board should consist of not more than 15 members, of whom not more than seven should be officials to be nominated by the Local Government and not less than one half of the total strength should be Indians." If you have seven officials and nearly seven Indians, then no other European interest can have any members there?—The officials may not all be Europeans; they may be Indians also.

But if Government do not get half the total number of Indians as commercial men, who have got a proper knowledge of these industries, should they not appoint others on the Board?—I do not think it is improbable that the Government can get seven Indians to represent on the Board of Industries.

The Board of Industries hold their meetings at Cawnpore or somewhere else?—Either at Naini Tal, Lucknow or Allahabad, and the members go there.

And they are paid their fees?—Probably they get travelling allowance.

Do you want these Boards to be only nominated or elected?—I prefer the elective system, if that is granted.

Don't you think that different bodies can appoint different people?—I say that the right may be given to the different chambers and associations and some may be nominated by the Government.

Then the election will be by the different bodies?—Yes, recognized bodies.

Then you say that the Director of Industries should be under them?—Under the control of the Board of Industries.

The Board of Industries will be the executive body?—It will be a controlling body.

Will it be an executive body?—Yes, and execute its orders through the Director of Industries.

You do not want its function to be advisory?—It must be a controlling and executive body.

Don't you think that it would not be practicable, under the present administration, for the Government to arrange that the elected body should be an executive body?—The general policy should be laid down by the Government and it is within that policy that the Board should work.

It cannot work as an executive body with the Director of Industries? If the Board is an Advisory Board to the Government, there are less difficulties. In Bombay we have considered the question of an executive Board and we found difficulties?—It would be a sort of department of the Government.

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But who do a great deal of business?—Yes.

Both in this province and in Calcutta for instance?—I know mostly about this province and the Punjab.

In this province itself there is a large class?—Yes.

Referring to your remarks about the Bareilly Co-operative Society apart from the case of that particular society have not co-operative societies in the beginning to invest some of their capital in buildings and purchasing raw material and for the stock in hand?—The money is generally spent on buildings and the supply of raw material.

With regard to your answer that the Government should give some preference to articles manufactured in India even at some sacrifice of the quality you do not mean a great deal of sacrifice but some sacrifice only?—Yes.

You think that it will be an advantage to industry if Government will show such preference to articles produced in this country?—I am certainly of that opinion.

And you think that what the Government might lose in doing so would be compensated by the progress of the industry?—Yes.

Are you aware that a similar policy has been pursued in some other countries?—I am not in a position to make any statement on that point.

You advocate compulsory education for all boys and girls. Is it your opinion that the want of general primary education is an impediment to industrial progress?—Yes, because the masses are absolutely ignorant.

You say also that concerns which are assisted by Government should be required to train a certain number of apprentices recommended by the Government. Would you extend the same recommendation to the case of industries which are patronized by Government?—Yes.

For instance, to firms to which Government gives large contracts for the supply of various articles required by it?—Yes.

You think such firms should be required to undertake to train some young men in the particular industry?—Yes.

Apart from the scientific aspect of the Indian Science Congress, did I understand you to say that there should be a constitution provided for that Congress and that sub-committees of persons engaged in particular branches of science might be constituted to whom particular problems of research might be referred? That was my meaning, that they should be able to organize various sub-committees to which questions might be referred, and which would be able to give their opinions.

You say that the Allahabad University has already instituted a degree in Commerce?—I mean a Faculty of Commerce.

They give Commerce certificates?—Yes. It is much inferior to what they have in Bombay. They give a higher commercial education in the Sydenham's College of Commerce.

Have you compared the curriculum of the two?—I have got the prospectus of the Sydenham's College of Commerce; they have a larger number of subjects in which they give education, and this fits people to hold the managership or secretaryship of an institution or firm. A mere certificate of the class which is given in the Allahabad University would not necessarily fit people for high responsible offices.

You favour the establishment of a college of commerce where higher education could be imparted?—Yes.

With regard to trade journals, don't you think that if particular journals were published an imperial trade journal, and provincial trade journals and trade journals in the vernaculars and in English they would have an educative effect upon the people engaged in trade?—If they are distributed free.

Suppose they are priced low?—They may serve the purpose.

Witness No. 89.

Sir Alexander McRobert.

Sir Alexander McRobert, LL. D., *Manager the Cawnpore Woollen Mills Co., Ltd., Cawnpare.*

(Witness did not submit written evidence.)

Oral evidence, 11th November, 1916.

President.—I invite you to give your views on Indian labour?—It is well-known that the efficiency of labour in India is not equal to the efficiency of factory labour at home in other words, a greater number of workers is wanted in a factory here than are needed in a factory of like size at home. In textile factories I think the proportion might be taken at 3½ or 4 to 1.

Another obstacle to progress is that the average worker after all has been recruited mainly from the fields, and does not take the same interest in his work that even a child of a factory worker would do at home. You very rarely find a factory worker pointing out that some particular piece of work was well done, and being proud of having done it well.

Then the discipline that must be exercised in factories is extremely irksome to the worker, because when a man is working in the fields and not perhaps applying himself to the work throughout the whole day, he can smoke and goes out without restrain. Whereas in a factory he has to get permission to go out and smoke. That is one of the privileges they have here which would not be tolerated in England. A man would not be permitted to go out and have a smoke in England. He must smoke in his own time.

Then in certain industries it is especially essential that the work be well done. In woollen manufacture, for example, there is a great deal more care needed in the handling of the goods than in the case of cotton or jute, and a good deal of the presentableness of a piece of woollen cloth is due to the care taken by the workers through whose hands it has passed.

In order to overcome these obstacles, it seems to me that the correct course is to endeavour to raise the standard of comfort, i.e., pay higher wages to begin with, and see that the houses that the workers occupy are at least in sanitary surroundings. It is a truism to say that one always tries to live up to one's environment, and the only way it seems to me by which it is possible to increase the efficiency of the worker in this country, as well as in other countries, is to raise the standard of comfort generally, i. e., giving them more money to spend upon themselves, even if they spend it upon luxuries. Higher wages would reach upon every one of the industries of the country.

One curious feature is that after a certain point, the prospect of higher earning does not seem to be any incentive to work harder. When they get to a certain point and there is a chance of making overtime, they don't want overtime, and would rather do without the money.

There is also a common idea abroad that the worker is not able to look after himself and that some sort of combination is needed in order that their interests might be protected. My experience is that they are perfectly well able to look after themselves, a strike is a common exhibition of their ability to control things in their own way. They are very easily led: a mischievous man can bring on a strike for no reason whatever.

The factory operatives here don't as a rule do the very best they can. Here we are obliged to do everything; if you want to start a factory, you require first to make the bricks. We used to have great difficulty in getting brick-makers, and when we got them, we had to make them heavy advances—several months' pay in advance—before they would begin work. It is a custom in brickmaking to give advances to workers. Even then the man dawdled and restricted the output. We got desperate and imported brick-making machine as we wanted a largely increased production. From the moment that machine appeared on the scene the difficulty ceased, our workmen became suddenly zealous and we have never started that brick machine: in fact we are rather afraid to start it in case it does not work as well as we have hoped.

In your long experience do you recognise any signs of the factory worker taking to his occupation as a profession and making it his life work?—It is a little difficult to answer that categorically. We have a very considerable proportion of old workers who are never absent one day. We give rewards at the end of every year for those who have not been absent more than a week in the course of the year, and from three to six hundred in our mills qualify for this reward every year. There is one class upon which we are beginning to depend more than we used to, and that is the native Christian. We are getting what seems to me to be a better type than used to be available. We are rather encouraging this element as we find that their work is satisfactory, but as regards rearing a community of factory operators, I don't think we have got to that stage.

Have you, as a result of the reduction of hours, noticed any corresponding increase in efficiency?—Well, as regards that, in our case there has been an increase of hours since the last Factory Act was passed. Our average day, before the amendment of the Factory Act was 10½ hours. We employ no half-timbers and the result of the passing of the last Factory Act was to raise our average day by about three-quarters of an hour. We are still well under the Factory Act, but what I have stated was the effect of the new provisions of the Factory Act.

Do you find also that people are beginning to spend their increased wages in a more healthy way? Of course your own community is a little exceptional?—As far as I can make out, all the increased earnings go in marriage ceremonies and other social functions. I don't think they are spending their money in the best way. They all claim to be in debt in consequence of having had daughters to marry.

Could you tell us approximately what system of Government you have in your labour settlement; have you not got a *panchayat* system of Government?—Not quite, there is a tendency that way. We have not any definitely appointed committees or *punchayats* but there is an inclination in that direction.

Hon'ble Sir Fazulbhoy Currimbhoy.—How many workers do you employ in your concern? About 4,000.

And they all live in this settlement?—No, they don't all live in our settlement; not more than half live in the settlement.

Where do the other half live?—Mostly in their own houses in the bazar.

Are they very anxious to live in the settlement?—Not those who own houses in the bazar. They don't want to come. At first they did not want to come at all, and not more than 12 houses were occupied for the first year.

Do you work more than eleven hours?—At present we work the entire 24 hours.

Out of that how many do they work in the factory ?—Ten hours. They are not absent from their work more than one hour out of the 11.

That is to give them time for meals ?—No, to smoke, drink water, etc.

Do many loiter about for the purpose of drinking water, smoking their *birees*, etc.?—Only within the permitted intervals.

Do you work with a double shift at night ?—Two shifts, at present.

How many hours shifts have you got ?—The night shift is about ten hours.

Do your workmen spend a lot of their money in drink ?—No, I don't think they are given to drink.

You have no liquor shops near your premises ?—There is one not far away.

Are your workmen brought by the jobbers ?—No, we obtain them ourselves. In time of great scarcity of labour, we have gone so far as to offer a bribe of, say, one rupee or more per head for bringing in new workers.

You have not experienced strikes in your mills very often ?—We have had strikes.

For higher wages only ?—Well, not wholly for wages; sometimes they would strike, say, for getting a little more holiday. They want more time to themselves. That is quite reasonable. Then again there might be a revision of rates for piece-work. Most piece-work rates have been revised repeatedly. Once we have sufficient experience in running departments on piece rates, we find that to be consistent certain rates need to be increased, and others lowered, and in order to reduce such inequalities in rates, we alter them, and a mild strike probably results.

In the case of carders, spinners or weavers promoted from the men, don't the latter some times give trouble in demanding their removal ?—No, the men are really wel behaved. They are not treated badly.

What do you think about compulsory education for the children of mill hands; are you for that legislation ?—They don't want to go to school.

Do you want that it should be made compulsory by legislation ?—I don't think the time is ripe for that.

Hon'ble Pandit M. M. Malaviya.—To what do you ascribe this superior efficiency of the English workman as compared with that of the Indian workman. Is it not to the better education that the English workman has received ?—I think it is due to a great many things; to a higher standard of intelligence on the part of the worker, which, in turn is due to the training that he has had, and also to the fact that he has inherited it from his forefathers, just as a blacksmith here is born a blcksmith.

Do you think that without any education, i. e., by nature, the English workman is more intelligent than an Indian of corresponding status ?—As a general rule they are.

Do you remember Macaulay's description of the difference which education brought abou in the intelligence of Scotchmen ?—I am not strong in Macaulay.

I will help you to remember it, Sir Alexander. In a speech delivered in the House of Commons in 1847, Macaulay said that a hundred and fifty years ago the name of Scotchmen was uttered in England with contempt. But that sometime after the parish schools had been established all over Scotland, an improvement such as the world had never seen took place in the moral and intellectual claracter of the people, and that wherever the Scotchman went he rose to the top as surely as oil rises to the top of water. Macaulay ascribed the difference to the fact that education had been made compulsory ?—Was not Macaulay born in India ?—Education was not compulsory in England in his days.

He lived the greater part of his life in England. Do you think that the intelligence of the Scotchman has been improved by education ?—No doubt in the days when they were cattle-stealers they were not so intelligent in a civilized way as they became after the parish school was introduced.

In England education is compulsory for every boy and girl ?—It is believed to be, but I understand there are ways of evading it just as vaccination is evaded.

Do you think one per cent. escape it ?—I am not able to give you the percentage.

Do you think 5 per cent. escape it?—I don't know.

From the age of six up to fourteen years every boy and girl in England has to be at school ?—I believe they usually start at about the age of six. In regard to finishing at the age of fourteen it depends on what standards they have passed. I think nowadays they have what is called "Nature Study" which is very elementary natural science.

And also elementary physics and elementary chemistry —Not as part of the primary.

Don't you think that eight years of education in the primary course, such as obtains in England, accounts for nearly all the difference which you find between the Indian and the English workman ?—I cannot agree with that.

Do you think it accounts for half ?—I don't want to be tied down to a proportion but I feel satisfied that it is not. I myself have observed a considerable falling off in the standard of elementary education in Scotland at least.

But you think that to some extent the difference is due to education ?—That is one of the points I started by predicating.

You say that if you raise the standard of comfort generally among the workmen, that will give a great impetus to their improving themselves ?—That is the usual course of improvement.

Don't you think that the standard of comfort would be raised if you gave them education, some ideas to think of ?—I think they would prefer higher pay, and do without the education for a bit.

But you yourself say that the prospects of higher wages seem to have failed in the way of affording stimulation ?—That is my observation, I may be wrong.

Don't you think, therefore, that the necessary impetus may be given by education ?—I am inclined to think that if you raise the standard of comfort, they will feel higher wages an incentive.

You have found that the Indian Christians are showing signs of improving as workmen ?—I do.

To what do you ascribe it ? May it not be due to the fact that, as a class, they receive much better education than the general mass of the population ?—I think that has partly to do with it, but they have also been associated with very self-sacrificing conscientious men as missionaries whom they naturally try to emulate. I think that influence has been at work. It may be unconscious to some extent, but I think it is having an effect.

But you know that among Indian Christians the percentage of the school going popular tion actually at school is very much higher than among the rest of the population ?—I think it is very probable, because the others won't go to school.

Hon'ble Sir F. H. Stewart.—Would you not ascribe the greater efficiency of labour at home, as compared with India, partly to climatic influences ?—No doubt that has something to do with it. It is a question of sustained effort, but I would rather work here in the cold weather than work at home in the summer.

And therefore of physique ?—Quite so. The average weight of a worker here is only about 100 lbs.

In your model village which we saw this morning you have a bazar ?—Yes.

Which is managed by the workers themselves ?—Yes.

Under a certain amount of supervision ?—Yes.

Can they purchase other things than food, their clothing for instance ?—Yes.

Have you tried any other means of encouraging habits of saving and thrift among workers ?—We try to make saving compulsory. We have a system of paying gratuities. We classify all our workers into first, second and third class, and those who put in what we call the qualifying attendances during the year, get, for the first class, three months' pay, for the second two months' and for the third, one month's as gratuities at the end of the year, i.e., we do not pay them the cash but put the amount to the credit of their account.

Do you allow them any interest ?—Yes.

In reality you have started a sort of savings bank ?—Yes, a compulsory system of saving.

Hon'ble Sir R. N. Mookerjee.—The average physique of an English labourer is greater than that of an Indian labourer ?—Yes.

Don't you think that is due to climate?—To climate, race, and the food that is eaten. Here the workers say, "I am not strong, I don't eat beef."

Generally speaking, they cannot afford to eat beef or meat?—No; perhaps not.

What is your experience since you began work in this country; are not the wages of labourers gradually increasing?—Undoubtedly.

By what percentage up to now, during the last twenty years?—I think the wages have nearly doubled during the past thirty years.

And their standard of living has increased proportionately?—I presume there has been a certain increase. I think they eat more sweetmeats than they used to do.

Dr. E. Hopkinson.—You spoke of the work of the Indian worker being one-third or one-fourth of the British worker. As a general statement, what would you say was the relative cost of labour per piece?—If you measure the cost of labour in terms of its efficiency, I don't think there is much difference. For work of a certain value you pay nearly the same here as you do at home. You will probably remember that Thomas Brassey found that no matter in what part of the world he made a railway, if he paid 4*d.* a day or 4 dollars a day to the workmen, the cost of the railway was the same; in other words, for 4*d.* he got 4*d.* worth.

You require greater capital is your labour if less efficient?—You take all such factors into consideration?—Yes.

Do you think that improvement can be promoted by legislation?—I am doubtful, very doubtful.

You say that your own hours of labour were shorter before the recent legislation, and I take it from that that you are in favour of shorter hours than the present hours sanctioned by legislation. Would further reduction by legislation be advantageous?—I don't know. I don't think myself that the present hours that the Factory Act permits us to work are too long for the average worker. They would be too long if they worked all the time, but the employee does not work all the time.

Does a factory stop for dinner, or does it run during dinner too?—We stop for one hour in the middle of the day in certain months, and two hours during the hot weather months.

You say that the workers take their day meal outside?—A great many of them do not take any meals during the day. They may take a handful of gram or a few sweets, but as a meal they don't take anything. A great many take their one meal at night before going to bed, as they say it helps them to sleep better.

I take it from what you replied to the Pandit that there would be more demand for education if we created an improved environment?—I think that improvement in environment would tend unconsciously to help them to seek for education.

How far, in your opinion, could manual training be introduced at an early stage in the general education scheme?—I don't doubt that manual training of children, in anticipation of their becoming factory workers, can be done. You will probably find the best illustration of that in Madras, but here I don't think we have arrived at a stage where it would be feasible to apply it, inasmuch as you would have to get your teachers first of all and, as far as we are concerned, we have no half-timers. The best material to operate upon would be half-timers.

You have no half-timers for reasons peculiar to your own factory?—We came to the conclusion many years ago that the trouble of carrying out the half-time system was more than it was worth, and we have not adopted it.

Do you think that half-time would be an aid to education?—I would not go so far as that, but think that the unemployed half-time would be best utilized in going to school. In our early days when we had half-timers, we kept a schoolmaster on the premises.

Would the enforcement of that system of education for the factory worker, viz. having the half-time available for educational purposes either in the factory or elsewhere, do good?—I think it would do good. I think it would be perfectly safe to lay down that half-timers must spend a certain number of hours in school.

I understand you would make education compulsory in that case?—Yes.

Would you go further and make half-time compulsory for the sake of education?—No' I would not do that.

Mr. A. Chatterton.—What is the common practice in Cawnpore in regard to the frequency with which wages are paid?—We pay every fortnight, i.e., the wages that are paid to-day are for the two weeks ending last Saturday.

Is that a common practice in Cawnpore?—I don't think anybody else does it.

They pay monthly?—To a large extent.

Do you think there is an advantage, commensurate with the trouble, in paying fortnightly?—I cannot really say that I have recognized any feelings of gratitude to us for having made the change.

Are your workmen much in the hands of money-lenders?—According to repute they are a good deal.

You said that you had a fund into which bonuses were paid for regular attendances. Do you from this fund make advances to workers for extraordinary expenditure?—No, but we have just made special advances to a great number of them in order to enable them to buy War Saving Certificates.

From the Provident Fund do you allow them to get advances for extraordinary expenditure, such as marriages, etc., so as to avoid their going to money-lenders?—No, they go to the Co-operative Credit Society for loans.

Have you got a Co-operative Credit Society?—That is part of the scheme.

Do they largely avail themselves of that?—They would all like to get advances, because the conditions are much less onerous than if they were obliged to have recourse to the money-lender.

If they get advances from the Co-operative Society, are these deducted from their wages?—No, we have nothing to do with that. It is quite possible that if the Co-operative Society came to us and said they were having difficulty, we might apply the screw.

Hon'ble Sir R. N. Mookerjee.—Can you tell us from experience or knowledge how the cost of a piece of work in an Indian factory compares with the cost of a similar piece of work in an European factory? I mean from the commercial point of view?—I don't think there is much difference.

Inefficient labour does not stand in the way of manufacture in this country as compared with other countries as far as the cost is concerned?—I don't think there is really much difference, taking quality into account.

Dr. E. Hopkinson.—In any provident system that might be set up in an Indian factory do you think that, as in England, there would be objection on the part of employees to the employer knowing too much of their financial resources? For instance, I speak of my own workmen. The men do not like to bank with their own firm; they prefer to bank somewhere else, so as to have their financial resources kept to themselves?—In our case they come to us rather than go elsewhere.

In regard to the purchase of War Certificates, was there any compulsion exercised in this matter?—We did not bring any pressure to bear. We gave them the opportunity and they availed themselves of it.

You obtained the certificates for them?—We sent the money home and will give them the certificates when they come. We have made it fairly easy for them.

Hon'ble Sir Fazulbhoy Currimbhoy.—About your Provident Fund, what is the percentage of wages? You say you deduct so much per cent. from their wages?—I did not say that.

What is the Provident Fund?—The Provident Fund is not dependant upon any contribution from the workers; it is a purely gratuitous payment from us. If a first class man is not absent for more than three weeks in the year, he gets three months' pay, a second class man gets two months,' and a third class gets one month. A salary of Rs. 50 per month is the limit; those above that participate in a separate fund, to which they contribute one anna in the rupee of their wages and the company does the same. Interest at 5 per cent. on the whole is credited half-yearly.

President.—Did you tell the Hon'ble Sir R. N. Mookerjee that wages had gone up 100 per cent. during the last thirty years?—I think wages have just about doubled in that time.

Did you not also tell me that there was no corresponding increase in efficiency?—I did not mean to say that.

What would you consider the improvement in efficiency?—It is not 100 per cent. I will go so far as that; but I think there has been an increase in efficiency.

You also believe that the way in which a man lives, his taste in living, help indirectly in improving his efficiency?—Yes, I do.

Do you think that if a man is working for eleven hours a day, that he has any time left to improve his surroundings or make his life a happy one in any way?—They don't really work that time. If they did they might be played out before the end of the day.

You don't think if they had a shorter day, together with facilities for education, it would in the long run improve their efficiency?—I think it probably would.

Do you think that any change like that could be brought about gradually?—I think that instead of pushing education, increase the standard of living, and the education would come of itself.

Have you real hope that within the next five or ten years there will be a marked change in that direction?—I don't think it will be so quickly as that. It will be a slow process.

Would it give you much trouble, or would it be possible for you to give us a short account written out, of the system adopted in your Labour Settlement, together with the system adopted for your Provident Fund? You know the system adopted in the Carnatic Mills in Madras; yours probably resembles that?—Probably; they manage theirs very well. I shall be very pleased to amplify what I have said about our housing arrangements and Provident Fund.*

Hon'ble Sir F. H. Stewart.—You say that wages have probably doubled during the last thirty years. Can you estimate how much the cost of living has increased?— I should think that the cost of living—the necessities of life—is not up more than 25 %. I am speaking very generally.

President.—For this province only?—Yes, that is as far as I know myself.

We would very much like to hear your views on technical education?—It is highly desirable first to know what one means by technical education. With regard to what in these parts is spoken of as industrial education, I don't think that the time is ripe for introducing a system, a national system of technical education inasmuch as in this part of the country at least, general education has to be taken in hand first, and you cannot, without preparing the ground by general education, introduce any system of technical education with much hope of success.

Similarly, the question of teachers is a most important one. There are some schools in these provinces that are doing well, and I think they are doing well largely because of the teachers. At Gorakhpur, for example, there is a very excellent school run in connection with the Bengal and North-Western Railway. I think the success is largely due to the teacher who is an enthusiast. He runs the school because he loves his work, but any technical school must be run just as a factory would be run. A school or a college or an university is merely an organization for turning out a certain product, and if nobody wants that product, there is no use in turning it out.

It seems to me there is more room, in connection with metal and wood-working, than in relation to, say, textile industries for developing technical education, and that has been shown by the comparative success of the schools that are associated with railway workshops. Such schools have been successful in a very gratifying degree. In the case of a technical school for textile industries, the conditions are not nearly as favourable. The pupils that go to the railway technical schools are practically guaranteed jobs at the end of their time, and they get higher pay than those who have not gone through these schools. I don't think there is any possibility, for a long time to come, for guaranteeing employment to the output of technical schools devoted to textile industries. Most boys who go to school or college here think that it is a step to some sort of Government post, and when the course is finished, instead of looking for work for themselves, they say, "Now you have put me through all this, what are you going to give me to do?"

Hon'ble Pandit M. M. Malaviya.—You have spoken about industrial schools in these provinces. Have you seen the Government Technical School at Lucknow?—Yes.

And also the one at Bareilly? No.

You think that a general education is a *sine qua non* for giving technical or industrial education?—I think so.

*Supplementary note not received at time of going to press.

Assuming that a general education is provided for you think there would be no objection to giving industrial education in a large measure?—In no case would there be objection, if you had material to work upon.

The lack of teachers, is that not diminishing; are you not finding more teachers capable of imparting industrial education?—I dare say but it may be that efficiency is not increasing.

Of the teachers?—Yes.

You think there are not sufficient efficient teachers?—A teacher has to be built in a particular way, and it does not follow that because a man possesses a certain amount of knowledge that he can impart that knowledge to others.

Then you would employ better teachers for imparting technical and industrial education?—I would look for them.

Is there not a good deal of textile work being done in these provinces, both woollen and cotton?—A good deal.

Yours is the second largest Woollen Mill in the world?—I believe so.

Don't you think that if you had a textile school to teach the processes of dyeing, bleaching, etc., you would have more efficient workmen?—That is what we are doing in our factory; we are teaching them to weave, dye, etc.

Suppose there were other schools established; don't you think if the students were to go in for a course of training in the different departments of the textile industry they would be better workmen than those you have at present?—I don't suppose that they would work in any factory. They would want to be foremen. A weaver who has picked up his weaving in school does not enter a factory to work a loom; he wants to become a foreman.

Assume that he is willing to start in a humbler position, with the object of rising to a foreman's position, would he not be a more efficient worker than workmen you are getting at present?—He ought to be.

You are aware that in almost all civilised countries now, a large number of technical schools are established to impart instruction, both technical and industrial. Don't you think that the time has come when India also should have provision for such education on a larger scale than exists at present?—I don't think it is urgent.

But it will be an advantage to have provision for such education on a larger scale?—Naturally you look for certain evolution in all processes. I take it that the time will come when conditions in India will be more on a level with other countries.

Has not the number of cotton mills increased within the last twenty years?—There has been a very considerable increase.

And they afford room in an increasing measure for employing men who have been trained in industrial and technical schools?—In places like Bombay and Ahmedabad that is true.

Do you know that several mills in these provinces have to import workmen who have been trained in Bombay, in the Victoria Jubilee Technical Institute to work here in these provinces?—It is not within my knowledge.

Dr. E. Hopkinson.—Can you, within your own factory, train Indians to become sufficiently skilled to become supervisors or foremen?—We get a certain number who show ability and can be trained to act more or less as foremen. We select them from the workers. There are a few who, we find, are worth looking after, and encouraging.

You give them special advantages?—Yes.

But I suppose you have to supplement these by bringing out men from England?—In every department we need to have home supervision.

Still you think the time may come when the number of Indians who are training for responsible posts will be largely increased?—You will never do without a certain element of European supervision. When I say "never," perhaps it is too strong a word, but I don't see the time.

Have you, within your experience, ever obtained Indians for responsible posts, who have had Indian University education?—We have no experience of that type of man.

And you have formed no opinions about that from general observation ?—No.

Mr. A. Chatterton.—You don't take apprentices from the better classes ?—We have no apprentices. We only pick out men who have shown a capacity for good work. They come to us as general workers at first.

Have you any experience of graduates who have been sent to Europe for technical training ?—We have had one such in our laboratory for a coup'e of years, but we have not employed any ourselves. We merely found employment for him at the request of Government while he was waiting for his substantive post. He showed that he had made good use of his opportunities in Europe.

Do you think that the scheme of sending men from the mills here to Europe for training a satisfactory one ?—I think it is fairly futile.

President.—Have you in your work found yourself handicapped for want of facilities for scientific and technological research in connection with your raw materials or processes of treatment; have you found that you have insufficient facilities in this country for anything of that kind, and have you wanted such things ?—We have had occasions when we wished we had such facilities.

What kind of subjects would you have liked to have had research help in ?—Largely chemical, relating to dyeing in particular. A certain amount of physics also would be of value. At the present moment there is a very exhaustive enquiry going on in Leeds as to the effect of the electrification of wool. We have been up against that problem ever since we started.

And you would have liked to have had some scientific official to help you in your problems here ?—We would have liked to have carried on investigations on our own account.

Supposing that Government had a staff of men of that type; could you employ men of that kind in your mills, with the understanding that their results might be published for general information ?— I don't think we have enough work for such a man.

But an occasional man ?—In that case if the enquiry were carried on with reference to our own particular work we would rather the results were not published to go elsewhere.

Would you object to the results being published in the usual blue-book form ?—I am not clear what ought to be done under these circumstances; I am a little doubtful. I don't believe in keeping secrets at all. One may know generally how a process should be carried out but the men in the mill will be the determining factor after all, when the time comes for working it practically.

You would not think it fair for the Government to lend you official assistance and then to bury the information ?—No, I would not.

Have you any idea, say, in Cawnpore generally, if there would be many occasions where Government officials of the kind could be used ?—They could be used, but, as far as research work is concerned, my own idea is that it ought to be in a separate institution, not split up among various districts, simply because it would be done much more efficiently if for no other reason than that the staff could meet together and compare notes. An illustration of that would be the Badische concern at Ludwigshafen, one of the best organised on the face of the earth. They had probably 300 Research Chemists always working at something, and they met once a week under the presidency of the Director. Amongst other things they attacked the problem of preparing synthetic indigo, but in spite of their having available 300 searchers, it took them something like 20 years to perfect their method. That is why, to my mind smaller institutions are likely to be ineffective, and they should, more or less, be associated with the class of factory there is in the country.

There are two very different ideas suggested for research organisation: one is that we have a central technological institution with or without the teaching. But we may put aside for the present any question of teaching and consider for the time being research facilities. We can either have this research done in provincial technical institutes, or one great central technological institution. That is one system. Another suggestion is this. Instead of having one central compound technological institute, we might have separate Imperial scientific departments, either for single subjects or for natural groups of subjects; for instance, instead of isolated chemists all over India, we might have one great chemical department with central headquarters and with subordinate laboratories distributed over the country merely for testing purposes, the main research work being done in the central laboratory. The head of the department would take care that his officers met him at frequent intervals for discussion of all their problems, for purposes of unifying their work and preventing overlapping, do you think it would be better to have a central compound technological institution, or would it be better to form natural groups

of subjects and bring them together for single treatment in one department for all India ?—Grouping of subjects for single treatment would be all right, but I would not have two men carrying on the same work. I would not have one institute for chemists here and another for chemists at another place. I would have all the chemists in one place.

Hon'ble Pandit M. M. Malaviya.—Have you seen the Nagpore Empress Cotton Mills ?—I have been over them.

That is managed by Sir Bazonjee Dhadabhoy ?—Yes.

He has been managing it for the last 25 years and more ? —Quite that.

Do you think his management has been efficient ?—It is quite good.

You are a part proprietor of the Cawnpore Woollen Mills ?—I am one of the fortunate shareholders.

And also of the Dhariwal Mills ?—I am a shareholder in the Dhariwal Company.

Do the Cawnpore Woollen Mills hold the largest shares of the cotton mills ?—They have invested some of their savings in it, as well as in other Cawnpore concerns.

How long have the Cawnpore Woollen Mills existed ?—40 years.

And the Dhariwal ?—About 36 years.

These two are practically one and the same concern, a joint concern ?—No, they are separate companies.

What is the capital of the Woollen Mills ?—What has that got to do with it ?

If you have any objections, don't answer, say so ?—If you will tell me what capital is meant, I will answer your question.

The share capital ?—The share capital is 55 lakhs.

Have you raised it recently ?—Yes.

Last year ?—I think so.

To what; what is it now ?—I don't think I should answer these questions.

Very well, you'll see why I wanted this information. When the Cawnpore Woollen Mills were started, were they started by Europeans only, or were there Indians also on it ?—Europeans only.

There were no Indians ?—Not one.

Are there any Indian shareholders now on it ?—There are some.

Do you encourage Indians to take shares in the Mills ?—I don't use any sort of influence upon Indians and their investments.

Are transfers of shares in favour of Indians refused ?—Not *qua* Indian.

Is there an article in the Memorandum of your Association—there is in some—which gives power to the Directors to refuse to recognise a transfer of shares ?—That is a very common provision.

And there is one in yours ?—There is. That is one of the commonest provisions.

Without telling me the amount that you raised last year, will you please tell me if you advertised your shares when you raised your capital ?—No, there was no need as it is one of the restrictions of a private company that it must not advertise for capital. Some of the new capital was allotted to Indians.

You have said that you had one Indian who had worked in your mills for two years. Except that one gentleman, have you never had an Indian workman as an officer in your mills during the last 40 years ?—We have had a number of Indians working as officers in our mills, I think hundreds.

I mean of the grade above Rs. 200 ?—We have never had any over Rs. 200.

A question has been raised whether the power to refuse to recognise transfer of shares is legal, and that is why I have asked you about it ?—It is perfectly legal.

Hon'ble Sir Fazulbhoy Currimbhoy.—You said just now that without European management at the top that a concern cannot be managed well ?—That is my own personal

opinion. I don't say that the native does not exist who can do it, but he has not come under my notice.

Do you know that Tata's Central India Mill is entirely managed by Indians, and is the best Mill in India, and that their 500-Rupee share is now Rs. 2,800 ?—I don't think Cawnpore need be ashamed of comparison with the Central India Mill.

It might be that some Indians gradually are improving. They can manage if they become efficient ?—I don't say that it is impossible, but only that it is not usual. Are there any other mills ?—There are six or seven in Bombay which are entirely managed by Indians, and the share value of these mills is at least three times their original value ?—I am very glad to know it.

President.—What other subjects would you like to bring to our notice ?—The question of indenting for Government stores. As regards this, it seems to me that the India Office store system is a good deal to blame for the slowness with which India has developed industrially, because whether the indenting officer is conscious of it or not, the fact of his getting stores from the India Office results in this, that there no one to whom he distributes stores sent out by the India Office is entitled to complain of them. It is quite sufficient, when the indenting officer receives a complaint if he can say that the goods came from the India Office. That is final. Now if the goods had been bought locally and fault were found with them, the head of the department might say, in effect, "why the dence did you accept the stuff from (say) Martin & Co?" That is very natural. A a matter of fact an officer—a very highly placed officer—did once say to me that was a reason for not buying locally inasmuch as it gave rise to endless criticism.

There is another difficulty that the local manufacturer has to meet, and that is the question of tests. Now most of the tests that are made on materials in this country are tests that quite honestly are intended to be those that apply at home. That is the origin of many of the tests that have been adopted in India. I have known cases in which goods made in this country did not come up to the official test although as good as could be made and were rejected in consequence. In desperation the contractor asked for a sample of the material that did comply with the official standard. It could not be produced. Whether it was due to a wrong standard having been adopted, or to climatic deterioration, I don't know, but it is a fact that the department failed to produce a sample that could stand the tests.

President.—What was the material?—It was woollen goods.

(*Witness continuing.*)—All Government departments have a sort of idea that it is their duty and their function to encourage competition as they term it. If one offers to supply the whole of the requirements of a particular line, they say, "No we cannot give the whole order to one contractor; if we did we would be in his hands entirely in future. We must split up and give a portion to some other man even at a higher price just to keep him going." What is the nett result ?—It means that the price is actually raised against Government, because if one concern is capable of giving the whole supply, it will do it cheaper naturally. It is quite wrong to think that Government would be in the hands of one any contractor because there is always the home market to fall back upon as protection from excessive prices.

President.—Don't you think that the local officer is unwilling to purchase goods made in the country because he fears the responsibility of having himself to check the quality of the goods supplied ?—It is exactly what he does fear.

And if he makes a bad bargain he is liable to various forms of insinuation. Do you think the difficulty could be got over if we had in India a purchasing department akin to the India Stores, so that the indents from different provinces might be gathered together and lumped into large orders, which would enable the seller to supply on a larger scale, and consequently to produce at cheaper rate ? Such a department would also have a number of expert officers who would check and pass the goods supplied ?—I think it would probably be an advantage especially if it were associated with a scheme for the Directors of Industries to make themselves acquainted, not only with what their particular province could supply, but what Government needs.

It would be the business then of that Stores Purchasing department to get into touch with local Directors of Industries ?—Yes, and more particularly if the whole scheme of industries is organised into a separate department, so that you have either a Director-General of Industries, or perhaps a Member for Industry with the Government of India, who takes care that all the operations of the various Directors in the provinces are co-ordinated and so prevent overlapping.

Do you think that most of the difficulties regarding the local purchases are due to ignorance as to what Government wants, and what can be produced in the country, and do you also think that most of that ignorance might be removed if Government published every

year a Blue Book return of articles purchased in Europe in the previous years, together with prices, so far as prices can be given, and the nature of the article ?—It would do good, especially if each consuming officer had in his office samples of those things of which samples could be kept.

Dr. E. Hopkinson.—Assuming such a department was constituted, would it not be of great assistance in the purchase of Indian goods, if there were a recognised list of contractors for any particular kind of goods on the books of that office, from which contractors only quotations could be obtained ? That is the list Sir Thomas speaks of.

President.—No, I did not speak of it in that form. Dr. Hopkinson means a certain member of approved contractors.

Dr. E. Hopkinson.—My suggestion is that such a list should be strictly limited to firms of approved capacity ?—I think that an excellent plan and would prevent a man taking a contract, say, for razors, and then going and buying at Gamage's. We have tendered for goods and were not the lowest tenderers, and did not get the contract, but all the same we supplied the goods.

Do you think my suggestion of a list of approved contractors would give the Government of India a very definite control over the quality of the goods supplied, in this way that if any contract, when improperly carried out, or any improper means were adopted to carry it out the contractor would be struck off the list ?—It would come to this that many of them would be struck off!

To go to back to the instance of woollen goods, do you suggest that the test was a foolish or improper one, or too severe ?—All I suggest is that it was no test that could be applied in this country. We could not work up to it with the materials we had and they could not produce a sample supplied by the India Office that did work up to the test.

The only conclusion to be drawn from that was that those goods ought to have been bought in England ?—No, they ought not to have been bought in England, because the India Office purported to have been supplied up to the standard laid down. I had the material compared with that which came from the India Office, and the India Office goods also did not stand the test.

President.—What is your opinion about Government pioneering industries ?—If Government is to give assistance of any sort to industries, the best form of assistance would be by way of loan, precisly in the same way that the Home Government have assisted British dyes. It seems to me that is the only sound way in which Government would be justified in giving financial assistance to an industry. I would be entirely opposed to Government becoming a shareholder.

Would you add to that any form of Government control ?—Not Government control as regards expenditure. One of the conditions I would make is that the man who proposes to start an industry puts down as much money as Government is going to give.

Would you have any kind of Government audit of accounts ?—No. In the event of a company an auditor is necessary in any case.

Would you insist on that as a condition ?—I would.

You would not like to have any more direct form of Government control such as a Government Director ?—No, Government have no men to spare for that.

Do you think that Government is now in a position to guarantee loans to industries in India, in view of the limited number of scientific and technical experts they have to advise them ?—I don't think there is any call for that kind of assistance.

You think that there are a good many industries in which Government could put their money at once ?—Yes, just as banks are accommodating.

Would a joint stock bank put money into a new industry when there are no liquid assets to fall back upon ?—They would want some form of security.

Something that they could realise, but this is another story. Would an ordinary bank be able to judge of the prospects of an entirely new industry, and put money into it without being able to realise readly ?—If a man can show that there is a reasonable prospect of success, I don't think existing banks would be unwilling to finance it. The reason I would not be against Government assistance is that experience shows that nearly all pioneers lose money.

That is why you want Government to give loans ?—Yes, because pioneers won't risk it. With few exceptions pioneers lose money.

Do you want Government to drop money in this way?—I don't want them to drop money ultimately this enter prise might become a success ! only in the initial stages the promoters would drop money. Industries that have to be started *de novo* might look for a certain amount of support in the way of a Government loan. People are very chary of starting new industries, because when they look round they find that nearly everyone who has started an industry has lost money at the beginning. Every pioneer of industry in Cawnpore has lost money but the tide usually turned after years of effort.

What objections have you to a system of guaranteed dividends with or without refund to Government of the expenditure incurred in paying dividends at the guaranteed rate?—I don't think that is a function of Government.

Don't you think that in a case of that kind it would be in the interest of the company to get rid of Government?—As a rule the rate is so low that the borrower is not anxious to get rid of the loan.

You don't approve of Government lending money indiscriminately in this way?—No, I don't.

Do you approve of Government guaranteeing the purchase of products for limited periods?—Yes, but there are a great many so-called new industries which ought not to be started by amateurs. An industry may be a new industry in India, but a well-established industry elsewhere There is a case here in point in connection with the production of bichromates. This is manufactured at home, and I think it very foolish for anyone in this country who has not particular knowledge of that industry to start it. The proper way to do it would be to induce manufacturers at home to start a branch here. The manufacture of bichromates is going on in Cawnpore. I have in my pocket a sample of the chromite from Baluchistan that is being used to make and the bichromate. Messrs. D. Waldie & Co. have taken up the manufacture of bichromate, more or less they must be groping in the dark as to the proved technical methods. If Whites or Potters were induced to come here and start a factory with Government support it would cost Government less than the cost of bringing a new industry to fruition by making grants to encourage it.

Would they come for bichromabe alone?—That is for them to say. There would be at least a thousand tons a year in the way of demand in India.

Dr. E. Hopkinson.—Taking that particular instance of chromates; supposing it were feasible to induce a British firm to start the manufacture here in India, would you, from the point of view of Indian interests, make any regulation as to the capital being found largely in India, or as to the employment of Indian labour?—I don't think it would be feasible. India is a land where you need not expect favours. You have got to be entirely independent of what I may call accidental advantages. If India wants to provide capital for such a thing, it ought to have the opportunity. But for efficiency's sake it is not the best way to start any sort of industry by amateurs.

Hon'ble Pandit M. M. Malaviya.—If an American firm produced bichromate of potash cheaper, you would let that firm establish itself here in preferenee to an English firm?—I don't know, I don't think I would.

Or a Japanese firm?—I don't think I would.

(*Witness continuing*).—In regard to the question of the employment of natives, the Hon'ble Pandit has been very emphatic, and he seems to think there is a great opening for them. You know the "*Tribune*" of Lahore? I have here a copy in which appears this advertisement "Wanted a young man of active habits, having a thorough experience in business to take over charge as Assistant Manager of my Cotton Factory, pay Rs. 25, and free quarters."

Hon'ble Pandit M. M. Malaviya.—Without a commentary from you, I cannot understand your presenting that cutting to the Commission?—If you wish to use this, it is public property, and at your service.

You offer it to the Commission?—If it is of any use to you, you are welcome to it.

(*Witness continuing*).—I don't know whether the question comes within the purview of the Commission, but it is difficult everywhere to reconcile agricultural interests with purely manufacturing interests. Every measure should be taken that seems feasible to increase the efficiency of the agriculturist, and I have always thought that one of the ways would be by preventing the export of bones from India. That is one of the ideas that perhaps obsess me. Bones contain most of the phosphates that are taken out of the soil by crops and it would be an excellent thing if the export was prohibited, so that the phosphoric acid could be returned to the soil.

President.—You would not like that done unless we can provide some way of absorbing these bones?—I think it could be done.

You know that there is a good deal of employment given in connection with the collection and grinding of these bones?—Why not use the product on the tea gardens and sugar-estates, instead of exporting it?

Don't you think it would be better to educate the people to ask for the bone meal or superphosphate rather than put on an artificial prohibition?—I am not sure that I would not: I think I should force the education.

You would then kill the present industry of bone meal-crushing?—I think you could develop another one. You can start making steamed bone flour and incidentally calf's-foot jelly.

You ought also to encourage the use of, say, mowha oil, for making *ghee* instead of using butter, and thus start the manufacture of margarine?—That is another industry that should be encouraged.

Hon'ble Pandit M. M. Malaviya.—Do you think that even if the bone cannot be crushed at present in this country, its export should be prohibited, in order that it might be used later on?—If you prevent export there will be no question about the crushing.

President.—If you interfere with the crushing of bones, the bones would not be collected.

Witness No. 35.

Lt.-Col. F. C. Lane, R.A., *Superintendent, Harness and Saddlery Factory, Cawnpore.*

Written Evidence.

Technical aid to industries.

My only experience of a good institute for the purpose mentioned is in connection with the Herald's Institute, Bermondsey, which has proved of great use to the leather trade in England. This Institute arranges classes of instruction in the theory and practice of tanning, currying, and dyeing. They have also acquired lately a small tannery where all practical work is carried out.

I am of opinion that a similar institute in India would be of great use to the trade which remains undeveloped in spite of the enormous indigenous products which are obtainable at rates far below those paid for similar products at home.

Training of labour and supervision.

My experience has been that the only way in which methods of manufacture can be improved in this country is by the enlistment of experts from home as supervisors.

Government organisation for the collection and distribution of Commercial Intelligence.

Industrial and trade journals.

Trade journals are always of great assistance, but as regards the leather trade it appears doubtful whether this has developed sufficiently in India to warrant the start of a trade journal.

(*The remainder of Lt.-Col. Lane's written evidence was confidential. He did not give oral evidence.*)

AGRA.

WITNESS No. 36.

MR. GEORGE A. JOHN, *Messrs. A. John and Company, Agra.*

(*Mr. George A. John did not submit written evidence.*)

ORAL EVIDENCE, 13TH NOVEMBER, 1916.

President.—You have had a good deal of experience in handling labour of different kinds for your ice factory, flour mills and weaving and ginning mills?—Yes.

You have also made provision for the mill hands having provided very good labour lines?—Yes.

Do you find that with these attractions and fairly good pay people are inclined to make either flour milling or cotton weaving their profession for life?—They do. A great many of them do. In fact some of them get so much experience in the working of the thing that they start little concerns of their own and compete with us. That is in flour mills. There is a difference in the quality of the stuff. They make it cheaper and the bazar takes it. They compete with us in the lower grades. The poor people simply look to cheapness and the various stone mills grind wheat and barley mixed.

So you find that the men are inclined to take to this as their life's work?—They do But there has been a great business of robbery among mills. Labour in one place is diverted to other places very soon.

What I am asking is whether that labour is really confined to one kind of labour?—It is confined. Many labourers after making money leave the mills for other jobs. There are mill hands enough for a large mill doing other work in the city.

Is there any hope of the men becoming efficient in one particular line and improving their present methods?—I think they are improving.

Where we can discover people who stick to one particular line, we can do much towards improving them?—It is a life job really. Many work in families, father and mother and brother together.

You have schools for half-timers. How many attend?—About 200.

Is that a fair proportion of the number of the boys of that age?—A very fair proportion. We give them clothes. The half-timer only gets Rs. 3 and Rs. 4 and his parents often say "Why should he go to school. I want him to help me to earn something."

How long have these schools been running?—Since 1913.

There has been no time to test the question of their settling down?—They are settling down. I can vouch for it.

Have they improved?—I do not know about that. They come in numbers. It is under Government and the Government prepare the curriculum.

You provide the building and meet the pay of the staff?—Yes. The Government give Rs. 20 a month and the municipality Rs. 12-8-0.

Dr. E. Hopkinson.—As regards teaching in the factory school do you teach any subjects, such as weaving in addition to the ordinary primary education?—This is what I should like. At present we have too much of the educative and very little of the technical. You cannot get carpenters but any number of babus. We can get any number in the literary line.

Would you like to have carpentry taught?—That is what is wanted. We want technical qualifications.

Could you not try the experiment yourself in connection with this teaching work and fit up a carpenter's shop?—In our mechanic's shop there is Mr. Thornely. He is an expert mechanic and numbers of boys come as apprentices. They are five years under him as a rule. Before the five years are over, either the parents grumble or the boys go away. They do not stay to get a thorough education. Mr. Thornely is disgusted and begs us not to send any more.

I understand the boys who go to the school, the half-timers, do stay with you?—They do

You might find it of advantage if instead of spending their whole time on literary education, they might do some manual work like carpentry?—They could do it. But they will have to be paid for it.

What I suggest is that concurrently with learning to read and write they might do some manual work?—I could propose it to the Education department. They have got certain curricula to which they have to adhere. I think that such a change would be very useful.

Have you discussed anything of this kind with them?—No.

Do you think they would have any objection?—I expect they will have. I could try it.

You speak of apprentices being taken into the mechanics' shop. Are they illiterate?—Entirely illiterate. We got 2 or 3 who stayed the full time. They were very good. They could pick up anything.

Do you think that want of education is in any way a disadvantage?—I do not think so. I think the more ignorant they are the more easily they are taught. Those who do not know to read and write have done very well. The father instructs his son in his profession from an early age and the boys have turned out very good workmen.

Why do you say so?—I am only speaking from experience of what took place in our mills.

In connection with the ginning business, I understand that you do not use the cotton that you gin and that you buy ginned cotton independently and that you sell the cotton you gin?—We only gin for outsiders and do so on a commission basis.

Hon'ble Sir F. H. Stewart.—Taking Agra as an industrial centre, is it stationary or are there any signs of its developing?—There is plenty of scope in Agra. But there is want of confidence and money. We started as managing agents to the Agra Spinning and Weaving Mills. Later we opened mills on our own account. We have done it one after the other, and we have been helped a good deal by what we may call the credit system. We have got the plant from Lancashire on very easy terms. Even at present if we had the money we could do much more. Once there was a proposal of a paper mill here. All the big people got together and what they did was that every one wanted to be managing agent and nothing came out of it. The failure of Ralph Douse and Son in Delhi spoiled the confidence of the people.

Have you had any difficulty in obtaining banking facilities?—It is very difficult. The banks would not help or encourage enterprises in any way. They only go on their principle of interest and safety. The Bank of Bengal is a chartered bank and would not give you money on block. They will give you on stock and even then they take 25 per cent. margin for it. The Alliance Bank has been helping us a good deal and have always been very good to us. But for starting enterprises it wants rather high interest. The native banks are no good at all. Failures in the large Indian banks have frightened the general public, no one will deposit in an Indian bank. They are therefore unable to help industrial enterprise.

It is not the business of the bank to get its money tied up in industrial plant and machinery?—The banking would not help enterprise. It is only banking that can help. You cannot raise a limited company. There is no confidence.

You have obtained more assistance from manufacturing firms in England than banks out here?—The Alliance Bank has been very good. It is giving us a fair interest.

Do you think there is room in India for the formation of an industrial corporation which would finance and develop industries?—Certainly.

Do you think that capital would be readily forthcoming?—Most certainly. It is mostly due to want of confidence. If the Delhi mills had succeeded the industry in Delhi would have been four times what it is now.

Do you think that the industrial bank would induce confidence?—Certainly.

Are there any special trade difficulties here?—The railways have been rather hard on us. They have not helped us.

Hard on you individually or on Agra as compared with other places?—Individually in one way. There are the North-Western Railway and the East Indian Railway. When I am sending a wagon of cloth to Cawnpore and want a wagon at the usual rate, the East Indian Railway, say "How do you expect the manufactured article at the same rate as raw yarn?" The North-Western Railway do just the opposite. Wheat is about 8 pies per maund *dearer* than the manufactured product. This has hit us very hard.

Have you made any representations?—I wrote to Mr. Silver. He applied to the authorities a dozen times. He got a letter saying that the company was considering the matter.

Can you give any other instances?—Yes, for instance, a merchant is sending many wagons of yarn to Howrah at the present moment. He says "please book to Cawnpore and from there I will book to Howrah." It is only about Re. 1-4-8 per maund, whilst from Agra direct to Howrah the East Indian Railway want over Rs. 2.

President.—Are the wheat freights to Agra from the Punjab higher than the freights from the Punjab towards Karachi?—I do not say that. What I say is that the freight from Batinda to Agra for wheat is higher than for flour and one of the excuses that the railway made is that if we were to reduce the price of wheat towards Agra they would lose their lead for Karachi. Again, in the case of the Rajputana-Malwa Railway we find that it is dearer to get cotton from Dosa to Agra direct than from Dosa to Bandikui and from Bandikui to Agra. When I reported the matter to Rajputana they said "If I give you a direct lead, you send it to Cawnpore and we get no benefit." The changing involves much unnecessary trouble and we want more facilities.

Will you put that on paper carefully? We should like to have an exact illustration in the form of a separate note giving the materials carried and the freight charges and also let us have the explanation given by the North-Western Railway. Was the excuse given in writing?—I have not got it in writing, I shall make a note as wanted.

Witnesses subsequently forwarded the following statements:—

Rates on wheat and flour to Agra:—

	Flour. Rs. a. p.	Wheat. Rs. a. p.
Lahore	0 7 11	0 8 7
Ferozepore	0 6 11	0 7 6
Bhatinda	0 6 8	0 6 8
Umballa	0 5 5	0 5 3

FREIGHT ON COTTON.

From Dosa to Agra Fort Rs. 0-8-3 per maund at owners' risk and Rs. 0-9-10 at Railway risk

From Bandikui to Agra Fort 0-7-0 per md. at owners' risk and Rs. 0-8-4 at Railway risk.

From Dosa to Bandikui Rs. 0-2-0 per maund at owners' risk and Rs. 0-2-3 at railway risk subject to a minimum charge of 54 maunds per wagon.

Hon'ble Sir R. N. Mookerjee.—You said that you take apprentices. They are of the artisan class. Do you pay them anything during the five years?—We start them from Rs. 3 to 5.

Why do they leave you and join the railway workshops?—We cannot pay at the same rate as the railway workshops.

Have they better prospects in the railway workshops?—I do not think so, because some of them want to return to us very soon.

You said that the illiterate boys do very well. Is it your idea that they should not be educated?—What I said was the work of some of the uneducated boys was very good indeed. I certainly believe in education. The man must be educated and then given technical education. Of course we have had many a boy who does not know how to read and write and he has turned out one of our best fellows. On that account I do not mean that education should be discouraged.

In connection with the President's request for a note on the railway freights and the names of the materials carried, would you also mention the gauges of the lines, whether it is a broad gauge or narrow gauge?—Yes, but there is no change of gauges for which I have complaints.

Witness subsequently said that they are concerned in wheat with the broad gauge and in cotton with the narrow gauge.

Mr. A. Chatterton.—Is it a fact that the primary education at present given is of so inferior a nature that it has no permanent effect upon most boys?—Yes, when they pass certain age they forget all that they have learnt and know only what their father's teach them in a practical way.

Are your schools for these half-timers, under the Education department? Do they get grants?—Yes, the Government gives Rs. 20, and the municipality Rs. 12-8-0.

And you have to conform to the regulations of the department?—Certainly.

Is there any system of indenture binding these boys from running away?—No.

Do you think it would be a good thing if provision is made to prevent boys from running away?—I think there should be special legislation. They are always apt to run away. I think every mill hand in the United Provinces has worked in every other mill. The old system is much better. The father brings his boy and teaches him. Of course when they pass the half-time they would not trouble afterwards. They settle down.

You said that the Delhi trade would have developed but for the failure of Ralph Douse and Sons?—Yes, their failure stopped the springing up of a lot of smaller enterprises. It is all due to want of confidence. There is plenty of money.

WITNESS NO. 37.

NAGENDRA CHANDRA NAG, M.A., F.I.C., *Professor of Chemistry, Agra College.*

WRITTEN EVIDENCE.

Scientific and technical education.

To promote the industrial development of India it is, in my opinion, absolutely necessary that there should be better co-ordination between Indian university training and actual manufacture. "Business cannot be learnt in a university or in a technical college...but the changes which have taken place in the conditions and needs of business-life in recent years render it absolutely necessary to employ men of scientifically trained minds." (*Nature*, 28th September, 1916.) What I mean by having better co-ordination between university training and manufacture is that wherever possible a science department of a college or a university should be expected to manufacture certain materials of every day use, so that the students in that department may be acquainted with the actual processes of manufacture and thereby be better fitted to enter upon an industrial career in the future. By way of illustration I might mention the manufacture of crayons, paper, pencils, ink, etc., for the use of the college as objects which would be instructive and useful. This is only to start with. Bigger efforts could come by and by. I have personally, with my assistants, prepared pencils, dyed "*safas*," manufactured burners, fitted my whole laboratory with water and gas pipes, manufactured foot-bellows at one-fourth the ordinary price. Such efforts make science a vital force. Of course, the quality of the article turned out may not be first class to start with, but it is here where the Government may step in to help the man who has taken up some investigation which may ultimately be of use to industry. Moreover, the articles which can be turned out in a laboratory are not always so inferior in quality either. I prepared test-tubes T-tubes, etc. and even distilling flasks out of Firozabad glass tubing and they were of far better quality than the consignments that we have been recently receiving from Europe both in finish and heat-resisting quality. But as the Director of Industries of United Provinces observed (at the ninth meeting of the Board of Industries held at Naini Tal) there is, what he called, "an unfair prejudice against Indian-made glass even on the part of Indian merchants selling Japanese glassware." It is this want of confidence of Indians in Indians which must be fought against and removed and the Government can help by giving Indians every chance, wherever possible, to come to the front. I have myself personal experience of this sort of want of confidence in analytical results and reports thereon submitted by Indians. In such cases I would ask the Government to come forward to help the struggling investigator. "For so long as the pursuit of original scientific investigation remains a blind-alley occupation, or is only capable of being followed in the leisure moments of other work, such as teaching, or by a man of independent means, so long it will fail to attract a large number of young men of ambition and ability." (*Nature*, 21st September, 1916, J. A. P. on the first report of the Advisory Council of the Committee of Privy Council for Scientific and Industrial Research.)

Government patronage.

Manufacturers and businessmen are probably not averse from availing themselves of scientific assistance or advice but "a small concern or one of moderate capitalisation simply cannot wait long for a return on an investment of capital." (*Ibid*).

Wherever the Government is a consumer of products capable of being manufactured in India it should give preference to the Indian products even if they be of passable quality. In case the manufactures deteriorate in quality or do not show any improvement and fall behind foreign articles in quality the Government should notify the manufacturers of their intention to discontinue their purchase after a certain definite time if the quality does not improve. This is the sort of help I would most advocate for the manufacturer. But in the case of a new industry, as the result of some investigation, I would advocate loan of apparatus or machines, and supply of raw materials on favourable terms and concession in railway freight. The above forms of help have no reference to the help that I advocated for the investigator to carry on his investigation in a college or a factory. I would further advocate that the Government should stipulate with those manufacturers of whose products they are large consumers, or to whom the Government have given substantial help that Indian men of science selected by

Government assistance.

Government should be allowed to carry on investigation in their factories with a view to further improvements in manufacture. Of course, it would be stipulated that the manufacturer will have first claims to the fruits of these investigations. The Government and the successful investigator should have a share in the profits accruing from the adoption of the process as the result of scientific investigation. As far as possible, Indian industrial problems should be solved in India, although there might be many failures. I know from personal experience one cannot get admission into a European factory even with a certain amount of influential backing.

Raw materials requiring investigation.

I know of the following Indian deposits which, in my opinion, should be further investigated with a view to their utilisation in India.

1. Cobaltiferous manganese deposit containing from mere traces 15% of Cobalt oxide, and more than one per cent. of nickel oxide, in Jodhpur State.
2. Ilmenite containing 48% to 56% of titanium oxide occurring in Alwar and Kharwa.
3. Copper deposit containing copper to the extent of 6% to 44% as malachite, azurite and copper glance in Jhalrapatan.

The Geological department would be conferring a real boon if they would provide teachers of chemistry in Science colleges with samples of Indian minerals and with details regarding the locality from which obtained and the prices, etc., at which available. Indians should be taught to look for gold in a handful of dust. They should not be allowed to remain collectors and exporters of raw materials. They must learn to utilize them in India.

Unsuitability of Indian climate for production of certain materials, such as bleach, should not be taken as Gospel truth. Experiments conducted by Professor Salig Ram and myself on production of bleach liquor gave us very promising results. Further experiments in every such direction to dispel myths of this kind should be encouraged.

President.—Where did you get your training?—I was first educated in the Presidency College, Calcutta. After working in the Agra College for 13 years I took furlough with a view to trying to get into some factory in England or in Germany. I tried and could not do so. On the advice of Sir Alexander Pedler, I went up for the final examination of the Institute of Chemistry and passed it.

What kind of factory have you tried to get into?—I had done some work in connection with the glass factory at Firozabad. I wanted to get into some factory in England but could not. Sir Alexander Pedler himself tried but they would not allow me to go into the glass factory of Chance Brothers of Birmingham or of Powell's in London.

Have you published any researches?—In 1896, I was working with Sir Alexander Pedler. He was studying the action of bromine on water under the tropical sun It was his work and not mine. As a side issue of that I observed that bromine had certain actions upon cobalt and nickel salts in the presence of bicarbonate of potash and I communicated the results to the Asiatic Society of Bengal. They published it. This was also published in Germany.

Have you published any other papers since, on research results?—I have not published any myself but I had undertaken the work of nitrogen estimation for Dr. P. C Roy who was experimenting on nitrites of mercury. My work has been acknowledged in the Transactions of the London Chemical Society. And for my paper on "Titanium Minerals their estimation and utilisation", I was awarded the Elliot prize for research for 1913 by the Asiatic Society of Bengal. I have not been able to follow up this work, having been busy at teaching.

You have no time for research work?—Very little.

How many lectures do you give?—At least 24 every week.

How many working days?—Six working days at 4 hours a day. That includes laboratory work.

Have you developed any other industry?—No. But I have been successful in making a very quick tanning agent by using titanium solution along with bark extract.

Have you brought this to the notice of the Director of Industries?—No. I asked the tanning expert here to take it up and he did use it in tanning hides with success

Have you followed up this work and got definite results?—Ilmenite must be brought into solution and preferably purified. I have not got the time nor the money to take up industrial work of this kind in the midst of college work.

You tell us that you want Government to help in translating these results into practice. You seem to have got a promising work on hand and you have not brought it to the notice of the Director of Industries?—In the case of the pencils we have brought it to his notice. I have not got the money and time to start any work myself.

You say that you have personally experienced the want of confidence in analytical results thereon submitted by Indians. Is there any instance which you could give as an illustration of that?—I analysed wolfram from Jodhpur. I gave my results to the Revenue Member there and he would not believe. He said that it contained a lot of tin and that it was of very little value.

But that was an Indian member of the Durbar. How is the Commission going to bring about a reform of this kind?—If we Indians are given the chance to analyse certain things and our reports are given publicity and action taken on our reports then I think people will come to understand that we can do some work of value. Now, somehow or other Indians have not got or command that amount of confidence.

You have got societies to publish the results of research work?—If you want to establish confidence in your name you would do well to publish your researches in scientific journals?—Some of these are not really worth publishing in this form. These analytical results are not original investigations and a Society would not take these results as they are mere analytical results. I do not think we Indians have come to that stage when we should take up purely research work. We ought to take up work which will also have an industrial side to it. What I mean is that our research work should be such as can be utilised for industrial purposes.

Unless you have some practical idea, I do not know what practical result you expect to derive from these?—I shall take another illustration. Professor Salig Ram and myself have done experiments in preparing bleach liquor. We went to the Lucknow Paper Mills and prepared it. They did not believe that it was possible to prepare this in the climatic conditions of India. But we did prepare it and they were at last forced to admit that we had done it successfully.

When was this work done?—Last May this year.

Now have you left your previous work and taken up an altogether new line, without finishing what you have taken up?—I have not got the money to take up and do the work myself. The Lucknow people wanted me to advise them in this matter.

What Lucknow people?—The Paper Mills. I could give my holiday time and advice but I have not got the money. We have not been given the chance to perform the experiment on a bigger scale. It is here that I would like the Government to come in.

Did you put the matter before the Director of Industries?—I think the Director of Industries knows it.

Have you definitely brought the matter to the notice of the Director?—The Assistant Technological Chemist came to me and we had a talk over it. He told me that the Lucknow Paper people had been to Cawnpore and that they admitted that we had prepared the bleach liquor.

Was the matter put definitely before the Director of Industries so as to lead him to suppose that there was a definite practical proposition to follow up?—I have not done so. But it was published in some of the local papers.

No one can take notice of a local paper in the matter of technical and scientific results. You must publish it in scientific journals which are read by men who are capable of understanding and forming an opinion in the matter?—Before we go to a scientific society our work must be thorough and before that work can be thorough we must have sufficient time and material to work on.

In other words you say that your bleach results are not thoroughly done?—They are thoroughly done so far as preliminary experiments have gone.

Mr. A. Chatterton.—Do you do any consulting work?—Some people come to me for help. But I have no regular consulting work.

You do not charge any fees?—I have not charged any fees so far.

What led to your connection with the Lucknow Paper Mills?—They wrote to the Principal of my college and asked for my help.

To do what?—To see whether I could make bleach liquor or not. The bleaching powder was not coming out owing to the war. They wanted to find out some cheap method

of preparing bleach liquor. Some of the shareholders of the Lucknow Paper Mills are Bhargavas and my colleague who is a Bhargava probably suggested my name.

Did they provide you with funds?—No funds were provided. We went over to the factory and used their dynamo. They could not give us the cells to our design. Still the results that we obtained were very good.

Did you ask them for money to develop the experiments?—No.

Did you put before them a business-like estimate of what the whole thing would cost when worked on a bigger scale?—I told them to get us some 25 or 50 cells.

They are not technical people and you must give them some estimate of what it would cost?—We wanted them to spend only Rs. 200 or so.

And they would not spend it?—They said they were ordering the cells to be made at Raniganj. The cells have not arrived yet.

Have you not seen in some of the mills in India bleach liquors prepared by electrolysis?—No.

Then why not see what is actually being done?—I was told that they could not prepare.

The process is at work in Madras, Bombay and other places?—If it is being prepared there, I do not see why the Lucknow people should not know about it.

If they called you in as an expert would you not be expected to know that such processes were at work in the country?—I saw some advertisements (put into our hands by the Secretary of the Paper Mills regarding certain plants which they were contemplating whether to buy or not). They said it was rather too expensive.

Have you heard of the Empress Mills at Nagpur, the Buckingham Mills at Madras and the Titagarh Paper Mills? Do you know whether they use bleach?—I have not heard anything about them, One of the men of the Titagarh Mills was telling me that they were getting their bleaching powder as usual.

President.—We see that your written evidence consists of so many vague statements that we hardly find anything practical on which to proceed?—I have put down what I thought was my opinion.

You say that the statement that the Indian climate is unsuitable for the production of bleach should not be taken as Gospel truth. We all know it is not Gospel truth Bleach liquor is prepared constantly in many mills in India, for example, the Empress Mills at Nagpur and the Buckingham Mills at Madras; there is nothing new or mysterious about it.

What have you done in the matter of pencils?—Dr. Hankin once remarked that he was getting bad pencils for writing on glass. I prepared some and he sent them to Mr. Silver and he said that they were good. I took it up as an ordinary scientific job and one of my assistants thinks of starting a business.

(*Mr. A. Chatterton*).—Have you ever seen pencils made by machinery?—No.

Would it not be wise to see the pencil machinery before advising people to make pencils by hand?—We are in communciation with the Director of Industries. The fact is even now we are turning out pencils far cheaper than the bazaar price; that is the war price. It would probably be possible to sell them at the market price even after the war.

Then why don't you take up the work at once? Don't you think that this is a good opportunity?—I took it up merely as a scientific job. Anybody can take it up as an industrial job. And one of my assistants thinks of taking it up.

Have you put your ideas before the pencil manufacturers in Bengal?—We are more or less still in the experimental stage. We tried indigo and the ordinary indigo that can be had in the bazaar is not pure enough and suitable for certain purposes.

Do you know that there are at least half a dozen other firms in India making pencils; coloured pencils?—No. I compared these with the Japanese pencils and ours are far better.

Witness No. 38.

Mr. B. Framroz, *Merchant, Firozabad, United Provinces.*

Written evidence.

With reference to the enquiry regarding the evidence to be placed before the Indian Industrial Commission, I beg to lay the following few points which concern the chief trade of Firozabad.

Firozabad can only boast of one industry which is prevalent here for more than a century past and that is glass bangle-making.

To make glass bangles we require raw material for glass making itself which requires a sort of stone sand and raw soda alkali.

These two materials were originally obtained from villages near Firozabad in the shape of raw materials called *Reve* from which crude glass was procured in lumps.

The glass was very rough and no good bangles were manufactured from it. So about thirty years ago the glass makers turned their attention to melt old broken glass (composed of broken glass chimneys) without any soda alkali. This improvement no doubt procured good glass but still it was very brittle and wastage in manufacturing bangles was very great.

So the industry took a further step and imported ready-made glass blocks from Austria which gave very good service although at much higher rates in cost.

Some enterprising firms started making the glass blocks at Dehra Dun Glass Works and these being very nearly fifty per cent. cheaper than the foreign glass blocks all the Firozabad traders turned their attention to utilizing this country-made glass which answered their purpose in every detail.

Now the Firozabad merchants themselves, ten years ago, commenced to manufacture their own glass by sand purchased from Dehra Dun and Bargarh (near Allahabad) and from soda which is imported in this country from England.

This industry is at present divided into two separate branches—

(1) Glass-making (for bangles).

(2) Bangle manufacturing (from glass).

The first industry of glass-making is confined to tradesmen with a capital of about Rs. 50,000 at least. Some seven factories are now working at Firozabad with an aggregate capital of about Rs. 4,00,000.

These factories turn out daily nearly five-hundred maunds of glass which is all used up in glass bangle-making in Firozabad and other districts.

Competition with its sting of animosity has led to the decline of these glass-making factories and so the trade which ought to have grown up by leaps and bounds, is crippled for the above cause and no progress is made.

If some combination arrangements could be made between the glass factory owners no doubt a decent profit could be obtained, and gradually the advancement could be made to manufacture glass chimneys and other valuable articles, which are at present imported from foreign countries at high prices.

Formerly glass blocks of foreign make were purchased at Rs. 12 per maund but now the same stuff local made is sold from Rs. 3 to Rs. 4 per maund, which in some cases leaves no profit at all. All this is due to competition in absence of any combination amongst the factory owners. In such circumstances this promising industry is crushed for want of combination.

Some arrangements ought to be made to form a sort of co-operative society between the glass manufacturers so that a fixed rate could be fixed with moderate profits and thereby the industry may get a chance to progress.

Bangle-making forms another branch of this trade. It is confined to local workmen, the majority of whom are Muhammadans. Nearly the whole of India is supplied by cheap Indian-made bangles from Firozabad, and although the trade is large the profit is very small compared to the labour spent. This is again due to unduly keen competition to a large extent.

Some industrious merchants try to introduce high class bangle-making, but before it can reach perfection other tradesmen try to imitate and make them very cheap in crude forms, and thereby spoil the industry before it has a proper chance of rising.

This system is a great bar to the advançement of the industry, and so it should be protected by granting patents, so that industrious people may have a chance to make further progress.

For instance, at present I have invented a particular process of painting bangles with fast porcelain colours but, in absence of any rights, it has every chance of being copied everywhere and the consequences will be that before it can come to perfection imitations in cheap and crude forms will spring up from all sides, and this rising line with a good future will die in its infancy for want of proper development.

Also, after great trouble and money spent I have found out a method of gilding and painting glass by gold and other fast colours, which industry itself will advance to a very high stage in the decorative work of painting glass panels, flower vases, and other commercial articles of importance, if it is carried out in proper hands with some patent rights.

These local decorated glass panels have been shown and highly appreciated by His Honour the Lieutenant-Governor of the United Provinces, the Commissioner and other high officials of Agra, and all have praised them for good workmanship and neatness. But I am afraid that before it can get a reputation, the trade will be killed by cheap imitations.

Again, I beg to point out that Firozabad glass and bangle-making industry has a very bright and prosperous future before it, but local envy, competition, and lack of trade honesty, give it few chances to rise or advance. Until Government interferes and tries to induce better feelings amongst the tradesmen, this industry will always suffer.

Further, for the industry of glassware, such as chimneys, bottles, etc., to be developed it is necessary to have trained labourers, and as such workmen are very few at present, the apprenticeship system ought to be adopted in the glass factories where there are blowing departments, by giving money grants-in-aid with the condition that such factories should turn out every year a certain number of trained blowers.

The Commercial Intelligence Department has done great service in promoting this industry, and trade journals have also assisted in getting many customers to Firozabad from all parts of India.

(*Mr. Framroz did not give oral evidence.*)

BANKIPORE.

WITNESS No. 39.

(1) PROFESSOR H. MAXWELL LEFROY, *Imperial Silk Specialist.*

(2) MR. E. C. ANSORAGE, I.C.S., *Officer on Special Duty (Silk).*

(3) MR. M. L. MACNAMARA, *Director of Sericulture, Kashmir.*

ORAL EVIDENCE,* 17TH NOVEMBER 1916.

President.—Mr. Ansorge.—I understand that this report† has been prepared in conjunction with Mr. Lefroy?—Yes.

There are one or two points in that report that I should like to take up first. Do I understand that the present imports of silk and silk goods into India amount altogether to something like 4½ crores?—Yes, something over 4½ crores.

And you are under the impression, therefore, that the demand for silk is large enough in India and you are also under the impression that the resources of India are sufficiently satisfactory to permit of our developing in the country a silk industry that will largely meet this great demand for silk and silk goods?—I think a considerable amount of the imports can be made straight off if the markets are kept in touch with each other, but another large portion of the imports can certainly not be made at present. They require the setting up of entirely new branches of the industry,—I mean for printing it and so on.

Is it correct to assume that, in order to develop a silk industry in India that will largely meet the total requirements of the country, we shall want a re-organization of our methods of marketing and also of the whole system of control and management of silkworm rearing?—I think most certainly. At present the position is that an extremely badly organized or an almost unorganized industry is competing with highly organized industries in other countries and can not practically put up a fight at all.

And is it right to assume that among the causes of the comparatively high prices of silk the cost of freight from other countries is relatively unimportant, in other words the present freight to India does not act as a sufficiently protective tariff?—That certainly does not act as a protective tariff, because the Japanese goods are now able to undersell Indian goods of more or less exactly the same kind.

When you are dealing with a cheap article like coal or limestone the cost of freight is such a big fraction of the total cost of the article that the freight almost becomes a protective tariff?—Yes.

In the case of silk am I right in supposing that freight is only a small fraction of the price of the article?—I think so.

And consequently if you are going to meet foreign competition we ought to have a re-organization of our methods?—Certainly.

Can you give us some assurance that the organization is possible and that there is some hope of our achieving good results if we do attempt anything like an organization?—I think it is rather difficult to say whether it is possible or not at present without trying first of all, or making some experiment of organization, which is partically not being done, of bringing the markets into touch with each other and so on.

Mr. Lefroy.—In the matter of dealing with the growth of silk worms and the cultivation of mulberry and the other things you require, are you also optimistic that we might in India bring about a production of silk sufficiently large if we had the business organization to meet foreign competition?—I think we might do it in time and I think it would be an easier thing to do than the organization required to meet outside competition for silk fabrics. It is much easier to develop silk production than weaving and the processes necessary for cloth production, and I should like to supplement Mr. Ansorge's answer to the previous question

*Written evidence of (1) printed after oral evidence (2) and (3) did not submit written evidence separately.

†Report on the present condition of the Silk Trade of India, by E. C. Ansorge, I.C.S., Officer on Special Duty. Not printed with the evidence.

where he said that he was sanguine that we could possibly compete, but it has not been tried yet. The decisive factor is one we do not know yet. How is it that Japan is able to produce so much more cheaply than India?

Until we have a real answer to that I do not think we can express an opinion. Everywhere in the silk cloth business Indian trade has suffered largely because of the extraordinary cheapness of Japanese goods. We do hot know whether it is due to superior organization or cheaper labour or better methods.

In your opinion is India a suitable country for the development of raw silk production?—*Large tracts of India are suited—very definite tracts that can be almost shown on the map* to the production of a much greater quantity of silk than is now produced.

And you are hopeful then, if our methods are improved, of getting India to produce a seriously larger proportion of its present requirements of raw silk?—Yes. I think we can certainly produce, say, 30 to 50 per cent. of the present imports by developing the silk production on quite reasonable lines.

Supposing one agreed that this country were suitable for the production of raw silk, what form of Government organization would you sketch out?—In the full report which is not yet available I have gone into that in detail. Roughly what we sketched is the provision of expert advice for the whole of India as to the best methods of having improved silk worms, secondly a centre under the control of the Government of India from which the best seed should be available, and thirdly in each province a local organization corresponding to the Deputy Director of Agriculture to do the actual developing work in that province.

That is with regard to the production of raw silk only. In addition to that you want mulberry?—That includes the growth of mulberry.

Can you roughly, sticking to raw silk only, for the time being, give an idea of the staff that would be necessary, that is, the quality and quantity of the staff that would be *required?—I think we should want one European officer under the Imperial Government* whose chief function would be advisory and who would be in charge of the central seed-producing station. *Then it varies with each province.* In Bengal we urgently want a European officer to be in charge of the present scheme which is going on. In the smaller provinces like the Punjab, the services of a European officer are not needed. A man of the class of the Entomological Assistant is wanted there. The same is the case with Bombay. The industry there is not big enough at present and the development can be carried on by subordinate officers. In Mysore we must have a first class European officer to organize the industry there. In Madras, I think, the industry is big enough and the prospects are big enough to justify the same. As regards the Central Provinces, there is very little prospect of anything and until further investigation is made I would not attempt anything, but I would do experimenting with people under the control of the Imperial officer. The United Provinces at present have done nothing. I would, therefore, experiment first under the control of the Imperial officer only for raw silk production. The experimenting work can be carried on by native assistants under the Imperial officer.

Is there any silk growing in the Native States of Central India?—There is some experimenting. You cannot call it more than that. I think the States of Gwalior, Bhopal and Indore are at present experimenting, and nothing more than that.

I understand that if people are allowed to grow silk-worm as they please without any strict control there is a danger of disease spreading throughout India?—There is no danger of further disease. Every part of India is infected with disease.

Except Kashmir?—Yes.

I am putting that question to you because I should like to know whether if an organization of this kind were instituted there would be any necessity also of having any kind of restriction as to who should do silk-worm growing?—I do not think there should be any restriction at all. In Bengal a great deal has been done for the industry especially from that point of view. There is at present no restriction and I do not think that any restriction is ever possible or desirable.

That is so far as the growth of raw silk is concerned. You want one Imperial officer two or three European assistants and something like five or six juniors?—Yes.

And you think that that staff would be sufficient to deal with the organization and production of raw silk?—At present.

Would they work in co-operation with the Forest Department in the matter of mulberry growing?—Except in Burma I do not think that there are any possibilities in connection with the Forest Department. Burma is peculiar. The Forest Department has already started to develop silk-worm production.

But I suppose mulberry trees would have to be grown in fairly large quantities?—Yes.

In suitable places?—Tree mulberry or bush mulberry.

And this work would require some one with a knowledge of forestry?—It is not a question of forestry so much as ordinary agriculture.

Would you add to this staff a number of men to assist in the development of mulberry plantations?—No, because the same man who is developing mulberry silk growing is also capable of doing mulberry silk planting.

This really represents the total Indian demand in the way of staff to encourage the production of raw silk?—Yes.

In addition to this I suppose we shall want a certain number of officers to develop an organization with regard, first, to the preparation of silk spinning and weaving, and afterwards to marketing?—Yes.

Cannot these additional officers be linked together with what we might call the production officers, in one department?—I think it is necessary to link them together. It would be a great advantage if the organization that is to help silk weaving is in very close touch with the organization *that is developing silk production.* The reason is that the silk producer in India must be producing with an eye especially to Indian markets. If you have a separate organization for raw silk production distinct from the other organization, you would not have that correlation which is necessary, and I regard it possible that the two should be under one co-ordinating officer.

It would be a thoroughly different type of officer that would be encouraging the development of silk weaving and spinning?—Yes.

And one has to realize the difficulties of employing men of different types without providing for them some prospects of promotion?—Yes.

Would it be, for instance, possible in this spinning and weaving section to have a staff including young men who might look forward to a reasonable career in that work?—I think that in developing this we have got to go a little bit away from the ordinary ideas. I have sketched here in some detail the organization that I would suggest for developing silk weaving, twisting, dyeing, and I deliberately propose that these men, each of whom would have a very specialized job, should from the start be given a rate of pay varying over sufficiently wide limits to give them an increase of pay, so that they would not require promotion in any other way. My idea of this thing is to specialize enormously, to have one assistant who would do nothing but dyeing and whose pay should be on such a level that he would not look for promotion elsewhere.

Have you drawn up a sort of proposition statement?—*I have a very detailed proposition* statement in a section of my report. Unfortunately it is not yet out of the press.

For the time being, what I would like to know from you is whether it is possible to form a sort of self-contained sericultural department including those who are encourging the growth of raw silk, those who are fostering the spinning and weaving industry, and with them, those who are developing the methods of co-operation and trade organization?—That is the scheme that has been planned.

Is there any way by which you can think of some of the specialists belonging to other departments being lent for silk especially, or is it better that they should be constituents of one sericultural department altogether?—I would prefer them as belonging to one sericultural department which was concerned with nothing else. At present, we have in India a number of assistants who are concerned with textiles, or as weaving masters and the like, and the result usually is that in most of the provinces cotton, being the biggest thing, gets most attention and I have also found and it is experience based on a large number of people that it is difficult to get men who have a minute knowledge of the processes required for cotton and silk together, because one of the features of the Indian silk industry is its extraordinarily minute subdivision, and also the conditions in which it is carried on very very much so that what I am picturing in my mind is that each man should have nothing to do but with his own special subject in silk only. I do not think you can have satisfactory dyeing experts for cotton, wool and silk.

There are a good many problems in common, I suppose, in the matter of dyeing especially?—Yes.

Supposing we have, for instance, in India a big chemical department composed of chemists of all kinds, among them being specialists in colour chemistry and dyeing chemistry, would it be better that the silk dyeing experts should be members of that chemical department, or should they be fixed members of the sericultural department?—In my own personal opinion I would rather have an assistant who was delegated to the silk department and was kept there. But it is a very difficult question to answer.

The difficulty in your mind, as it is in my mind, I suppose, is that in a small department for the time being it is difficult to provide for a man sufficient prospects to retain his services throughout a reasonable part of his life. But if he were a member of a large department—I am speaking now of colour chemists—like the chemical department, his promotion

would go on in the chemical department until he reaches a stage when he may be required for special branches. In the meanwhile the younger officers of the specialist kind would be coming and taking up silk dye problems. You have not thought out these proposals sufficiently to give a definite opinion as to which you would prefer ?—I have two or three cases in my mind and my experience has been that it is not a good working system in India to work in that way. I have had occasion to try and get assistants from chemical departments and I have found it more satisfactory to try and have my own man and not to have to depend upon getting somebody else. My opinion may be worth very little, but my particular experience has been in favour of having your dyeing expert attached to your silk department and kept there.

At the end of ten years this expert is beginning to get a little senior and then you feel that unless you can offer him prospects in your own department of promotion to such an extent as to satisfy his reasonable ambition you would find it inconvenient to have a large number of experts of different kinds grouped together ?—There is another difficulty which is entirely a personal one to myself, and that is, if you had a central chemical department from which one could get, say, a colour chemist to organize and become an expert in the dyeing of silk, each time you have a new man you would have great difficulty in impressing him with your ideas as to policy and the way of doing things.—I do not mean technical methods, but the general carrying on of the work. My own personal belief is that if you have a suitable man as the head of the department it is better to let him have his own man and train him or send him for training. If at the end of ten years, say, he is fit for higher work I should expect to be able to pass him to other departments.

If a man is a junior chemist advising the sericultural department he is not likely to regard his position in the same way as when he is a member of the chemical department and can rise ultimately to be the Chief Chemist to the Government of India if in addition to his specialized work he is able afterwards to show administrative ability. Is not that worth considering? — That is a distinct point. But in my experience there is an item in India which one has got to take into account, and that is the fact that, as a rule, these scientific assistants would prefer to stay in a department which they like under an officer who has trained them and they think more of that, as a general rule, than of getting possibly higher pay and promotion to another department and also possible to another part of India.

Have you in your proposition statement made out the total of the initial cost of this department, first in salaries and secondly of equipment ?—The total in salaries is Rs. 99,000. That is when the full scheme has been worked up to. I reckon the non-recurring expenditure at Rs. 4,33,000 and the recurring expenditure apart from establishment at Rs. 81,000.

You begin by an outlay of 4½ lakhs and at the end of five years the department would cost two lakhs a year ?—Yes. But this is entirely for the Central Department. This is not taking into account the expenditure in the provinces on developing either the production of silk or the improvement of silk weaving. This is solely my conception of the expenditure on the central or imperial department which is to organize and advise for the whole of India. The provincial expenditure is not taken into account.

You have not made a detailed proposition statement for the provinces ?—No.

What salary would you think that your Imperial sericulturist, or by whatever name you might wish to call him, should reach ultimately ?—I think Rs. 2,000 a month.

Beginning at Rs. 1,500 ?—That would depend upon his previous experience and so many other things which I have not considered.

You are of opinion that this expenditure on behalf of the Imperial department is justified by the prospects you see ahead ?—I would like to qualify that. With regard to silk production I think that the expenditure is justified provided the policy is that the industries ought to be developed whether there is any demand for the industries in this country or not. My feeling is that if the production of silk is going to be developed in India to the extent to which it might be done reasonably, it will have to be done to a very large extent against the wishes and feelings of the people concerned, so that if one is to go on the policy that naturally the development will take place, then I do not think that this expenditure is justified, but if the policy is that from outside as it were the development of the industry is to take place without there being any call or demand for it in India, then the expenditure will be amply justified.

Would it not be fair for me to conclude that nobody wants to be educated, and still you consider it worthwhile to spend money on it ?—There is no doubt whatsoever that the silk weaver and dyer would more than welcome a scheme such as I have tried to frame and it would attempt to bring him real help.

When you say that you do not think that the people of the country will ask or clamour for this organization you mean by that that they are at present insufficiently educated to be otherwise than indifferent ?—I think in some cases it goes further than that. Attempts to stimulate silk production where we have very good reason to believe that it would be of material benefit to the people are in the first stages opposed, and opposed at times sufficiently strongly. Although we say that the families are going to get Rs. 20 extra, their prejudices at the start are so strong that it is impossible to get the development going. Once the thing is a success all these prejudices disappear.—I am referring particularly in my mind to Kashmir and the Punjab.

Are you under the impression, then, that before anything like a scientific development can take effect we shall have to acquire some powers to enforce regulations ?—No. I do not think that any enforcing is required. I rather take the view that it is open to question whether we should attempt, for instance, in the Punjab, to develop silk industry which in the first stages is repugnant to the people themselves. It is not the question of legislation, or pressure, or compulsion, but there is something beyond that. For instance, the United Provinces would be an admirable area for silk production, and we have everything in our favour, and we know that it would be a great blessing to many classes of the people if they had it. Yet I should hesitate, because not only the United Provinces do not ask for it, but in the first few years we should have to face deliberate opposition.

On the part of the silk people themselves ?—On the part of the classes one would expect to grow silk worms.

Not the educated leaders of the people ?—To some extent.

What do you think is their reason for opposing the development of an industry that would obviously bring wealth to their people ?—It is largely from a large class of people in this country to whom one feature of the silk producing industry is repugnant, the killing of the cocoons. When once the industry is shown to be paying and really helpful, these scruples go out, but until that stage is reached one is working undoubtedly in opposition. This does not hold with the silk weaving business. You will see that in my proposals I do not advocate the starting of silk production in the United Provinces. I propose to do it in the Tirhut district of Bihar and Orissa and in the Punjab, and try to develop it and hope that it will spread gradually into the United Provinces from outside.

Where silk rearing goes on now in Bengal do you find the same prejudice or the same scruples about the killing of cocoons ?—No. In Bengal the industry is mainly confined to Muhammadans two-thirds, and to Hindus one-third. There is a sufficiently high proportion of Hindus who do it and benefit by it. Kashmir is very predominently Muhammadan.

You definitely recommend the Government of India to set to work in organizing a department of the kind you have just sketched out ?—I do not recommend it now. What I say is that, allowing for those facts, it seems to me reasonable that the expert organization that would make this possible should be provided, but in the absence of a demand from the leaders of the communities in those places it is not desirable to develop.

Can you give us an idea of what we ought to do now with regard to raw silk production ?—The first thing is the re-organization of the industry in Bengal which is a perfectly easy thing. It simply means the appointment of a European officer who will utilize the present resources for distributing seed and for better ways of silk worm rearing. There is an exisiting industry there which simply wants improvement By simply issuing better seed we can immediately raise the yield of silk in Bengal by 50 to 100 per cent. without drawing in any more people or anything of that sort. If that was done the earnings of the silk weaver would be sufficiently great to bring back a large number of the weavers who have left the industry. Mysore is pretty much the same. The chief improvement needed there is the issue of a better kind of seed which is really free of disease, and this is a matter of organization, I think. As regards Kashmir I think nothing can be done for it except what they are doing to increase the number of trees available. If there were more trees in Kashmir more silk would be grown. Then there are the areas where silk does not exist at all or exists in small quantities. For instance, in the Punjab there is very little silk industry and the question there is one of planting trees. If trees were available in the Punjab they could go on gradually increasing the industry. We cannot in the Punjab use the methods that are used in Jammu where the industry has increased ten times within the last seven years. The main thing in the Punjab is the production of trees and the organization necessary to keep it in touch with the people. As regards Assam and Burma the same thing is required as is required for Bengal and Mysore. They want better ways of rearing which are available but they do not know them. That would be quite easy. Then there is the rest of India where at present there is no silk industry. If we are to develop them we should have to go to work deliberately to find places where there are suitable population and suitable climate, and we should there have to plant mulberry, and we should probably have to subsidize a certain number of people to take up the industry in the first instance and then gradually make the industry to grow up to a point until we could see whether it was going to succeed or not. Unless I take a great deal of time I cannot go in very great detail into these matters The methods in different places are slightly different. During this year Indore, Gwalior, Travancore and other places have made a beginning on those lines.

That leads me back to your proposition statement. I do not see how you are going to do this effectively unless you have provincial officers to refer to and so far as I can see, also an Imperial officer to unify the whole work ?—If you limit the development to the present areas, Bengal, Mysore, then practically speaking, an Imperial officer and his staff are not required.

Would you get the right kind of officer to go and take up the Bengal problem ?—I think so. I think, in fact, we have. They have had in Bengal for some years a French expert who has done good work. He gets Rs. 600 a month.

You expect him to rise to what will keep him ?—Nearly to Rs. 1,200.

That man might ultimately grow into an Imperial officer ?—He might.

For Assam ?—For Assam, Burma, and the Native States that have already started experimenting on their own lines, I do not think they are justified in having the whole-time services of a really competent expert.

The Assam officer could not very well devote his time to Travancore and Central India ?—No. But you could have in Assam a man of the type of the Assistant Entomologist in Pusa—a man whose pay begins at Rs. 100 and rises to Rs. 300 or 400, and he could carry on his work with a visit from the Imperial expert. You could not expect Assam to pay Rs. 1,200 to Rs. 1,500 a month.

Would you put him under the Bengal officer ?—Yes. But it is very difficult in actual practice. It would be difficult to devote his time to two departments. It would be better to have one Imperial officer for these isolated places.

Would you not put the Bengal officer under him ?—I would put him in the same relation as for instance the provincial agricultural officers hold to Pusa.

Where would his headquarters be ?—The headquarters of the Imperial officer will be, I imagine, so far as raw silk production is concerned, probably in Shillong. It is a question of climate. There are only four places in India where it could be. Shillong seems to be quite suitable.

It should have a laboratory and establishment ?—It should have a small establishment for growing mulberry and producing the best sorts of silk. For the present, while the industry is a small one, I should have in the Punjab an assistant such as we have at Pusa. The assistant that I have in my mind at present draws Rs. 200. He is an Assistant to the Imperial Entomologist at Pusa. If the industry showed that it was going to become big enough you could have ultimately an European officer. At present the industry is not big enough to justify it. Provided that your man can fall back on somebody else whom he would be able to ask whether he is proceeding on the right lines, he can do the work while the thing is small.

That is for raw silk production only ?—Yes.

You told us that if possible the weaving and spinning experts and even the dyeing experts should be associated with the production specialists ?—Yes.

You want to develop both these at the same time ?—Yes.

What establishment would you provide for that?—For this I have provided an assistant director who might be an expert either in raw silk business, or in weaving, twisting and dyeing. You have to get two places and two men. The headquarters of the weaving institute can not possibly be in the same place, at least we cannot find one. So that I contemplate another headquarters at a centre like Benares and I would give them this establishment which I have planned [witness reads from his notes a number of appointments], and these would be paid salaries varying from Rs. 200 to Rs. 600 a month.

You begin with them at once ?—I imagine it would take a couple of years altogether.

There is an immediate demand for them ?—Yes, and I think they can be got.

With an establishment of that kind linked together with the production establishment such as you have sketched out, don't you still think that there is room to have an Imperial officer for the whole lot ? —An Imperial silk expert ? It will be necessary.

Is it any use attempting to provide a small establishment for Bengal, another for Punjab, of a certain number of weaving and dyeing men unless they are all under the direct control of some Imperial officer ?—I think there must be a central establishment.

So that we have come back to the original proposition that if you are going to have this machinery at all you ought to have with it a central sericultural department ?—Yes. But it is possible to have that central sericultural department without having any raw silk organizing department.

We have been playing for too many years. If we are going to do anything to revive this industry, having made up our minds that it is worth developing, there is no use at all in adopting half measures. We should set to work on a scale that will ensure some degree of success ?—I think so. There is another point of view which appeals to me a great deal. Personally I should be inclined to start with the Imperial silk expert, giving him such organization as he could use for developing, twisting, dyeing and weaving and all that side of it, and also allow him and his staff to develop silk in new places where there was a demand for it. Instead of pushing it, wait until the demand came ; and my own impression is that

in a few years it may be possible to educate public opinion in India to the realization of the beneficial possibilities of silk as an industry, especially for well educated young men who are able to command a small amount of capital. If we can once get that, development would be much quicker than any process of pushing.

It would be better to begin with the central department of sericulture ?—Yes.

And you might develop the offshoots that would appear to help its growth ?—That will be the idea.

Are you free to give us an opinion as to what has been done by the Salvation Army ?—I am quite willing to give an opinion. I have dealt with it in great detail in my report. I have no objection to the publication of my opinion. I think that on the whole what the Salvation Army have done has retarded the development of sericulture rather than helped it. I say so quite deliberately, and that is for two reasons. One is that the statements of the Salvation Army are enormously exaggerated. They give an idea of the possibilities of the industry which are not in accordance with the facts, and the result has been twofold. One is that the Native States, particularly, have started to develop sericulture in ignorance of the proper conditions and in ignorance of the proper methods, and have failed, and every failure means that that Native State will not try it again for a long series of years. Had they tried on the best principles and met with failure we should know that sericulture in those States was not possible. In a number of cases they have tried on wrong lines and the failure was due to wrong methods being adopted ; that is to say, the Salvation Army have prevented the possibilities of development hereafter. The second thing is that they have provided men to organise the industry in the Native States and elsewhere, who have from the start gone on wrong lines, that is to say, they have not provided the expert assistance which they claim to have given. They do not really know sufficiently about the subject to be able to advise. I have come across efforts, misguided efforts, which might have been successful if they had been properly organised. I have dealt with many of these in my report and I have come to the conclusion that the Salvation Army has been entirely hindering the development rather than otherwise. There is one other thing I wish to say and that is quite generally. The last efforts of the Salvation Army has been the Simla School. They have obtained money to start the school. At that school the course of instruction is one of six months, which covers the whole ground. It attempts to cover everything about silk. In my own experience that kind of instruction in India is absolutely useless. If I wanted to develop sericulture in India I would take men who were in a position to do it and I would teach them to grow silk worms under their own conditions, or I would teach them silk weaving or silk dyeing or twisting exactly as they would do in their own homes. To take these men and put them through a course of six months on general sericulture and then expect them to apply their knowledge is impossible in India, and the Simla Silk School is doing no good to the industry whatsoever. I have no quarrel with the Salvation Army if they start any school, but when they come to the Government claiming that they are going to revive the silk industry through this school, then I come in. I only saw one place in the whole of India where I consider that their methods of growing mulberry and rearing silk worms are good. In all the other places I consider that their methods are entirely wrong. That one place is Travancore, and that is the only place I have been able to note with approval.

You have seen their work at Changamanga ?—Yes. It is a thing which might have very serious consequences in India had we started the development of sericulture on that line. They show the futility of trying to grow silk worms on that system and yet they claim that it is the system on which to grow silk worms.

Would you give us a short sketch of what has been done at Changamanga ?—At Changamanga there is a forest of 10,000 acres of mulberry and the Salvation Army erected large houses for growing silkworms in. They had about six large buildings, each capable of holding fairly large quantities of silkworms. In order to feed the silk worms and look after them they had their servants housed in tents and other places. It should have given a crop of 100 maunds and a maund costs Rs. 50, and therefore the total value of the crop was Rs. 5,000. I asked Commissioner Booth-Tucker what his expenses had been on the buildings and the general upkeep apart from the expense of beginning his staff, and he told me that it had been over Rs. 5,000. Now it is not business to do that sort of thing. That simply shows that it does not pay you to do it. All over the world it is now recognised that to attempt to grow silk worms in large houses in great numbers together is to court disaster. The biggest experiment that was ever made failed for that reason, and I consider it a mistake to demonstrate and publicly advertise a system of growing silk worms which is known not to succeed. Last year Chaugamanga lost three-fourths of their crop and their total loss must have been Rs. 3,000 or 4,000. Chaugamanga is situated on a tract where the hot weather comes in with hot dry winds. I understand that this year they lost about 25 per cent. Instead of getting Rs. 5,000 they got about Rs. 4,000. Considering the way in which that is boomed in the press and elsewhere I call it a mistake. It does harm and does not do good. It is a mistake which tends to mislead other people.

Dr. E. Hopkinson.—Mr. Lefroy.—You said that the Salvation Army obtained money from Government for this school in Simla. Was that money obtained without reference to the Agricultural Department?—I think so. It might have been referred to the Agricultural Department of the Punjab. I should not have known it. As a matter of fact, it was obtained before I came out to this country.

Generally speaking would mulberry trees be grown in concentrated areas or would they be spread?—You can grow mulberry practically in any way you like. It is grown in Bengal as a field crop. It is grown in Kashmir as a wild tree scattered over the tract.

I take it that the organization required for gathering and marketing the crop would be considerable?—Not for the marketing of raw silk. Raw silk finds a market in India at once, and there would be no difficulty in disposing of the actual crops. If it is started in a new place you would require help at the start. You can sell as raw silk or cocoons.

You spoke of the machinery for developing silk manufacture being a more difficult matter than for developing cocoon growing?—Do you wish us to infer that India might become an export country for raw silk?—I think ultimately India might, but seeing the enormous amount of silk cloth now imported into India, I should first try to develop and produce that in India. I think India would not become an exporting country in silk manufactures apart from raw silk for certainly a long time to come. I would try to help the development in the direction of producing what we now import rather than attempting to export.

Is all the raw silk produced in Kashmir used in Kashmir?—It is all exported. At present there is no utilization of Kashmir raw silk in Kashmir at all. The Kashmir people wind the raw silk.

And then it is exported?—The greater part of the Kashmir silk (I speak subject to correction) goes to Europe. It is so fine that as a rule India will not use it.

You spoke of a number of officers and experts that you would require for developing sericulture. How do you propose to obtain them? What sort of training would they have?—I should propose to get young men of good education and train them myself. I do not think it is possible to get men at present with expert training. I think that a greater number of the officers will have to be trained. It is impossible to get trained men at present.

You mean from home?—Only two men from home. The bulk of them would be Indian. Would you go to the Universities for such men?—I should accept a degree, probably in science from one of the Indian Universities, and for the rest go largely on my own personal experience of the men.

Mr. A. Chatterton.—Mr. Lefroy.—Are cocoons exported from India, or were they exported?—They were exported. It is suggested that there ought to be two organizations for the development of sericulture, one for the agricultural side that is the production of raw silk, and the other for the industrial side each having a different personnel as they would have to deal with a totally different set of problems. The two can be dealt with quite separately. I am personally in favour of combining them under one head if possible, because I look so much to trying to develop production in India of good qualities of raw silk to be used in India, and ordinarily speaking, if you separate the two branches completely it would be difficult to get that.

In the provisional organization, would it not be feasible to have two officers, one dealing with sericulture and possibly attached to the agricultural department, and the other dealing with the twisting, dyeing and so forth attached to the department of industries?—Yes. It is quite easy to co-ordinate both, provided the co-ordination comes from somewhere.

I should like to ask you whether it would be difficult to get an Imperial silk officer with the necessary training on the textile side of the subject to be able usefully to direct operations which would be necessary to put the raw silk on the market in the most favourable condition?—It would be. It is almost impossible to get the man. I take it, it would be possible within four or five years to produce the man. My main conception of the thing is, supposing a man was found who had the necessary qualifications for the production of raw silk, he could get his experience and learn about the industrial side of it and gradually develop it.

Do you think it would be better to have two separate experts, one independent of the other?—No. I propose to have two European officers as Director and Assistant Director. One of them will start with industrial experience and the other with the experience of producing raw silk, and each will get the experience of the other in their particular lines of work.

President.—Mr. Lefroy.—Would you like to make any supplementary remarks?—It is impossible for us to go into the details or the merits of any proposal in connection with a specialized industry, but we are studying these things, with a view to finding out what additional Government machinery or what organization of the present Government machinery would be useful in the industrial development of India. If we wish to go further into the subject we shall have to do that afterwards. Now we get a picture of how, for instance, the silk industry can be improved. When will your report be ready?—I think the whole report will be ready by the end of the month. I do not think I have anything else to say. I could not say anything which would not be found in my report in fairly full detail.

President.—Mr. MacNamara.—What is done in Kashmir State to promote the growth of silk-worms?—We prohibit the growth of silk-worms from any but our own seed and also imported seed. We do not allow anybody to grow silk-worms otherwise. It is absolutely probihited by a State order, accompanied by a penalty for breach.

You therefore provide the people with the necessary seed?—Yes. They get seed free.

And is there a fixed price for the cocoons?—We pay them Rs. 15 per maund for the cocoons.

The silk is sent out of the country?—Most of it. The inferior quality is chiefly sold in India. The finer quality goes abroad. We are selling cocoons for Rs. 70.

What would be the freight Home?—About one per cent.

Mr. A. Chatterton.—Mr. McNamara.—Is there a considerable loss in cocoons by the time they get to Bombay?—The cocoon dries up to practically one-third.

President:—Mr. MacNamara.—How long has that system been in operation?—For 18 years.

Organized by Sir Thomas Wardle?—Yes.

Do you think it is possible to organize anything of that kind in British India?—I have no experience of British India. My experience is limited to Kashmir.

It means the forcible growth of a certain class of seed?—Yes.

No one will be allowed to grow a seed of the kind that is now freely grown in India?—No.

Mr. Lefroy told us that if silk were grown in India there would be a ready market for it in the country, but I understand that Kashmir silk is largely exported?—Yes. The fine size which is practically used in Europe is not used in India. The inferior quality is used considerably here.

The better quality you export?—Yes.

Would there not be a market for it in India?—I do not know.

Is it exported ordinarily in the form of cocoons or spun silk?—Raw silk.

Are you at liberty to give us a sketch in writing of the silk industry in Kashmir?—Mr. Lefroy has already got it.

Were you trained as a silk expert before you came out to this country?—I got trained in Kashmir. I have been there for the last 15 years.

You have grown up with the silk industry largely there?—Yes.

Mr. A. Chatterton.—Mr. Lefroy.—Is it not a fact that in France and Italy silk growers are only allowed to use the seed which has been certified or passed?—Yes.

Is it also the case with Japan?—Yes.

President.—Mr. Lefroy.—Do you think there is any hope of developing the silk industry unless we regulate in this way the use of seed?—It is a very difficult question about which we know very little. But we have come to the conclusion that European conditions do not apply to India. For thirty years in Bengal they have been working on wrong lines, because they apply to Bengal what holds good for Europe. In Europe there is only one crop while Bengal has continuous crops, and the supposed disease-free seed in Bengal is not and never has been disease-free. Mr. Hutchinson of Pusa took up this year my suggestion and he has found that the methods of Bengal are fundamentally wrong because the thing was not studied in India, and we cannot say if we can produce disease-free seed in India. You can import, but not the variety of seed required for India. Kashmir is the only place which grows seed. Mr. Hutchinson has given certain results but they require working up. I do not think it is feasible to regulate the industry in India as it is regulated in Kashmir. Kashmir is an isolated country. It will be excessively difficult and impossible without an enormous police staff to prevent the Mysore and Bengal silk weaver having his own worms. You could not do it in practice.

Because of that, you do not advocate it?—Also we have not as yet understood how to get disease-free seed.

President.—Mr. Ansorge.—Would you like to add any thing?—You were speaking before about our recommending a silk institute as a whole. I think as regards the portion of it which concerns industries, until we know something about the methods of the industry in Japan, we can hardly recommend anything being done.

Would you recommend a deputation to Japan?—I think it is absolutely necessary.

Do you think you will get full access to all the information?—It might be difficult. What we do not know about Japan is the fact of how they are able to produce the thing so much cheaper than in India, whether it is due to co-operation, whether it is due to the fact that they get better crops or cheaper labour, whether the labour when got is more useful. I do not see how we can compete with it unless we know all about these things. We might improve by organizing the industry, but how can we compete with Japan without knowing about them?

Mr. A. Chatterton.—Mr. Ansorge.—In the course of your enquiries did you get evidence as to the high cost of rearing silk in India being due to the fact that a large percentage of worms die of disease?—No. I am afraid I have not. I have no knowledge of how much has been lost in rearing. I had really nothing to do with rearing at all.

I think, that is at the bottom of the high cost of production?

President.—Mr. Lefroy.—You all three think that there is not the slightest chance of our stopping this import of foreign silk, unless we have a proper establishment of scientific advisers devoted to silk industry?—Yes.

Do you think the prospect warrants a considerable expenditure on staff and organization?—I think it is worthwhile. Unless there is a continuity of policy on the part of the Government there is no use of starting.

You think that unless the experts are members of well-organised and permanent departments of the Government of India you will never get the best class of scientific officers to undertake work in this country?—In this case continuity of policy is essential. There are very many cases where scientific research work could be better done with short time employees.

You think that these short time appointments would be better organized in conjunction with the establishment of the Imperial scientific departments?—Yes. In twenty years you can get good results; but the budget should not be minutely subdivided. The silk business is a new thing and the officers should have a good amount to start with.

Mr. H. Lefroy.

PROFESSOR H. MAXWELL LEFROY, *Imperial, Silk Specialist.*

WRITTEN EVIDENCE.

(*Submitted after oral evidence had been taken*).

The questions issued by the Industrial Commission have been received and studied. We have tried to frame answers and have come to the conclusion that to do so willbe impossible. For every industry there are peculiar conditions—those of the silk industry are not those of the oil-pressing industry or of the pottery industry: to develop silk the one essential is an understanding of the conditions of the craftsman (whom presumably we are trying to help) if that development has to be brought within the rigid lines of industrial development, as foreshadowed by the Commission, then it is hopeless: success depends on the freedom of organization of the man responsible, on his being able to adapt method to circumstance, on his being able to meet the peculiar need of each community with a separate method: and this cannot be brought within the straight lines of the questions of the Industrial Commission. An organization and a series of methods that suit industries in the average cannot possibly help the silk industry: the greatest difficulty is the personal element and the key to the position is the understanding of that element. To properly develop the industry will require a technically equipped man with some imagination, who is given a free hand and who has the full confidence of Government to bring him within the meshes of the proposed Imperial Scientific and Technical Department will be fatal. For these reasons, I have abandoned as hopeless the attempt to correlate the development of this industry with that of industries in general.

Financial assistance. *Q.* 5 (1).—In the development of silk production, I think that the plan of giving a grant or a bounty is a valuable one, as it makes it possible for a trial of silk production to be made by a zamindar or planter, where the only other method possible would be for Government to experiment, probably at a much greater cost. The amount given is determined by the total loss possible if the production is a total failure; the production is supervised on behalf of Government and if it is successful there is no grant.

(2) bounties and subsidies;

This is discussed under section Legislation.

(7) guaranteed Government purchase of products from limited periods?

This method should be used cautiously in certain developments of the silk industry, had it been possible, the eri silk industry would now be flourshing; and it is a method that has advantages.

Pioneer factories. *Q.* 7.—In the development of silk, pioneer factories are absolutely essential and the method will be most valuable in many places no other method will be possible and it will be the easiest way of demonstrating the value of certain processes. Though not called "Pioneer Factories", the establishment of such factories is recommended for many branches of the silk industry under section Trade Organization.

Q. 8.—This question is answered by the full report. India imports 318 lakhs worth of silk manufactures that could be made in India to a large part owing to the want of organization, bad financing and poor methods; these are not made in India, but Government will pioneer their production. Pioneer factories should be closed when they fail, handed over to private companies when they succeed: but in the latter case they should be watched.

Financing agencies. *Q.* 9.—Silk is very much hampered by the conditions under which the industry is financed: the production of raw silk and cocoons is checked by the producer not being able to get the full advantage of the prices, having to sell when he has a crop. The use of tasar is restricted by the weaver having insufficient capital to buy a stock of cocoons; the reeling of mulberry silk is hampered by the want of capital of the reeler, who is at the mercy of the dealer; the weavers and silk preparers cannot work to full advantage as they cannot buy raw materials or hold their stocks of finished goods for the season when there is a demand (usually the marriage season). Speaking generally the majority of weavers and silk workers work for a very small wage because they are in debt or are slaves to organized employers who have the capital. This capitalist class then hamper development, make exorbitant profits and the Indian silk industry is on the whole at a disadvantage.

Co-operative societies. *Q.* 11.—The silk weaving industry of Burma is being developed by Co-operative Societies; the workers are individually responsible for the society and obtain advances, buy raw material, and are able to sell their own products without the employer's intervention; through these societies improvements are introduced and the production of new fabrics made possible.

Q. 12.—The object of co-operative societies in the silk industry should be—

(1) to supply raw materials;

(2) to deal collectively instead of singly;

(3) to provide improved methods;

(4) to provide facilities for such processes as twisting, dyeing or finishing whereby all can benefit by labour-saving methods not possible to individuals.

Limits of Government assistance. *Q.* 13.—Where private enterprise can do what Government is doing or proposes to do, Government should not compete.

Q. 14.—If a new enterprise proposes to compete with the importation of a product possible to prepare in India, there should be no limitations whatever on the extent of Government aid conformably with the general principles of aid rendered to that industry generally: Government should give the same aid to an enterprise that proposes to compete with an import as to a similar enterprise that proposes to make a new product not imported: it should not give more.

If a new enterprise proposes to compete with an established production or export trade, which already deals fully with the trade, there should be no assistance from Government whatever or the same assistance should be given to both. A concrete case will best illustrate my meaning: if Bengal exports raw silk to the amount of the demand, then the production of similar qualities elsewhere for export should not be aided by Government: but if there is scope for development then the same assistance should be given to Bengal as to any other place.

Technical aid. *Q.* 15.—My experience is limited to assistance given to the silk and lac industries on a very small scale from the Entomological section at the Agricultural Research Institute, Pusa. This section endeavoured to advise industrial development in silk and lac: as a result, the eri silk industry was started and lac production in agricultural areas: the former failed for want of capital and an organization that could buy and ship the raw material: the latter failed chiefly from economic conditions and the fall of prices in the raw product. The general experience in the silk industry was that the provision of technical advice was valuable, was welcomed by the trade but must be backed by financial facilities that were not then available. The technical aid given was of value but was too small to be able to exert any real influence.

Commercial Museums. *Q.* 28.—The Calcutta Commercial Museum will not assist the silk industry: the fabrics shown are either from Government institutions or unusual ones (some already not obtainable) or one class of goods (handkerchiefs): there is no information as to the wholesale quantities and sizes available in most cases; no effort seems to have been made to get a really represenative lot of goods: freak productions from the Imperial Entomologist at Pusa are not the goods that should be shown in what purports to be commercial museum. It is necessary also that the goods should be handled: and there should be some one there who really understands the trade. The commercial museum should either be complete and thorough or not done at all: nearly all the silk exhibits could just as well have been in the Indian Meseum.

Q. 29. Real commercial museums should exist at Calcutta, Bombay and Madras: but each should be efficiently staffed or should be constantly advised as to the raw materials and

manufactures of the country. If such existed, the silk department would be responsible for keeping their information up-to-date and their exhibits complete and representative. If this were done, these museums would really be of value.

Sales agencies. Q. 30.—My opinion is that, as a rule, sales agencies should be worked through ordinary dealers or firms and not through shops under Government control. If there are products of minor and unorganized cottage industries, ordinary shops and dealers will sell them if they are saleable and if a guaranteed supply can be provided. I have no experience but I have visited the village industries shops at Cawnpore for instance, and seen stalls run at railway stations, etc.

Exhibitions. Q. 31.—In regard to silk, demonstration of new methods is valuable if the class concerned come to the exhibition, but I think the same results can be got far more cheaply by direct demonstration. The general demonstration of silk, as a whole, of its possibilities as an industry, of its methods, is as a rule wasted, so far as the general public is concerned. An exhibition of silk processes, to which weavers were brought, would be excellent but would not interest the public. The labour and cost of organizing the Silk Exhibition at Allahabad in 1910-11, for instance, was largely wasted and could have been better applied in other ways.

Trade representatives. Q. 34.—As regards silk, I would prefer to send one special representative than to entrust silk to trade representatives having to deal with all Indian products. The trade representative cannot know enough about each individual thing and while it is sufficient, say, for an oil seed for him to have samples of each of 10 qualities, and know how much of each can be got and where, there are many kinds of silk cloths and products and many others that could be made. If the trade representative knows enough about silk production, weaving and fabrics to be able to push silk, he cannot possibly know enough about all other trades.

Supply of Government owned raw materials. Q. 40.—Raw materials should be rendered available at the lowest price they are produced at but not at reduced rates, i.e., it is reasonable to take steps to supply a village with raw silk at its current price if they are, owing to isolation, paying too much: but it is not reasonable to supply it below the price it sells at where it is produced. If spun silk costs Rs. 5-8-0 a lb. at the mills and Rs. 6-8-0 through the village dealer, I would supply the village at Rs. 5-8-0 plus freight through a co-operative society or other organization.

Land policy. Q. 41.—This question was an important one as regards silk in Bengal but is so no longer probably: it will be troublesome probably if the industry is increased in Bengal.

Training of labour. Q. 44.—The institutions at Amarapura, Serampore, Bara Banki, Benares, Bangalore, Simla, Ludhiana, Pusa, claim to improve the skill of the weaver, whether cotton or silk, or of the reeler. These are referred to in the text and particularly in section V, part 2. Only two appeal to me as having any useful influence or as being worked on the right lines. I think there is a fundamental distinction between two principles:

(1) You give a general training in the methods and circumstances of the industry, and leave the pupil to apply his knowledge and better his craft.

(2) You give no general training, but you teach a singledefinite improved method suited to the circumstances of the pupil and no more.

The first method, useful with highly educated people possibly, is absolutely useless in India: the second gives good results when the teacher knows a really genuine improvement. Out of all the training institutions I have visited in India dealing with various industries, I can name only three that seem to me to comply with this condition and that really effect any improvement in the industry in question: these are:—

Amarapura, Silk.

Bara Banki, Silk.

Bareilly, Carpentry.

Official organization. Q. 62.—If the separate activity in all industries is correlated under a single head, in an Imperial department, I do not anticipate any particular progress being made in the silk industry, which from its complexity and variety will require special treatment. The danger in India is a routine red-tape administration applied indiscriminately to all industries, and having regard to the failure of the Directors of Industries in Local Governments, it is unlikely the giant intellect required to correlate industries in all India will be available. It is safe to allow that average intellects and abilities will be available and not to attempt what will require the abnormal: this is especially true of India where agricultural, industrial and technical departments are often regarded as offering administrative posts of a harmless kind to an officer who is otherwise unsuccessful.

Imperial departments. Q. 64.—The constitution of an Imperial Silk Expert's Department is recommended and is discussed in detail in the report. As it entails only two European officers, of special qualifications, and a number of Indian assistants, special recruitment is unnecessary.

Q. 66.—The head of the department shoud have full executive control, have power to appoint and dismiss staff, and be free to transfer money allotted from one head to another. He should be attached directly to the Revenue or Commerce and Industry Department on the same footing as the Inspector-General of Forests or the former Inspector-General of Agriculture.

The silk technological institute, if there is such, should be an independent unit not fitted into any general development scheme for all India. **Technological Institutes.**

Q.—72. It should deal solely with silk in all its branches.

Q.—77. It is essential that the experts should visit foreign countries and study methods there. **Study of foreign methods.**

Government publications. Q. 87.—The special monographs on the silk fabrics prepared about 1900 in all provinces have been of value in this inquiry but I imagine of no other value whatever. The issue of publications on silk industry from Pusa, except as regards the 'Agricultural Journal', are wholly useless and fruitless: they are positively harmful as they tend to produce the feeling that the mere publication of the results is the end: the bulletins on silk-reeling and the like, issued from Pusa, have been wholly useless so far as the actual workers are concerned: they add to knowledge but do not in any way affect the industry or serve any really useful purpose. In the silk industry the mere publication of this kind of information is wholly useless.

Certificates of quality. Q. 89.—The system of granting certificates of quality is one that requires careful consideration and testing and its application to some branches of the industry might be very large and important. Were an export in eri cocoons to be developed or likely to be developed, the granting of certificates might be considered: and a system of stamping fabrics as of pure silk or as fast dyed may eventually be desirable in some branches of the trade. It is a system that is at present wholly impossible and whose value is untested.

Prevention of adulteration. Q. 91.—Penalties should be imposed on the selling of goods containing more than 5 percent. of non-silk as silk goods, or of cataloguing such goods under circumstances such as lead the buyer to think they are silk.

Q. 92.—For purposes of detection, the employment of inspectors, who would normally be the ordinary officers of the department, who would scrutinize catalogues, purchase samples and be able to prosecute on the result of the examination of the department's expert. Further, examination of samples would be undertaken by the department for the public and prosecution would follow where an offence could be proved.

Witness No. 40.

Mr. F. Walford.

Mr. F. Walford, A.R.C.S., M.I.M.E., *Principal, Bihar school of Engineering, and Inspector of Technical Schools, Bihar and Orissa.*

Written Evidence.

The following connected statement bears upon questions 44 to 51, 56, 57 and 60.

Training of supervision. The writer's experience for 16 years, as Principal of the Bihar School of Engineering, has been mainly in the direction of the training of supervisors and subordinates for the engineering establishments of the Public Works Department and District Boards. It is not clear from the questions whether information is desired on this subject, but I may briefly state that, in my opinion, the arrangements in this Province for the training of upper and lower subordinates, estimators, draughtsmen and surveyors, for employment under civil engineers, will before long meet the needs of the Province, so far as they can be met under existing conditions. Improvements to the Bihar School of Engineering have been worked out and submitted to Government and a scheme for a School of Engineering at Cuttack is also before Government. It may be noted that the improvement scheme for the former school includes classes for railway permanent way inspectors and I understand that consideration is being given by the Government of India to the question of so constituting the classes as to meet the needs of all Indian Railways.

Practical training. As an example of the value of a term of apprenticeship to follow a school course of instruction a system introduced by the writer some time ago in the interest of overseer apprentices may be of interest. The system is as follows:—

After completing the school course (4 years) students are placed out under executive and district engineers for a final year to gain experience on actual work of construction. They receive no pay from the officers they serve but are supported by stipends given by Government. The final or upper subordinate certificate is not awarded until after the completion of training and then only provided a favourable report is forthcoming from the engineer under whom the training is served. The value of the training is recognized both by the engineers and

by the students and no difficulty is experienced in inducing the former to take them. Every student who has undergone such training, during the nine years the system has been in action, has secured remunerative employment. Further improvement on these lines is proposed in the scheme above referred to; the school course is to be reduced to three years and the period of practical training increased by a year. Sub-overseers also are in future to undergo a similar year of training.

Training of labour.

I am impressed with the following facts relating to Indian workmen:—

(1) They are, as a body, intelligent, skilful, quick to learn, but unreliable and rather indolent.

(2) The great drawback from which they suffer is want of education.

It is of far greater importance, I consider, that more should be done to remove the latter defect, than that endeavours should be made to improve their skill. My experience is that, when pressed to exert it, their dexterity is not inferior to that of workmen of other countries. The large majority however cannot read and write and it is ignorance, helped by caste restrictions, which has operated to keep them in the same backward state they have been from time immemorial. It is not reasonable to suppose that so large a body of mostly intelligent men does not contain a proportion who, given education and training, would be fit for positions of responsibility, yet our technical schools are filled, not by the offspring of the skilled workers, but largely by members of the educated classes who are by tradition divorced from industrial pursuits. Is it surprising therefore that our schemes of technical education have not been conspicuously successful? It appears to me that any scheme which excludes the hereditary industrial classes can never be completely successful. To improve matters the only remedy is to broaden the outlook of the workers as a class by education.

Indian workmen may be divided into two classes, those who receive their training in commercial workshops and those who are trained in bazars and villages. The two classes need to be dealt with separately.

Workshop trained artisans.

There is no satisfactory or well defined apprenticeship system for young artisans that I have seen in this part of India, except in the single case referred to below. In most workshops the boys are employed on daily wages and they pick up a knowledge of their trade as best they can. Their general education has for the most part been neglected, indeed I have heard it said that it would be useless to attempt to educate them, but fortunately proof is forthcoming that it does immediately repay to educate them.

Some years ago a mechanics' school was started at Beniadi near Giridih in the East Indian Railway collieries. Only lads who have passed the upper primary examination and are sons of colliery employees are admitted. They attend the school for half the day and for the remainder they are engaged as apprentices in the adjacent colliery workshop. They are taught machine drawing, elementary mechanics, mensuration, etc., all through the medium of Hindustani. The late colliery superintendent (Mr. Ward) informed me that the school had more than repaid the trouble expended on it in the superior intelligence and value of the lads who proceed from it; the ex-pupils have proved to be of a definitely higher wage value than the average illiterate workman.

My experience fully confirms the above. Similar artisan classes were started in the Bihar School of Engineering about three years ago. Particulars of these classes are as follow:—

Boys, preferably sons of workmen, are admitted who are above the age of 12 years, provided they are able to read and write. In addition to a trade, all are taught machine drawing and workshop mensuration. The trades taught are carpentry, blacksmithing, fitting and turning, motor repairing and painting. All instruction is given in the vernacular.

At the discretion of the Principal, members are paid stipends of average value Rs. 5 according to the skill attained. The stipend list is revised every half-year and stipends are re-allotted according to progress made in workshop and in class. In addition to his stipend each boy is credited with half the value of his earnings which sum is paid to him upon the satisfactory completion of the full course of training. The amounts are kept in the post office savings bank. If an apprentice leaves before completing his course the whole amount standing to his credit is forfeited. Apprentices must attend the school until they are proficient, the time taken being from 3 to 4 years. Those who show no aptitude for mechanical work are dismissed at any time. Boys who become proficient are placed out with employers and car owners for a final year to gain experience. No certificate is given until a favourable report is received from the employer.

The classes are popular and bid fair to be successful. Several of the lads we have trained have already secured well paid employment. It may be noted that the number accepted for training is small, being 25 only.

A similar mechanics' class is about to be opened in connection with the Tata Iron and Steel Works at Sakchi and another is included in the scheme for a school of Engineering at Cuttack where the apprentices would receive their industrial training in the neighbouring Government canal workshop.

In my opinion, half-time mechanics' schools should be opened in connection with every large workshop and the curriculum should include literary instruction where necessary.

Training of bazar and village craftsmen.

The training of bazar and village craftsmen presents a somewhat different problem. The village workshops are after all the main source from which the industrial army is recruited, yet the problem of improving them, and with them the training of labour, has practically not been touched. During my service in India I have come across but one small effort which I think contains the germ of a correct solution. I will briefly describe it.

About 10 years ago, a former Deputy Commissioner of the Hazaribagh Division (Mr. Radice) started several small village industrial schools His method consisted of inducing a good workman in each village to undertake to train 8 or 10 boys in his workshop in return for a small payment of 5 rupees monthly. The lads receive no wages but are soon able to make small articles the proceeds of the sale of which they are allowed to keep after returning to their master the cost of the raw material used. Literary instruction is an important part of the scheme, the boys attend a night school, if one exists in the village, or they are taught the three R's. in their workshop by a *guru* who is engaged for the purpose.

Some half dozen such schools still exist and have between them turned out a number of useful and literate workmen. I am endeavouring to improve the schools by supplying such tools as the men themselves cannot afford to purchase and by increasing their wages, but so far I have failed to induce the authorities to believe that there is much good in them.

It will be noticed that Mr. Radice's system follows very closely the indigenous apprenticeship method whereby a boy receives his training in his father's workshop or in that of caste relation. It is a small attempt to improve the village training but it represents the first step beginning at the source.

I give it as my opinion that any scheme of improving the training of labour, which is calculated to have any permanent effect on the mass of the workers, should follow on the lines of the indigenous system as closely as possible. The primitive conditions under which the men now live and work, their poverty, crude workshops and tools and the fact that they labour for a market dealing in cheap and rough manufactured articles, must be taken into account. These conditions prohibit any rapid or large advance being made at first but the initial step must be taken sooner or later; and the fact that it can be taken, and at very moderate cost, the Hazaribagh experiment proves.

Industrial schools.

I have observed no advantages to follow from the establishment of industrial schools of the type usually known as such. By this type I mean a school managed by a superintendent, usually a member of the educated classes, who has himself been trained in an Indian engineering school or college. A few tools are got together, including sometimes machine tools, some mistris are employed as instructors, and pupils, mainly of the non-mistri classes, are enticed to attend by stipends. The subjects taught are usually carpentry and blacksmithing and the work consists in the making of joints and in executing a few orders for the public.

Such schools do not fulfil even one of the essential conditions pertaining to industrial schools and are certain to fail sooner or later.

The essential conditions for the establishment of a self-contained industrial school are:—

(1) It must be established in the locality where the industry it relates to is actually being carried on.

(2) There must be a constant and sufficient amount of work passing through the school workshop to afford the pupils the necessary training, which work should be executed as near as possible under trade conditions.

(3) The local industry referred to must be sufficient in extent to absorb all the pupils trained at the school.

Condition No. 2 necessitates there being a business side to every school, which must needs be carried on at no great loss, and also that the superintendent possesses fair business ability. It is in the latter respects that technical or industrial schools are most frequently wanting. Further, given all other conditions, the personality of the superintendent is a powerful factor making for success or failure. An unsuitable man will in time defeat the object of the best of schemes. The rate of wages offered is invariably insufficient to attract men with the necessary technical and business qualifications.

Control of technical and industrial schools.

Although advisable I do not think that the time is ripe for the removal of technical and industrial schools from the control of the Education Department; the educational difficulty pointed out above should first be solved. Rapid or radical changes in education matters are not advisable but in this case I think that, if made at the fitting time with due precautions, the transfer to control by a Department of Industries might be made with little disturbance to the necessary policy of continuity. I may say however that, in my opinion, the Education Department is not well fitted to control technical schools. Their views are tinged too much with 'class and book' methods, whereas the needs of trade and industries should be the guiding factors. Moreover the engineering and allied professions are not considered by many educational officers to be of equal dignity with their own and other learned professions—as I have repeated and have personal reason to know—with the result that one class of school or college suffers by being considered of inferior status to another.

General official administration and organization.

No organization exists in this province for the development of industries. Our chief industries are agriculture and mining, the interests of which are otherwise provided for, and most of the remainder are small or in an embryo state. It has, I understand, been decided by the authorities that these industries are not of sufficient importance to warrant the creation of a Department of Industries. I concur with their decision. The appointment of a Director of Industries, however, was recommended by the Conference of Technical Education which met in Ranchi in 1914 and was subsequently to have been filled by a weaving expert had not the war intervened. Although I agree that the need exists for a Director of Industries, I do not think that the post should be held by an expert. I hold strongly that he should be a business man, who would be the more valuable if he had gained his business experience in connection with the chief industries it is desired to foster. On this subject I fully endorse the views of Mr. de la Fosse which have appeared in the press.

I may remark in conclusion that the title 'Director of Industries' is a misnomer. Directors of Industries do not direct industries but act as advisors on questions relating to industries. 'Industrial Adviser' would be more appropriate.

Note on the proposal for a Technological Institute at Sakchi subsequently submitted by Mr. Walford.

I have been requested to put forward a proposal for establishing a technological institute at Sakchi. I do so necessarily in brief outline as the proposal is a very recent one. It has not yet been thrashed out and is under consideration at the present time by the Government of the province.

The idea generated with Mr. Padshah, representating Messrs. Tata Sons & Co., and has underlying it the desirability of utilising the facilities existing at Sakchi for the training of Indians and others for positions of responsibility in steel works and engineering concerns. The reason for its suggested location at Sakchi is that Singhbhum and other districts are rich in minerals and will doubtless in time become one of the most important industrial centres in this part of India.

The subject was considered for the first time at a meeting held recently at Sakchi, at which were present Mr. Tutwiler, General Manager, Tata Iron and Steel Works, Mr. McWilliam, Government Metallurgist, the Director of Public Instruction, the Deputy Commissioner, Singhbhum, the Inspector of Schools, Chota Nagpur Division, and myself. I was the opinion of this meeting that technical instruction should be given in close association with industry and that there was an opening at Sakchi for an institute devoted mainly to metallurgy. They considered that other subjects, such as mechanical engineering, electrical engineering and to a lessor degree, civil engineering, might with advantage be also taught in it. It was thought that such an institute should serve, not merely the local and neighbouring works, but a much wider field. The main branches of technological study should be confined each to an institute situated in the district where the relative industry was actually being carried on. Whether the institutes should be of provincial or imperial status or whether there should be central institute to co-ordinate the whole seemed to the meeting a matter for the local and India Governments to consider. It was however not considered necessary that an institute at Sakchi should be linked up with any other technical institution, such as the proposed School of Mines at Dhanbad, which would specialize in coal mining. The training to be given at each centre should be complete as far as possible.

In the opinion of the meeting the theoretical instruction should be in the hands of a staff of whole-time professors comprising:—

One Professor of Metallurgy on Rs. 1,200 to 1,500.

One Professor of Mechanical and Electrical Engineering on Rs. 1,200 to 1,500.

One Lecturer in Mechanical and Electrical Engineering on Rs. 300 to 500.

Two Demonstrators on Rs. 150 to 200.

Occasional lectures might also be given by experts from the local works but the practical work of the students and demonstrations necessary during the course would be carried out in the works.

To ensure the resources of the institute being expended only upon suitable and promising material, it was suggested that candidates should be made to undergo a year of selective practical training either at Sakchi or elsewhere before admission. The theoretical course would cover two years and would be followed by further two years of apprenticeship to the profession selected before a diploma was awarded. The admission qualifications would be of the I. Sc. standard, a preliminary qualifying admission examination being held for candidates who had not passed the I. Sc. Examination.

The probability of the students finding employment after being trained was fully discussed at the meeting. Mr. Tutwiler considered that, under present conditions, there was annually from 15 to 20 openings for suitably trained men in Messrs. Tata's concerns alone. He further informed us that it had been decided to enlarge the Sakchi works in the near future to more than double their present size. The numbers accepted for training in the proposed institute therefore would be small in its initial stage and in subsequent stages the numbers accepted would be in proportion to the demand, so far as it could be ascertained.

As the proposal stands at present, the Local Government would control the institute through medium of a Governing Body composed largely of representatives who are engaged in industries with which it would be concerned.

ORAL EVIDENCE, 16TH NOVEMBER 1916.

President.—I understand that you have been practically the whole of your service in India with the Bihar School of Engineering?—Yes.

Did you come out as Principal of the School?—I came out as Head Master.

And then the school was raised in grade?—The school was formerly under the Principal of the Patna College. Since its separation from the College I have been Principal of the school.

What was your training and experience before you came here?—I was apprenticed to a firm of mechanical engineers. At the end of my apprenticeship I went to the Royal College of Science where I obtained the A. R. C. S., I then reverted to the engineering profession during which time I taught evening classes at Ipswich.

Your apprenticeship was then before you went to South Kensington?—Yes.

Did you find that what you learned as an apprentice was of use to you when you went to the College of Science?—In certain subjects it was of use.

Are you of opinion that a boy can profitably be sent to a college for any form of technology before he has had practical experience in connection with technology?—Take a boy who has had a good, ordinary, simple school education. Now he has reached the age of 16 and his father has to decide whether the boy should go to a Technological College or University, or whether he should be apprenticed and get some form of practical training, his hope being that the boy is to be ultimately a mechanical engineer. What line of training would you adopt?—I think that the boy should have some knowledge and experience of the profession he intends to adopt before he goes to a college.

Say one year?—Yes.

Two years?—A year, I should say.

You have seen a certain number of boys who have gone straight from school to the University and taken degrees in science and technology?—I have not had recent experience I have been home to England a few times but only during vacations.

What do you base your opinion on?—On my experience and my training, i.e., my experience before I came to this country.

Applying that to India; assuming you have boys of 16 and 17 who have had a decent school education, would you send them to the works at first or send them to Sibpur or the Bihar School of Engineering?—To be mechanical engineers?

To be any form of engineer you wish to turn out?—I think that in the case of Indian boys it is necessary that they should first go to the works.

But here I notice you have a scheme by which you give boys 4 years in the school and then one year under Executive or District Engineers, followed by a 2 years' practical training?—That is so. Your previous question I understood to be a more general one. We have to deal with a particular class of boys here. You cannot get lads of this class who have had any kind of practical experience before they come to the college. The present syetem does very well under the circumstances.

You would not get a boy to go to work before he had been to College?—Speaking only of the students whom I train in my school for the civil engineering profession, it would be very difficult to arrange, I think.

You think it hopeless to expect that you will get enough boys who have gone first to the works and then afterwards come to the Engineering School?—They would not go to the works unless they were supported financially. Their parents usually could not support them. It is cheaper to send them to a school than to a workshop.

All these boys who come to you come with scholarships?—More than half get scholarships.

Are these scholarships given as the results of examinations?—The scholarships which Government give are awarded on the results of examinations. Those that the District Boards give are awarded by the Boards themselves.

Are Government scholarships the result of competitive examinations or merely of tests?—Competitive examinations.

Is the competition ordinarily great?—I am trying to get the present system altered by basing the scholarship award to the results of school tests. Boys would be just as keen to pass the annual examinations if there were no scholarships.

I asked you whether competition for these scholarships was great or not?—There is no competition for the scholarships. They are so keen to get a certificate that they study irrespective of the hope of getting scholarships.

Where are these examinations?—The certificate examinations are conducted by the Joint Technical Examination Board.

On the results of those examinations scholarships are granted?—Yes, that is the case for the certificate examination. In other cases we ourselves hold examinations for promotion from one class to another.

Your real trouble, I understand, at present is that there is an insufficient number of boys in the country who have had any kind of primary education?—I was referring in my note to artisans and mechanics who do not know English. All such boys who come to me do not know English.

Would you like to see more boys taught elementary English?—No, I should not like to see boys of this class taught English. If they were, I think, it would have an unsettling effect on them.

You think that English is no good to them in their work?—I don't think they need it.

Is there any hope of your ever obtaining a superior class of engineer until he does know English?—The most promising ones should be taught, English afterwards.

If you taught the boy English in his very young stage, would he not be able to read English books and devolop any ambition he had to improve himself?—In that case his ambition would be to become a clerk or to leave the profession of his father.

At present the system of education in the country excludes practically the non-literary industrial classes?—Well, yes, it does.

In this institution that you are proposing, do you propose to introduce English education at all?—It is not my proposal only, it is that of a Committee.

This proposal relates to something very much higher?—Yes; candidates would be admitted on passing the Intermediate Science Examination and of course they would know English.

What Committee was this?—It was a Committee called together by the Director of Public Instruction.

It is evidently of a different type; a much higher standard of training?—Quite different.

Have they got any industrial school at Sakchi?—Not at present. They are about to start small mechanics' school for the sons of artisans on the lines mentioned in my written evidence

And they propose to start this higher institution before they have a foundation laid in the matter of industrial education?—It depends upon the view Government takes of the matter.

Are you in favour of starting at once this Technological Institution at Sakchi?—I think it is rather premature.

But you have taken part in the Committee?—Yes.

Were you in favour of the proposal?—Yes, I agreed generally with the proposals.

Then you are in favour of starting at once?—I think it premature to start at once but I did not write a note of dissent. The note expresses the Committee's views.

Then you wish to disagree with the Committee?—I said at the meeting of course, that I thought the proposal premature.

You are still of the same opinion?—Yes The works at Sakchi were started only a few years ago. It seems to me premature to base a public teaching institution upon one commercial firm. No doubt that firm has a good chance of being permanently successful but still there is only one there at present.

When you were giving us an idea as to the type of man required for Director of Industries, you say in your opinion it should be a business man. By "business man" I suppose you mean one who has been experienced in actual commercial life?—Yes.

If a man were successful in commercial life, is he likely to take up a Government appointment?—Not unless Government attract him.

But you know the approximate scale of pay that Government generally gives for heads of provincial departments. Do you think that pay would attract anyone?—I think it is possible that it would. There are many advantages in Government service; e.g., the pension.

Then you think that it is likely we shall get successful business men to apply for positions of this type?—I think it likely that you would get careful men who thought of the future rather than of the present.

You agree that we do not want to have unsuccessful business men?—Yes, certainly.

Hon'ble Sir R. N. Mookerjee.—You have two distinct classes in your School of Engineering, one for artisans and one for engineers?—Yes.

These engineers qualify as assistant engineers in the Public Works Department?—No, they do not.

Have you got a large staff in your school besides yourself?—I have nine assistant masters one European and the remainder Indians.

What is the qualification of the European?—He was a foreman in a railway workshop.

Had the Indians any practical experience before they joined you?—Some who came from Roorkee had had practical experience before they came.

And they teach the overseer class?—Yes.

Have all the passed students from your College guaranteed posts?—There are three guaranteed appointments but every student who passes out from my school finds employment.

Under the Government?—Some under Government, others under District Boards, on the railways or as surveyors.

You have an examination for admission?—Yes, in English and Mathematics up to the standard of the Matriculation Examination.

Dr. E. Hopkinson.—You particularly commend the system at Beniadi, near Giridih as being very successful?—Yes.

That is dependent upon the boys working half day?—Yes.

Do you think from your experience that such a system could, with advantage, be applied to a less educated class, for instance boys working in mills. Might not their free hours be devoted to primary education concurrently with the manual training of their work in the mills?—I think so, but they need not give half the day to education; an hour or two hours would be enough.

I understand that your opinion is that the two forms of education should go on concurrently?—I think so.

You state that you consider the great drawback to the development of skill in Indian labour is the want of primary education?—I think so.

Could you endorse the proposition that skill in any vocation cannot be properly developed without thorough primary education?—It cannot be improved.

You would rather put it that way?—The Indian craftsman has usually not been educated, yet he is a very good craftsman.

I understand from the general tenor of your evidence that you consider that in all branches of handicraft, education should be directed from the first towards development of skill in that particular handicraft, and that primary education should go on concurrently?—Yes, but it should not be given in the ordinary primary school.

Mr. A. Chatterton.—I understood you to state in your evidence that you admit to your industrial classes boys of twelve years of age?—Over twelve.

Are they physically fit at that age to do this sort of work?—I don't think we have very many near that age.

At what age do they usually come?—They come up to thirty-years of age. Many people who fail in other walks of life come and seek admission to the artisan classes but they are not taken.

Do you think, in its practical aspect here, it would be advantageous to give literary education at the same time as industrial education to the boys whom you get: boys of 14 or 15 years and upwards? Would you have a school going on concurrently with other classes?—My particular classes do not need it, we do not admit boys who cannot read nor write.

I understand that you are Inspector of Technical Schools; you have some experience of the class of boys who are admitted into these schools, but you say they are mostly over 12 years of age. Would it not be better that if boys are to get literary education it

should be insisted that they got this literary education, *i.e.*, taught to read and write before they entered the school? Take the average age of the boy as 14?—It would be better if he could read and write before he came to school.

Is there not ample time for him to get all the necessary education wanted, before 14?—Yes, there is time.

If he does not get general education before he is 14, does he, to any great extent, profit by the primary education offered in the school?—If he learns to read and write in that school, I take it he profits.

Does he learn to read and write?—My experience of industrial schools is that the boys know how to read and write before they go there. There are a certain number of village industrial schools where elementary education is given with their apprenticeship, but in others, such as mission industrial schools, they are taught reading and writing before they are taught a trade.

Then you express an opinion about the artisans of the villages. There seems to be a complaint made that the artisans in the villages are not of a sufficiently high standard of craftsmanship to carry on the work of the country. Are not these opinions mainly opinions of people who want them to do work which is not ordinarily done in villages?—That is so; very frequently one hears that opinion expressed.

Is not the standard of handicraft skill among village artisans sufficient for the ordinary work of villages?—Yes.

Then it is a waste of time to try and train these boys in the villages in a class of work on which they are not likely to be employed afterwards?—Yes, I think so.

I take it that on the whole you are not in favour of industrial schools?—Except of the special types which I have indicated in my written evidence.

That is for the training of special artisans?—The special types I indicated are the Beniadi School and the village school. The ordinary industrial school, I am not in favour of.

You mention the schools started by Mr. Radice. Where are these schools located, in towns or villages?—There is one in Hazaribagh town and the remainder are in villages.

And who pays this stipend of Rs. 5 or 6; is that paid by Government?—By the District Board. I think there is a proposal that they should be taken over by Government.

There would be difficulty in getting these boys to go to school without this stipend?—The boys do not get the stipend; it is the mistries who get it in return for their trouble in teaching the boys. The schools do not cost more than Rs. 6 or 7 a month each.

How long do the boys work in the school?—They work until they can get employment or set up for themselves.

Are they mostly relatives of the mistries' people of the same caste who go to such schools?—There are relatives but there are also members of other castes, not blacksmith and carpenter castes.

He employs them in doing the work going on in his own workshop?—Yes.

There is no systematised instructions?—No

Your opinion is that it is rather a successful arrangement?—Yes, because it closely follows the indigenous system.

You say that the most essential conditions for the establishment of a self-contained industrial school are:—

(1) It must be established in the locality where the industry it relates to is actually being carried on;

(2) There must be a constant and sufficient amount of work passing through the school workshop to afford the pupils the necessary training, which work should be executed as nearly as possible under trade conditions; and

(3) The local industry referred to must be sufficient in extent to absorb all the pupils trained at the school.

You mean the local industry in the province, or in that around the school?—The industry in the locality of the school. In my note I first of all indicate the type of school I do not approve of which is quite different from the village school or the mechanics 'school. The latter are connected with commercial workshops. In the village school the boys when trained would be absorbed in the surrounding villages.

This would be for the training of weavers?—Anything like that; any special profession. Weaving is a good example. There should not be trained more weavers than could be absorbed in the locality.

You would draw all the weavers from the weaving class or would you admit outsiders?—Weaving schools are not under my inspection, so I have not studied them. They are inspected by the weaving expert of the Prison Department.

WITNESS No. 41.

HON'BLE RAI PURNENDU NARAYAN SINHA, BAHADUR, M.A, B.L., *Vakil, Patna High Court, Director, Bank of Bihar, Ltd., Bankipore.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

I am one of the directors of the Bank of Bihar, Limited. One of the original objects of starting the bank was to finance local industries, and to stimulate larger activities in them.

The Bank advanced money to three such industries:—

(1) The Moon Button Factory of Mehsi, District Champaran.

(2) The Cutlery Factory of Bose Brothers of Muzaffarpur.

(3) The Handloom Factory of Bankipore.

The Moon Button Factory.

Babu Bhulawan Lal, a Deputy Inspector of Schools, found pearl shells near Mehsi and started the idea of manufacturing buttons. On his own initiative, he proceeded far enough to start the factory with his own money and some money advanced by others. The bank advanced money on a hand-note executed by Babu Bhulawan Lal. The factory came in competition with cheap Japanese products and wanted to secure the services of an expert. Babu Bhulawan Lal could not afford to pay for an expert and applied to Government for a monthly grant for such time as the services of an expert were needed. Mr. Walford, Principal of the Bihar School of Engineering, reported very favourably upon the industry. The Local Government could not give any grant on the ground that the factory was not an educational concern. The factory, therefore, goes on with much difficulty and could not pay any interest on the hand-note. We shall have to give up the whole of the interest and may have to be content only with the capital money advanced.

If the factory had been able to keep a running account, the Bank could have been of some help to it.

The difficulties of the factory have been:—

(1) It started with a small and inadequate capital and had largely to depend upon the private resources of one man.

(2) It has not been able to form a company with limited liability with an adequate number of shareholders, mostly because the factory is in an out of the way place, which does not attract many visitors.

(3) It has not been able to get Government support in time and much Government sympathy.

The Cutlery Factory of Bose Brothers.

Babu Monmotha Nath Bose runs the whole thing. The factory is located at Muzaffarpur, but it does not get much local help. A company with limited liability has been started. But much is not known outside Muzaffarpur about the management and its control and supervision. Therefore shareholders outside Muzaffarpur are shy to advance money, though Government experts have spoken highly of the turnout of the factory. The bank advanced money to Babu Monmotha Nath Bose, a portion of which has been however realised with difficulty.

A limited liability company was started under the name of "Bihar Industries, Ltd.', to finance the above two concerns and other promising industries. But the idea had to be given up because (1) there was no reliable and independent data available about the present and future prospects of these industries from an authoritative source, without which the promoters did not feel themselves justified in risking their own and the public's money, especially as at that time there were bank failures and general distrust in the country for new concerns. If there be a Government department which would certify as to the future prospects and success of the industries, and would make provision for public audit, funds would be forthcoming to finance and develop these and other industries.

The Handloom Factory of Bankipore.

Maulavi Fakhruddin Khan Bahadur and myself took personal interest in this factory and its management. I started the factory after consultation with Mr. Hoogwerf, Principal

of the Serampore Weaving College, in every matter of detail. The master-weaver was given by Mr. Hoogewerf from amongst his successful students of the Serampore College. The full amount of capital suggested by Mr. Hoogewerf was raised. Looms with accessories were brought from Serampore. We could not get students from the Bihar School of Weaving to do the weaving. But we engaged experts in country looms on fixed monthly pay, some of whom had been awarded prizes at the Bihar Industrial and Agricultural Exhibition. The difficulties are :—

(1) The first difficulty was to get yarn. Wholesale price of yarn differs materially from retail price, yet a very large amount of money has to be invested to get yarns of all numbers from Messrs. Andrew Yule or other wholesale dealers. We were not in co-operation with other co-operative societies to enable us to give wholesale orders for yarns of different kinds.

(2) The snapping of yarns in the Serampore looms.

(3) The unwillingness of the weavers to conform to the requirements of the Serampore looms.

(4) The impossibility of competing with power looms in the manufacture of cloths of every day use and the necessity of restricting ourselves only to the turn out of bed-sheets, check cloth, and stuff used for shirting, trousering, etc. Such stuff as could be turned out could not find ready sale in the market or amongst shareholders.

(5) Lastly and chiefly, the weavers employed could work only for some fixed hours, irrespective of the turn out and could not work at all on Fridays as they were Muhammadans. The master-weaver suggested they should not get fixed monthly pay, but should get wages on the outturn of their labour every day or every month. To this the labourers objected. We tried to get workmen from Sambalpur. But we could not frame any working scheme, calculated to bring profit. The business failed and the factory was closed.

The Bank of Bihar advanced over Rs. 800 on hand-note. Out of this only Rs. 80 could be recovered by sale of three handlooms. The balance had to be written off.

Government assistance.

Q. 5.—The methods suggested in question 5 of giving Government aid to existing or new industries are all necessary and it will depend upon each industry and its local requirements as to what particular methods will be best suited to it.

Government control may be exercised whenever aid is given. I would suggest a Government auditor of accounts for every division and an annual certificate of the progress of the industry by the Director of Industries to be appointed for every province.

Pioneer factories.

I have got no experience of Government pioneer industries. But I am strongly of opinion that pioneer industries should be started by Government. I am particularly keen about a Government sugar factory near Bihta station in the Patna District, or some suitable place in Arrah District. As soon as the factory begins to work on profit, it should be handed over to private capitalists, or companies. I know of a big capitalist who is eager to take over such a factory when its profit is assured.

Co-operative societies are useful for wholesale purchase of yarn, or metal sheets, or such other materials when several industrial concerns require them at a place. At present the small manufacturers take loans at high rates of interest for the purchase of materials separately. The societies will be also helpful in advertising and securing orders and markets for industries.

II.—Technical aid to industries.

I am keen about combating successfully, the insect and fungus pests that seriously interfere with the agricultural industry in India. Government researches should be specially directed to this matter which is of special importance to the agricultural population, which is the largest population in India. The researches made in Pusa do not seem to me to be adequate in this respect.

III.—Assistance in marketing products.

I am of opinion that railway stalls should be largely availed of for advertising and selling the products of minor and unorganized cottage industries. In my opinion railway stalls are more helpful than exhibitions for many minor industries, such as pottery, carpets, glassware, cutlery, and several woollen, cotton and silk goods. Men do not always go to exhibitions, but they always travel. I think Government should insist on railway companies giving every facility to the exhibition of local and Indian industries in Indian stalls. It is with much difficulty that Indians get permission to keep such stalls at present. If proper stall arrangements be made the following Bihar industries will receive great encouragement :—

Sewan pottery, Sassaram pottery, Patna glassware, Gaya stoneware, Bihar *muretiea*, Obra carpets, Patna pottery, Patna and Sewan printed cloth, Patna tinsel, Mehsi buttons, Muzaffarpur cutlery, Bhagalpur *dhupchaya*, Monghyr *shirki* and ebony work and Colgong fish.

The advertisement will also give inducement to other industries.

Exhibitions.

I have been organizing exhibitions in Bihar for a long time. I started the Bihar Industrial and Agricultural Exhibition in 1904, with the active help and sympathy of Mr. P. C. Lyon, who was then the Commissioner of the Patna Division and have ever since continued to be the Secretary to that Exhibition. Government made a grant of Rs. 500 which was raised to Rs. 1,000. Government officials gave material help in sending exhibits and also in securing tents and *shamianas* for the exhibitions. The exhibition was first held yearly. At first the exhibition was of much use in bringing together and advertising all industries of Bihar. But it was soon found that the same thing was being done year after year without much appreciable result. It was decided therefore to hold a provincial exhibition on a grand scale every three years. This meant a substantial grant from Government and on account of the war nothing could be done.

I am of opinion that the exhibition should be held every three years and a museum should be kept at Bankipore, which is the chief town of the province. This museum should also have a sale side and be in touch with the manufacturers and able to carry orders. A commercial information bureau should also be attached to the museum. The exhibitions should be popular. Otherwise they cannot attract a large number of visitors. The museum which is an essential accompaniment to the exhibition should aim at bringing sellers and buyers into contact.

The Government should give grants for exhibitions and give help in securing exhibits. But the management should be left in popular hands. The exhibition committee should consist of officials and non-officials, with a non-official secretary. The exhibitions afford the best opportunity for official and non-official co-operation which has got its moral value in India, which should not be lost.

V.—Training of labour and supervision.

I am a member of the Board of Visitors of the Bihar School of Engineering. The accompanying note* of Mr. Walford, Principal of the Bihar School of Engineering, will shew what is being done at Bankipore to improve the labourers' efficiency and skill. This is highly useful work and should be very much enlarged in its scope and measure.

The Bihar and Orissa Government appointed a committee to advise Government on mechanical and industrial education. The report of that committee, of which I was a member, may be referred to. In that committee there were representatives of several railway concerns. They agreed to take apprentices every year from passed students of the Bihar School of Engineering for the railway workshops. The object was to give them plate-layers' work. But nothing has been done as yet in this matter, and I am not aware how far our Local Government has pushed on the undertaking then given by the representatives of the railway concerns.

When a Department of Industries is well organized it may advise the Education Department as to the lines on which the industrial schools are to be worked, but the education may be left to the Educational Department itself. The employment of labour, however trained in industrial schools, should be guided entirely by the Department of Industries. In this way there may be co-ordination between the two departments.

VI.—General official administration and organization.

There is no provincial organization at present in our province for the development of industries. There should be a Board of Industries, representing experts in industries and commerce, which should be merely an Advisory Board.

The suggestions of the Board should be carried on by the Director of Industries, who should be pre-eminently a business man, and, if possible, an expert in one chief industry, preferably textile industry.

It is desirable that provincial work should be correlated under an Imperial Department. The line of correlating the Provincial Agricultural Departments should be followed.

X.—General.

Special enquiries should be made for the glass-making industry in Bihar.

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* BIHAR SCHOOL OF ENGINEERING.

Note on the artisan classes by Mr. F. Walford, Principal, Bihar School of Engineering, dated the 27th October 1916.

(To be considered at the next meeting of the Board of Visitors.)

Classes for the training of artisans in the school workshops were started in 1913. They have proved so successful that it is desirable to consider the question of enlarging them.

Particulars of the classes are as follow :—

Boys, preferably sons of artisans, are admitted who are above the age of 12 years provided they are able to read and write. In addition to a trade all are taught practical drawing and workshop arithmetic. The instruction is given in the vernacular.

At the discretion of the Principal, members are paid stipends up to a maximum of Rs. 10 according to the skill attained. The stipend list is revised every half-year and stipends are re-allotted according to progress made in workshop and in class. In addition to his stipend each boy is credited with half the value of his earnings which sum is paid to him upon the satisfactory completion of his full course of training. The amounts are kept in the post office savings bank. If an apprentice leaves before completing his course the whole amount standing to his credit is forfeited. Apprentices must attend the school until they are proficient, the time taken being from 3 to 4 years. Those who show no aptitude for mechanical work are dismissed at any time. Boys who become proficient at motor repairing are placed out with car-owners for a final year to gain experience. No certificate is given until a favourable report is received from the car-owner.

The cost of the classes amounts to Rs. 2,900 per annum excluding the cost of instructors, but as the income from the proceeds of sales and work done amounts to about Rs. 8,000 the classes are self-supporting.

The classes have been working for about three years and some of the more intelligent apprentices have completed their training and been given certificates, while others are on probation with car-owners.

Applications for admissions are received almost daily and many candidates are willing to work without wages in order to get a footing and await a vacancy on the stipend list; a few such are taken, but owing mainly to the want of additional supervision it is not possible at present to accept more for training.

The following is the present and proposed strength of the classes :—

	Present.	Proposed.
Motor Mechanics	10	15
Carpenters	5	8
Fitters and Turners	5	10
Blacksmiths	5	5
Moulders		4
Painters		3
Total ...	25	45

The Bihar School of Engineering Committee, which met in April 1913, to advise Government regarding the development of the school, considered the question of the artisan classes. They advised that provision should be made for 50 artisans in the above trades and that there should be a class also for tinsmiths and sheet-metal workers. The Committee proposed at the same time that the workshop accommodation should be increased and that there should be three foremen-instructors, two Europeans and one Indian.

An additional workshop was built last year so that the shops are now of the size recommended by the committee, but no additional foreman has been appointed. Application has been made for the appointment of an additional man, but Government have deferred the case on financial grounds.

Owing to the introduction of the lump allotment system for the payment of mistris and of an improved system which allows of more work to be undertaken in the shops, no additional instructors would be required for enlarging the classes to the extent proposed above, but it is indispensable that an additional supervision should be available The present foreman is supposed to be responsible for the practical training of all the students in the school, numbering about 160 and in addition to manage the shops, stores, electric generating plant, etc. It is, of course, not possible for one man to perform efficiently so many duties and much of the time of the Principal is absorbed in the details of the workshop instruction. The carpenters' and paint shops are entirely managed by the Principal.

The question for the Committee to consider is whether it is advisable again to approach Government with a more urgent request for the early appointment of an extra foreman to enable the artisan class to be enlarged.

ORAL EVIDENCE, 16TH NOVEMBER 1916.

President.—I understand, you are a Director of the Bank of Bihar Limited ?—Yes.

And you give us examples of three industries that this bank has assisted ?—Yes.

The bank was founded mainly for the purpose of financing local industries and stimulating larger activities in them ?—Yes, at first.

And what has happened to the bank now ?—The bank is prospering in a general way.

It is also a general bank ?—Yes.

Do you accept fixed deposits from ordinary depositors ?—Yes.

And you lend your money to finance certain industries ?—Yes, but in a limited way. From the experience we have had we do not undertake that now. So far as our experience of industries is concerned it has not been very satisfactory.

You did this on quite a small scale ?—Yes.

So that you were not running any real risk ?—No.

But were you doing sufficient good to industries by lending money on a small scale ?—It was merely to lend them the money when they needed it. They wanted the money and we lent it to make their business good.

If you had a Director of Industries in the province, accompanied by a sufficient staff, do you think that these failures could have been avoided ?—I think to some extent.

What means had you before you to form some idea as to whether it was desirable to found a button factory near Mehsi ?—It was quite by an accident. He had found some pearl shells there and thought that the industry might be developed.

You had no expert advice of any kind ?—Not at the beginning.

And the same with regard to the cutlery factory at Muzaffarpur ?—Yes. This business is going on and turning out good cutlery. The man has some experts and has trained men himself.

From this handloom factory at Bankipore you will not recover your money either ?—No.

Why did you introduce the Serampore loom; was that on Mr. Hoogewerf's advice ?—Yes.

But those looms had not been tried here before ?—No.

Does it not seem unwise to introduce a strange loom to people who are conservative and are not able to appreciate it ?—We left everything in the hands of the expert.

You are particularly keen in having a sugar factory in Bihta ?—Yes.

Why do you select that area especially ?—Either that place or some place in Gya district, because there is a large supply of canes in that quarter, and the station is near.

Have you brought this matter to the notice of the Agricultural Department ?—The Agricultural Department does not care about factories.

But there are sugar enterprises in the country, for instance, at Cawnpore and Calcutta. Would not these people who organize or are responsible for these sugar factories recognize the value of starting a factory in this district ?—There was some Calcutta concern who wanted to start a factory here, but they wanted the capital to be raised entirely in Bihar, but the people in this district did not like the idea.

Supposing this information had been available to you, and you had in this province a Director of Industries, you would put this information before him and ask him to see that this matter was brought to the right quarter ?—Yes.

You want the railway companies to be forced to have 'swadeshi' articles on sale on the book-stalls and other stalls on railway stations ?—Yes.

Don't you think that if these articles are obtainable and are also saleable at a profit, you do not need to force anybody to take them ? If they are saleable they will make it their business to sell them ?—These are small industries which do not find their way to Calcutta or big markets. Some of the things I have mentioned are art industries.

But they are selling a certain number already, and they have these stalls in railway stations in addition to ordinary book-stalls ?—No, the industries I have mentioned do not find their way there.

At Moghalsarai, for instance, I remember seeing a stall for the sale of such articles ?—Moghalsarai takes Benares and Agra things, not Bihar.

But if it paid a man to sell your local products, he would start a stall on his own account ?—If the railway company will allow that.

And if it does not pay him to sell the article, you are not going to force him to do so?—If the railway company gave permission, we could induce him to open a stall. For instance, there was one man in Dinapore who, I was told, was not permitted to continue his stall with Indian articles. I know nothing personally about it. In none of the big Bihar stations, as far as I know, has any attempt been made.

What makes you think that the glass-making industry would be successful in Bihar?—Professor Ramsay, when he came here, wanted samples of sand. We sent him some samples and the Professor was of opinion that the sample was very good for making glass and quite recently a Government expert came and he thought with a capital of Rs. 50,000 a first class glass-making manufactory might be started with profit.

Have you sent samples of the sand to the Geological Survey?—No.

That is the office that is responsible for gathering together all investigations about mineral occurrences in this country. They are the people who can turn your information to account? Are there any people here who have attempted to start such an industry?—There were two Muhammadan gentlemen who took it up as a cottage industry on a small scale.

That would be for the manufacture of glass for bangles?—Manufacture of glass for bangles or for these glasses.

Hon'ble Sir R. N. Mookerjee.—You recommend a Board of Industries; how many members should it have?—Just a representative of different kinds of industries.

Have you any idea how many the number should be, 20, 30, 40?—No, not more than 5 in any case with the Director. I think 5 or even 3 to represent different interests.

You say they should be good business experts; have you got such men in the province to act? Outside men will not come here to advise you?—In the province perhaps you might get a mining expert.

You never thought of the matter?—No.

If there were experts, you would not have made such failures in other business?—No.

Witness No. 42.

Babu Ganesh Lal. Babu Ganesh Lal, *Proprietor of the Bihar Angel Press and Bafta Factory, Nayabazar, Bhagalpur.*

Written Evidence.

Bhagalpur is an important industrial district but it is a pity that the local industries have not till now received either encouragement or scientific advice for their improvement.

I shall take up the tusser industry which is the most important industry of the district, and secondly, the mining industry, which has not attracted even the smallest attention.

The tusser industry of Bhagalpur.

Since I entered into business about 17 years ago this important local industry engaged my attention and, with the object of improving it, I set upon to work it with the capital that I could spare. It seems to me to be necessary first to describe the existing conditions in order to show what improvements are necessary for placing this industry amongst the competitive industries of other manufacturing countries. At present there are about 400 handlooms of the old type (technically called pitlooms) working mostly in the western suburbs of Bhagalpur. Nathnagar and Champanagar are important centres of this handloom weaving industry. No less than 500 families of weavers earn their livelihood by weaving tusser and bafta cloths and about five and six lacs of rupees worth of these cloths are annually sent out of this district to different trade markets mostly throughout India and in a very small degree to France and Portugal. The cloth mostly sent out is called bafta and has reeled tusser for the warp and mill-spun cotton for the weft. The tusser yarn used for the warp is reeled from the tusser cocoons by the woman of the weavers. The average production of cloth (medium quality) on each pitloom is about a yard and half per day and it takes two men to make the warp. The average income of men engaged in this kind of weaving is about 2½ annas per day, although there is such a big market for bafta all over the country. There is no organized factory where a number of looms work, but each weaving family has one or two looms. The mahajans or the dealers in these cloths advance certain sums of money to certain weaving families who become their exclusive weavers and bring their production to them. As in all dealings between a clever man of the bazar and a simple man of the village these mahajans always try to buy these cloths from the weavers at a discount of 15 to 20 per cent. below the normal wholesale market value. That is one reason why the average earning of the weaver is so low. Another thing is that the weavers go on weaving the same old pattern and the same old kind of texture which with the change in taste brought about by modern civilisation, do not appeal to the present generation; otherwise I am confident the consumption and the demand would considerably increase.

All this attracted my serious attention and I consulted Mr. M. Leach, formerly the weaving master of the Bhagalpur Central Jail and now the Deputy Superintendent of the Dacca Jail. This gentleman kindly took a great interest with me in the question of the development of the tusser industry. He advised me to try tusser on the Salvation Army loom after having consulted Mr. Maxwell of the Salvation Army. The Salvation Army people have got a weaving business at Ludhiana and at the suggestion of Mr. Leach I went to Ludhiana to consult Mr. Maxwell on the advisability of weaving tusser on the Salvation Army looms. His opinion was that tusser could be woven on the Salvation Army loom and I could successfully start a weaving factory with half a dozen of such looms in the beginning. Consequently I got from him the requisite number of looms and accessories at a cost of about Rs. 2,000 and started the work but failed. Mr. Leach, who happened to be here at that time, kindly consented to help my weavers in learning to work on the Salvation Army loom, and he gave his Sundays to coach them. But unfortunately we found that tusser was a very brittle yarn and until it was properly sized it could not work. The first difficulty was that in the way in which the local weavers size it, it was not possible to make warps longer than 14 to 15 yards in which case, considering the expense and labour of "reeling the threads" every time for such short warps, it would be no good to use the Salvation Army or any fast picking looms. Secondly the sizing of tusser is so difficult that until the females of the weavers came and worked upon it the result could not be satisfactory; and it was difficult to induce the weavers to bring their women to work in my premises. So the idea of weaving tusser to make bafta was abandoned. The next idea was that instead of reeled tusser and sized yarn we should use twisted yards of tusser. As it is, there is no system of twisting tusser in vogue among the bafta weavers. I wrote to the Imperial Entomologist, Pusa, to enlighten me on the subject. His reply was that there was no satisfactory twisting machines available in India except the Chhoi Silk Mills of Poona who were doing *eri* silk and could also do tusser twisting; and if I wanted to have my own twisting arrangements on a large scale, I should write to a certain firm of Lyons (France) to give me the details. I did so, and found that the cost of erecting twisting machineries was prohibitive for a man of my means. Then I entreated the Chhoi Silk Mills to do the twisting of tusser for me but they refused saying that they were too busy with eri. So the question of using tusser, reeled or twisted, had to be given up.

The next suggestion was that as in bafta there was one cotton and one tusser, cotton for weft and tusser for the warp—I could have them but only change the order, namely cotton for the warp and tusser for the weft. It was hoped that the cost of materials would be the same the effect would be the same and there would be no difficulty in weaving this on a fast loom. I was advised by Mr. E. G. Hoogewerf, Principal, Serampore Government Weaving Institute, to get Hattersleys' improved looms. I did so and got out from their agents four such looms with all necessary accessories at a cost of about Rs. 4,000. It was then found out that though Hattersleys' looms were very good for fast picking, the effect of the cloth with twisted cotton warp and reeled tusser weft was quite different from the pitloom bafta, besides the cost on account of the greater quantity of tusser consumed in weft than in warp tended to equalize the advantage of fast production.

Messrs. Grandage and Company, agents to Messrs. Hattersleys and Company, Manchester, next advised me to substitute the fast and delicate looms made by Messrs. Livesey and Company, in order to deal with this delicate tusser. Accordingly I placed an order with them for a number of such power looms and necessary fittings, and it is with extreme disappointment that after getting a few parts at a cost of about Rs. 2,000. I was told that on account of the war it was not possible to get delivery of the remaining things.

It will appear from all this record that notwithstanding my best efforts for the last 17 years and notwithstanding my having invested in the enterprise a sum not less than 11,000 to 12,000 rupees the result has been *nil*. One thing, however, I have gained, and that is an experience about the way in which tusser can be used on improved fast looms. I am convinced that if any arrangement can be made for giving the tusser the necessary twist it will do very well with cotton or any weft on any improved fast loom. The question is how to twist it on a large scale and at a cheap cost. This is one important point which the Industrial Commission should consider in arriving at a decision to make the tusser industry a success. The next thing is that there should be a school with a competent man to give the necessary training to the local weavers. I shall be glad to part with my experimental factory should the Government decide to open a school here.

The Government should further advance money on good security to those who wish to open factories on the new system and also help the factory men with trained weavers from this school.

Tusser waste. Another side industry of tusser silk which can be profitably started is the utilization of tusser waste which at present is thrown away or locally sold for non-commercial purposes. About five years ago I sent some tusser waste to a German firm and got out from them yarns made of it. The yarn was very good and I manufactured from it in my factory a texture which I called "tusserina". This cloth was very much liked by people of European tastes except that for want of proper finishing machineries the feel was not very glossy. There is a great future for this tusser waste industry if proper spinning and twisting machines were erected. In that case it will be possible to get tusser waste from other tusser producing

districts, and spin yarn out of it It seems necessary to mention that the Cawnpore Woollen Mills Company, Limited, have begun to make a tusser shade woollen fabric from this tusser waste.

Kaolin (China clay). At Samukhia, in the Banka Subdivision, there are big deposits of kaolin. The area covered by it roughly is about 2 square miles. In 1912 I secured a lease for 5 years from the proprietors of the village to work up this stuff and worked the place for about 2 years. The kaolin found was, however, mixed with sand and grit. In order to make it commercially marketable it is necessary to separate the kaolin from its impurities. This would necessitate the erection of a power plant for shifting and washing and would mean a considerable outlay of money. If necessary capital is raised and kaolin manufactory opened at Samukhia the business, it is hoped, will be profitable. Imported kaolin used to sell at Rs. 45 to Rs. 50 a ton and, with the enhanced charges of shipping and insurance and scarcity of labour abroad, the price must have gone up considerably. The working cost of kaolin at Samukhia owing to cheapness of labour there will not be more than Rs. 3 to Rs. 3-8-0 a ton. One serious difficulty, however, which I had to experience in bringing kaolin to the railway station was carting. The distance from Samukhia to the nearest railway station, Barahat is 11 miles, and there are two streams, the big sandy Chandan and Orhny, on the two sides of Banka which carts coming from Samukhia to Barahat have to cross. The road from Banka to Samukhia is besides 'kutcha'. If the roads were metalled, streams bridged over and transport made generally easier there would be a great prospect for kaolin and its bye-industry, *viz.*, pottery.

Oral Evidence, 17th November 1916.

President.—We are very much obliged to you for your note on the tusser industry showing the various attempts that have been made to help the industry but, so far as I can see, without much success. Is it your idea that the Government should have some kind of official machinery by which they could foster an industry of this kind?—Yes, I think the Government should open an industrial school giving training in the art of tusser weaving, which will let people see that this industry can be worked on the new method with success.

Do you think that the industry is big enough to warrant a certain amount of outlay of this kind?—Yes.

Are there many families dependent on this industry?—There are about 500 families dependent on this industry in Bhagalpur alone. I think in the suburbs the number will be even more.

If the industry breaks down they will have to seek other employment?—I am afraid they will have. There might be difficulty for some time.

If there was a Director of Industries I suppose you would have been able to appeal to him for help?—I think the appointment of a Director of Industries is very necessary.

Mr. A. Chatterton.—I understand that about five lacs worth of tusser silk is annually made in Bhagalpur?—Five to six lacs.

Are there any other centres of tusser silk weaving industry in the neighbourhood?—There are some villages but there is no great centre.

Where is the tusser silk grown?—Tusser silk is mostly grown in the Santal Parganas, the Rajmahal and the Central Provinces side.

Are the cocoons brought to Bhagalpur?—They are brought from those places to Bhagalpur and the tusser silk is reeled at Bhagalpur.

How many people are employed in reeling tusser silk apart from weaving?—On the whole I think about 400 to 500 families. Each family reels its own silk.

How do they reel the silk?—They boil the cocoons for some time and then mix something with it. I could not say what it is. The people would not give out what it is, as it is a commercial secret. It is some sort of *masala*. Then they reel it.

I notice that you say that in your experiments the tusser silk used for warp was very brittle and give a great deal of trouble. Was it due to faults in the reelings?—It is partly due to faults in the reeling.

Did you make any experiments to improve the reeling of the silk?—I never tried.

You went to the Superintendent of the Jail for assistance. Was he a weaving master?—He was a weaving master in the Bhagalpur Central Jail.

Had he much experience of cotton weaving?—Woollen weaving.

He advised you to get the Salvation Army looms?—Yes.

How long did you work these looms?—For about a year, always going on with new experiments, sometimes this and sometimes that, trying to adapt it in different ways to tusser weaving.

And the experiments were all unsuccessful?—They were mostly unsuccessful, not all.

Was that due to the loom?—I think it was due to the loom. The loom gives too much jerk on the warp. It causes the yarns to break.

What did you do with the successful results? Did you carry them on at all?—They were not satisfactory.

And then you tried the Hattersleys' looms?—Yes.

And were they equally unsuccessful?—They were more successful than the Salvation Army looms. The result was better in this way that the texture woven was more uniform and the production was faster.

Did the warp break in the same way?—Not as much as in the Salvation Army looms.

Did the men at these looms get tired?—A strong man with very good health could work it.

How often did he rest?—For every 15 to 20 minutes, he would rest for a minute or two.

All through these experiments of yours you found difficulty in getting competent expert advice?—I always felt the want of expert advice.

Unfortunately when you got the expert it was too late?—Mr. Hoogewerf said that he had never tried tusser silk.

Did you try experiments in making cotton warp?—That succeeded very well, cotton warp and tusser weft.

Then why did you not continue it?—There was not the same glossiness on the surface of the texture. The cost of the cloth worked out more than the locally sold bafta cloth.

How much more?—One and a half times more, that is 50 per cent. more.

You tried twisting the warp?—Yes. I could not get any twisting machines. 't was twisted on the ordinary *charki*.

Did you ask Mr. Hoogewerf to help you in the twisting problem?—It is sometime back. I could not tell you exactly. I do not remember. This is certain, that he suggested to me nothing.

All this weaving is plain weaving?—Plain and twill and drill.

You had one of *Mr. Hoogewerf's students employed* under you?—Yes. He was not satisfactory. I had one man and then another from Mr. Hoogewerf but they were never a success.

Have you a practical knowledge of weaving?—I have no practical knowledge. By that I mean that I have not put my hand to actual weaving. But I know all the processes involved and I have picked up sufficient experience of the art.

In regard to the tusser waste you sent some of it to a German firm. What firm was that?—I could tell you the name of the firm. I have noted the name in my book. It is an import agency firm. They got it twisted by some firm in Germany and they used to send it to us. How much did you send?—In all 2,000 maunds.

How much cloth did you get back?—I have still got some tusser waste lying idle. I have not been able to spend the whole lot. The first time I sent the tusser waste to the firm the yarn was very fine. The next time the yarn was not fine. They probably mixed up some jute or cotton. I could not get the former finish and so I stopped it.

Did you try warping machines?—I tried them with twisted threads. I tried also *eri* silk which I got from the Chhoi Silk Mills of Poona. They did very well.

What is the difficulty with regard to *tusser* silk?—I have never tried. The difficulty was that the whole thing used to be confused. It is so fibrous and the reeled *tusser* is not like one uniform thread. The whole thing is fibrous and *in the warping machine it gets confused*, one thing with the other.

If it was fibrous and you sized it, was it not then satisfactory?—The result of the who thing becomes one mass of confusion. If we put it on the warping machine and then draw the thread and size it, then that could be done. In this case also there is confusion, but less than in the case of dipping it into the size.

Were you able to get rid of the gum?—No, there was much gum left on the silk

Do you think it would be an improvement if you could get rid of the gum?—I think it would be better if the gum is taken off. In the reeled silk made by the local people there is much gum.

And all your experiments go to show that some experimental work is necessary under competent supervision?—My experience has shown that a lot of experiments have yet to be made and that a lot of money has to be spent yet.

You then turned your attention to kaolin and apparently your principal difficulty there was the washing out of the sand and the grit. Did you send the kaolin to any paper mills in Calcutta?—I showed it to the Bengal and Tittagarh Paper Mills. They said that they would like to have it in a finer state. I tried to wash it in the ordinary way. They said that it was not sufficiently fine. They wanted a still finer thing.

And you supplied some of this to the Iron Works of Sakchi?—Yes, Messrs. Tata and Sons wanted some as a sample. They said that they would buy it regularly if it would satisfy them. They said that the quality of the article was not satisfactory.

Did you send it to the Geological Department?—I showed it to Mr. C. S. Taylor, Agricultural Chemist at Sabour. He analysed the thing for me and he said that it contained a good proportion of pure kaolin and that it would be a nice industry, if it could be separated from grit.

What was the proportion of pure kaolin extracted?—72 or 73 per cent.

How much did you spend on this?—I spent about Rs. 3,000.

Altogether you spent from Rs. 12,000 to Rs. 15,000 in this way in experiments and entirely without any results?—Yes.

In reply to President's question, you said that you would like to have a department which will help you. Why did you not send the kaolin to the Geological Department?—The idea never struck me.

President.—There has been established a Geological Department for the last 60 years and yet it is not turned to account when an opportunity arises?—I did not consult the Geological Department. The idea never struck me.

Most of the evidence seems to show that there is a necessity in India of providing scientific and technical departments to foster industries and to give advice both to the people and the Government and yet when the occasion arises the services of the department are not availed of?—Will the Geological Department be prepared to make experiments?

They will give you advice as much as they can under the circumstances. At present they are considerably undermanned on account of the large number of officers who are away fighting?—My impression was that the Geological Department would not care to attend to this.

If it cannot attend to this, I do not see what it is for?—I thought it was meant specially to report upon the samples sent by the Government officers. That was my impression.

The Geological Department understand kaolin and its uses. If they were satisfied that the development was one that ought to be taken up, their opinion would be of use to you in trying to persuade the local authorities in providing better road communication in order that the industry might be developed. I understand that your trouble was that the place was not easily accessible?—Not easily accessible. There are two streams to cross.

In the absence of railway communication you want improved roads. Before the Government is justified in laying out improved roads, the Government must be satisfied from expert advice that the industry is one worth developing in the public interest. In a matter of that kind it is the duty of the Geological Department, so far as they can, to help you with their limited staff. It would have been quite an appropriate thing, if you had referred your problem to the Geological Survey Office. As a matter of fact they are extremely anxious to get hold of genuine information about the occurrence of kaolin in the country. They would always be willing to give you information so far as they can. If you write to the Geological Survey and let them know that I have reccommended you to do so, I have no doubt that the Director would give you any help he can. Of course during the period of the war the officers are all overworked, many having gone to the front?—I will write to the Geological Department. I have got some experience of difficulties regarding financial help. There are two kinds of banks at present, the Indian banks and the Indian banker, that is the Indian mahajan. Both of them advance money to industrial people on seeing that they have good property. They never care to wait for the return of the money. They become so impatient after six months for the return of the money that it becomes almost impossible to continue the enterprise. In this tusser weaving industry a lot of money has been consumed. I had a hope that I would be able to go on. I knew that success was bound to come. But there was difficulty about money and I had to stop the enterprise. So my impression is that if there is an industrial bank, a provincial industrial bank, with a board of directors of industry, it will greatly help industrial efforts.

You understand of course that no bank conducted on safe lines would run the risk of ending out depositors' money on fixed plant and buildings, because if there is a run on the bank they could not realize their assets readily. So that the ordinary banks, as they now exist, would probably not be free to help industrial enterprises in the way that you want. You suggest that in addition to these banks there should be some kind of organization designed specially to make advances for the development of industries?—They would advance the money on the recommendation of the Board which would be a responsible body.

The first thing is to find out whether, from the technical point of view, the industry is worth supporting?—That is the first thing to be looked into.

The next thing is to provide the necessary technical staff?—Yes.

Apparently in the country at present there has not been sufficient justification for a bank employing a variety of technical and scientific experts. So that until these are obtainable in the country there does not seem to be much hope of an industrial bank doing anything like safe business. The industrial bank would have to advance on the prospects of an industry, not on obvious visible assests Any bank will advance money on saleable stock but they would not advance on the prospects of an industry. You have no proposal to make, I suppose with regard to the organization of such an industrial bank?—I have nothing to say about that.

You simply wish to call our attention to the fact that there is a real want of such an institution?—There should be technical instruction, banking facility and Government supervision.

We must not put the cart before the horse. We should not start the bank unless it has the means of finding out whether an industry is worth supporting. There is a great deal to be done before we can ensure the continuance of a bank for dealing with a large number of minor industries?—Yes.

Hon'ble Sir F. H. Stewart.—If a suitable scheme for an industrial bank were drawn up, do you think that capital would be forthcoming from private Indian sources? Would Indian business men come forward with money?—If the Government would have a share or some sort of connection with the bank.

Supposing there was Government supervision?—Then capital would be forthcoming from Indian sources.

Would you put money in it as a business man?—I would put in my money.

But it would not be necessary in your opinion or desirable that Government should supply the capital?—That it would not be necessary. I think the money would all come from the locality in which the bank is started. There is enough money which goes to undeserving bankers who are never willing to advance money to industrialists. They advance to zamindars. This is the local state of affairs. If there were an industrial bank and Government had some sort of connection with it, then people would have confidence in the bank and they would naturally come forward to deposit their money and the Government might help industrial undertakings in that way.

Hon'ble Sir R. N. Mookerjee.—You said that the directors of the industrial bank will recommend the advancing of the money. Will they be responsible for the money?—It will see whether the industry is likely to prove a successful one.

And then the shareholders will be satisfied?—If it is a joint stock company then the shareholders' or rather the directors' consent will be necessary. It should not be a joint stock company. It must be a Government industrial bank.

You said to Sir Francis Stewart that the public will subscribe the money?—The public would put deposits in the bank. The capital would be entirely Government. I said that deposits would be forthcoming from the public.

President.—Supposing I am a Government official and have only been able to save a 1,000 rupees and I put that thousand rupees into the bank, would it be fair for the bank to lend it out in a way which will not make it possible for me to recover the money readily?—The bank would not lend out. There should be a percentage which would be given to industrial concerns.

Supposing there was a run on the bank?—In that case Government will have to come to the rescue.

Hon'ble Sir F. H. Stewart.—Supposing we call the institution a corporation and not a bank, and it was formed with the express purpose of advancing money to industries and intending investors took shares in it, would it be suitable?—I wish to call it a bank.

An industrial trust?—I have no experience of banking but only of difficulties of obtaining money.

Witness No. 43.

Babu Radha Kant Lal, *Zamindar and Mica Miner Hasua, Gaya.*

Babu Radha Kant Lal.

Written evidence.

Government assistance.

Q. 5.—Of the seven modes of Government aid, suggested in question 5, I would prefer those numbered 3, 4, 5 and 7. Different industries will, however, require different sorts of help. Money grants-in-aid and Government subsidies, tending to create and promote

idleness, carelessness and recklessness ought to be generally discouraged. But the Government should at the same time take proper care to provide against the advantages over us derived by our rival foreign manufacturers, getting Government grants-in-aid and subsidies from their respective Governments. Being patronized by their Governments by grants-in-aid and subsidies they can very well afford to sell things manufactured by them at cost price, and unless this advantage, which they have over us, be effectively neutralized by protective measures our industries can never hope to prosper.

Q. 6.—In all the methods, specially in method no. 3, there should always be some sort of Government control, but this control should, in no case, extend beyond auditing of account, and providing against misuse of monies. In no case, there should be a Government Director.

Pioneer factories.

Qs. 7 & 8.—My experience as regards pioneer Government factories is nil; but, I think it is urgently needed, that the Government should establish pioneer factories to lead the way and by way of setting examples to our countrymen. Being conservatives of conservatives; naturally they are not of enterprising spirits. They will not stir and set up a business unless they are sure that some one has already been successful in some such enterprise. The Government pioneer factories should exist simply for the purpose of setting examples to the people and should be handed over to private companies or capitalists as soon as their purposes are served and as soon as they become profitable concerns. Conversion of successful pioneering experiments to permanent Government enterprises should be discouraged, as it is not advisable, that there should be competition, as between the Government factories and those belonging to private companies or capitalists.

Co-operative societies.

Q. 11.—I have known co-operative credit societies giving loans to raiyats. But I am sorry to say that, in most cases, the noble ends of the co-operative credit societies have been frustrated. The improvident raiyats take loans from them, and, instead of spending the same for the purposes for which they are taken, spend for extravagant purposes, such as marriages, etc., and the result invariably is that they are tempted to live beyond their means and ultimately find it too much for them to clear off their debts to the societies and also to pay the rents due by them to their landlords. The co-operative credit societies would do well to be more careful, to see that the monies taken from them are spent for the purposes for which they are taken. They would also do well to advance money to the raiyats with the recommendation or approval of their landlords. This will, I hope, minimise the chance of the raiyats' squandering away the money obtained from the societies. I do not know any instance of any other industries in our district getting loan from the co-operative credit societies, nor do I know if any such industries have developed by the help of the co-operative credit societies.

General.

Q. 110.—As a mica miner, I get mica raised from my mines, have it cleansed and cut, and sell it to merchants in Calcutta, by whom it is shipped abroad. Other mica miners also either sell it here in India or ship it off to other countries. I would suggest that the Government be asked to consult experts to ascertain, if it is feasible to establish mica factories here in India, so that we may have quite a new industry, which on account of our ignorance and negligence has hitherto been carried on solely by enterprising men of other countries. If the opinion of the experts be in favour of my suggestion, the Government might be asked to arrange for lending to capitalists or companies in India, willing to establish such factories, the services of experts for helping them in establishing such factories.

ORAL EVIDENCE, 17TH NOVEMBER 1916.

President.—I understand you to say that raiyats have taken money from co-operative credit societies, but instead of spending the money on the industries, or rather the agriculture for which the money was intended, some of it has been spent on marriage ceremonies and other customs of the kind that are expensive?—Yes.

We have heard this complaint in various places about the way in which the poor people are practically bound down by these customs. It is very difficult for a man in a village or in any town, when a custom has been established, to break loose from it?—They take money not for marriages but for agricultural purposes.

Do you think there is any hope of getting the people to realize that these expensive ceremonies are of no real value from the point of view of religion or anything else?—I think not.

But people will get into debt to carry out expensive ceremonies?—It is difficult to get into debt for these ceremonies, as no one will lend them the money.

Is there any social movement among people of your class to help poorer people; will elementary education do it?—It will take a very long time by education. There should be some check on the money taken from the society.

Is there no kind of social organization of a private kind to help the villager to break free from these customs?—As the masses of people are uneducated it would be difficult for private social organizations, if there be any, to bring out an appreciable change.

Have you any hope that within the next few generations there will be any freedom from their unnecessary and expensive tastes?—Not within the next few generations.

Don't you think it a stumbling block to their advancement?—I don't think these customs are so much a stumbling block.

Money spent on marriage ceremonies; does not thes prove a stumbling block?—I do not think so.

You don't know of any special social movement for the purpose of getting the people to adopt simpler tastes?—I don't know of any among these lower classes.

The same difficulty exists in England. A lot of poor people are fined very heavily because they will go in for expensive funerals, but there is a great tendency, with the growth of education, to give up these ideas. I understand you are engaged in mica mining in the Hazaribagh district?—No, in the Gaya district.

Your mica is raised and when cleaned and cut, sent to merchants in Calcutta and shipped abroad, and you say that it ought to be feasible to establish mica factories here in India. What do you mean by a mica factory?—I mean factories in which things of mica are made. We do not know even what things are made of mica.

There are scores of things made of mica, but you could not establish factories for the sake of mica. Mica is used, for instance, in the construction of dynamos. Do you want dynamo factories established?—No, say, for instance, micanite. Small pieces of mica are split and pasted together and made into big sheets. These things could be made here. There are many other things which we do not know.

The manufacture of micanite is one of the subjects which I have marked down as suitable for further research work. We have a certain amount of information as to how micanite is made. We know what is wanted of the mica miner in India in the way of splittings. You know how they are made in your mine and sent out of the country. We know that they are cemented together in some way with cement, the composition of which is kept a secret. These are moulded into shape to take the place of sheet mica. A certain amount of research work is necessary to find out what kind of cement is suitable for the purpose and what treatment the mica should undergo in order to form a useful sheet of micanite. That cannot be done without a good deal of research work. So that your suggestion does agree with the one that we have already noted, only I am not quite sure what you mean by having a mica factory established. That is what you mean?—Not only micanite: we do not know what other things are made of mica.

Are your mica mines entirely in Government land, or in zemindari land?—In zemindari land.

So that the Government of India Mining Rules do not apply to you?—No.

Hon'ble Sir F. H. Stewart.—In regard to your answer to question 6, the auditing of accounts may come after the mischief has been done and the public money wasted?—It should also be seen that the money is not spent on any other thing.

How are you going to find that control? The auditing of accounts comes after the money has already been spent?—By providing against the misuse of the money.

How will you do that?—You will have men from Government to check the accounts and see that the money is not spent on any other thing.

Will this continue all the time; from the time the money is given?—Yes.

You don't think that would be met by Government nominating directors?—The directors will have everything in their hands.

Do you think that Government should not nominate a director?—Not directors, but something like inspectors.

What is your objection to Government nominating directors?—The capitalists will have no hand. By having directors, instead of facilitating work, it will hamper work.

In what way?—Suppose the capitalists want to do something; the directors will come and say, "Don't do it." The work will be hampered.

But if he was one of the Board, there would be 5 or 6 directors of which one would be a Government director?—I have no objection then, if only one will be a Government director. I did not quite understand the question.

Witness No. 44.

Mr. H. R. T. S. Perrott, I.C.S., *Deputy Commissioner of the Santal Parganas.*

Written Evidence.

I.—Financial aid to industrial enterprises.

Government assistance.

It seems to me that the nature and method of the assistance that should be given by Government to industries must depend to a great extent on the nature of the industries. I suggest the following broad classification of Indian industries:—

(1) The big industries of western type with headquarters in the presidency towns. These would derive indirect help by means of anything that benefits the other classes.

(2) Middle industries of Indian type, largely conducted by Marwaris, e.g., oil-mills, sugar-mills, etc. This kind of industry is generally individualistic in type.

(3) The small manual village industries, weaving, carpentry, metal-work, pottery, etc.

(4) Raw material industries, *sabe*, hides, clays, myrabolams, silk-worms, lac, jute, etc.

It seems to me that if Government assistance is to be given to these industries, it should be principally directed to the assistance of classes (3) and (4). Classes (1) and (2) will inevitably benefit indirectly.

I think the best forms which such assistance should assume would be the following:—

(*a*) Industrial loans on the lines of Land Improvement and Agricultural loans.

(*b*) The encouragement of co-operative effort.

I think there probably exist special cases of industries of classes (1) and (2) which might receive assistance at the hands of Government by—

(*c*) guaranteeing Government purchase of products for limited periods,

(*d*) the offer of facilities for getting land.

Such an industry is, in my opinion, the *sabe* industry, on which I am submitting a separate note.* That industry is partly class (2) and partly class (4).

Financing agencies.

I think many of the smaller industries in classes (3) and (4) are greatly hampered by want of capital. I know that such industries, as weaving (both cotton and tassar), lac and silk-worm production, suffer much in my district for want of a little capital. I also think that certain industries of class (2), such as oil-mills, could be considerably extended if more capital were forthcoming, as the supply of oil-seeds is considerably greater than what is required by the existing local mills.

I think an effort should be made to build up a banking system on co-operative lines from below, as has, in fact, been done to some extent in the case of agricultural co-operative banks. It appears to me that the main feature of Indian money-lending is that a man will not lend money unless he can see and understand what the borrower is doing with it. I think a co-operative system with its roots in the villages would go far to produce that mutual confidence which is now conspicuous by its absence. I append a separate note on the subject of co-operation as applied to village industries (Appendix A). A co-operative provincial bank, built up from both industrial and co-operative efforts in the villages, would attract large deposits and ultimately be in a position to finance industries of larger type, such as those comprised in class (2).

Co-operative societies.

The following local industries, it has occurred to me, are industries to which co-operative principles might with advantage be applied—weaving, lac and tassar cultivation, poultry and fruit-growing. The organization would, of course, vary with the nature of the industry.

II.—Technical aid to industries.

Demonstration factories.

I much doubt if demonstration factories would serve any really useful purpose. For industries of class (3), I think industrial departments for demonstration purposes might be run in connection with agricultural demonstration farms at district headquarters.

Surveys for industrial purposes.

Speaking for my own district I think that an industrial survey would be fruitful of results. Its object would be to gather the possibilities of the area in respect of raw material, as well as to discover the most suitable modes of giving assistance to the smaller industries and the production of raw material.

III.—Assistance in marketing products.

Commercial museum.

I am of opinion that a small commercial and industrial museum on a humble scale at the headquarters of each district, or, at any rate, at divisional headquarters would be of great benefit. It would enable any one who wanted information regarding the industrial possibilities of any district to obtain it at first hand. Such institutions should not, of course, be on an expensive scale. Such district museums might also be made to serve the purposes of advertising the products of the local cottage industries.

Not printed.

Sales agencies.

If co-operative methods could be successfully applied to village industries in the manner suggested in my note on co-operation, I think that sales agencies for the products of such industries would be a natural development. An effort would, at any rate, be made to get into immediate touch with the more remote markets. Co-operative methods applied to industries with this object alone in view would, I think, prove most valuable.

Exhibitions.

An industrial exhibition on a small scale was held annually at Dumka until the War broke out. I think the weakness of such exhibitions consists in the fact that unless a very careful scrutiny over exhibits can be exercised, the same exhibits will be produced year after year. I doubt if any real benefit is obtained by such exhibitions. There is also a tendency for them to develop into a mere *tamasha*. I think that an industrial museum might be made to serve far more useful purposes by way of demonstration.

Trade representatives.

Unless trade representatives could be found who possess a very comprehensive knowledge of Indian industries, I doubt if they would be of very much use, except as a medium for making enquiries. It is difficult to see how men possessed of a comprehensive knowledge of Indian industries are to be found. Probably partners of some of the largest firms which deal in a dozen or more forms of commercial activity, might be suitable, but such would naturally place a very high value on their services, and the system would prove very expensive. Otherwise it might be possible to train a class of industrial experts for the purpose. I am not quite clear, however, that I properly understand the question.

Trade representatives officially accredited from one province to another seem hardly necessary. Particular trades can employ commercial travellers, if necessary.

IV.—Other forms of Government aid to industries.

Land policy.

I know of no check imposed on industrial development in this province by the land policy of Government.

I think the Waste Lands Manual meets the case for concessions of land so far as mining is concerned.

In this province land can only be acquired under Act I of 1894 for a *public purpose*. I have come across one or two cases in which ignorant and grasping proprietors have "squeezed" industrial enterprises to some extent. On the other hand, it is a very delicate matter to interfere with proprietary rights, which have not been interfered with since the Permanent Settlement. I would not recommend any change in the existing law. There is a special law of acquisition in the Santal Parganas, which enables a proprietor to acquire village lands for *the benefit of the estate* subject to the approval of the Deputy Commissioner.

V.—Training of labour and supervision.

Industrial Schools.

I think more industrial schools would do much to improve the labourers' efficiency and skill. I have principally studied the matter from the point of view of benefitting aboriginals. I am personally convinced that for the aboriginal peoples industrial education will prove far more beneficial than academic education, though, of course, I would not neglect the latter. I must admit I have no experience of industrial schools in other districts.

We have an industrial school at Benagaria. A night school to provide academic education is attached, and is working well. We have also a night school for *sabe* employés at Sahebganj, which is reported on very favourably by the educational officers. I think provision should always be made for academic education, as it is hopeless to expect the workman to be really efficient if he has no general education. When industrial schools are under the *aegis* of local missions, this is assured: otherwise provision can be made by the Education Department. There ought never to be any difficulty about this.

I certainly think industrial schools should be placed under the Department of Industries. The Education Department has quite enough to do already without adding to its burdens. I would confine inspection to the Director of Industries and to the District Officer, and to any expert detailed for the purpose by the former. It is very essential, in my opinion, that the District Officer should take a lively interest in the schools.

Training of supervising and technical staff.

I venture to think the University Course. I have outlined in my answer to question regarding colleges of commerce would provide, after one or two years' practical training in a workshop, an adequate supply of supervisors and skilled managers.

My own conviction is that what is principally wanting in Indian industry, except those of class (1), is capital and business-like methods, and I doubt much if the latter can be acquired by sending a student to another country. I also think that probably information as regards business organizations and industrial processes can be obtained by other and less expensive means. I think, however, that facilities should be afforded in very special cases.

VI.—General official administration and organization.

I think there should be a Provincial Director of Industries in the same position with respect to the Local Government as the Director of Agriculture, with a purely Advisory Board consisting of:—

A representative of each big industry in the province,
A representative of railways,
A representative of the Marwari community,
A representative of small industries,
The Registrar of Co-operative Societies.

The Director should have executive powers under the Local Government with budgeted funds and should be the administrator of industrial loans and of industrial co-operative credit. I think the Provincial Director of Industries should be an official, but also an expert in the sense that he should, if possible, be afforded the opportunity of acquiring, either by means of study-leave or otherwise, a general knowledge of industrial conditio s both in India and other countries. I think there are objections to the appointment of a business-man to the post. In the first place, no really successful business-man would accept such a post. We do not want an unsuccessful business-man for the post. In the second place, a business-man has generally had experience of only one industry or allied group of industries. What is wanted is a broad view of industry as a whole, combined with administrative experience, and, if possible, an intimate knowledge of the people of the mufassal, their modes of thought and political economy.

The Director should have an expert staff such as would enable him to get immediate advice on all expert matters as they arise.

VII.—Organization of technical and scientific departments of Government.

There should be an Industrial Adviser to the Government of India. He could be recruited from the ranks of the Provincial Directors. Whether an Additional Member of Council would be necessary or not, I cannot say. The Local Governments should, in my opinion, be allowed a very wide discretion in industrial matters. An Imperial Department would, I think, be a great mistake, particularly in the interests of indigenous Indian industries, which can be best fostered by the people in immediate contact with them. Possibly a solution might be found by making class (1) industries the affair of an Imperial Department, while leaving classes (2), (3) and (4) to the Local Governments.

Imperial departments.

I think there should be one or, perhaps, two Imperial Research Institutes for the whole of India. These should be very thoroughly equipped with chemical laboratories. They could be divided into departments for each industry calling for research work. These would, I take it, be mostly the industries which involve chemical processes. A very thorough knowledge of chemistry, both organic and inorganic, would be necessary to the research students.

I would draw a distinction between research proper and mere experiments. Experiments might be conducted anywhere. The Directors of Industries might have experimental departments. I would not cumber the research departments with industrial experiments. Take, for example, the question of selection of wood for making matches where the selection had to be made from a limited area. Experiments with various kinds of wood could easily be made by the Provincial Director.

I think that research work in such directions as *eri* and *tassar* cultivation should be left with the Agriculture Department.

Technological institutions.

There should certainly be Government control over research as over every other department. I think it should be Imperial control.

Study of foreign methods.

I think Government experts should be given facilities as may seem necessary for studying conditions and methods in other countries.

Colleges of commerce.

I think it would be a good thing if there were in each province a commercial college affiliated to the provincial University where such exists. I would suggest the following subjects for a commercial course :—

Elementary Mathematics, Geography, Survey, Accounts, Precis writing, Shorthand and Typewriting, Political Economy, Chemistry, Geology, Indian Currency system, Banking systems, and Co-operative Societies.

The course could be spread over three years. Those who acquit themselves well could be given scholarships to enable them to take up research work at the Imperial Research Institute after a further one year's course of chemistry. The bulk of the students, on completion of the three years' course, would go in for one or two years' practical work before entering a business. Probably at first it would be necessary to limit the number of boys allowed to take such a course.

VII.—Government organization for the collection and distribution of commercial intelligence.

I think it would be a good thing if a sort of district commercial intelligencer were prepared in each district giving information regarding all industries that exist in the district. The form I would suggest for this would be as follows :—

(*a*) Description of industry, and kind of people employed.

(*b*) Any peculiar or interesting feature, past or present.

(*c*) Extent of industry. Is it increasing or decreasing? The number of people engaged in it.

(*d*) Markets, proximate or remote ; lines of trade.

(*e*) Any particular wishes of those engaged in the industry as regards its future development.

(*f*) Any suggestion regarding help or encouragement.

An intelligencer of this kind would assist the public in getting information of local conditions. It could be kept in the district office and inspected on payment of a small fee to defray the cost of renewal from time to time and keeping it up-to-date. A copy could be supplied to the Director of Commercial Intelligence, if necessary.

IX.—Other forms of Government action and organization.

Mining and prospecting rules.

I have not experienced any difficulty in the working of the mining and prospecting rules (1913).

Forest department.

I think a great deal might be done by the Forest Department by way of planting and fencing closed blocks with timber used for certain industries. The department is at present planting closed blocks with *gamhar* trees in the Santal Parganas. This is to meet the demand of certain firms for this wood for the manufacture of *bobbins*. I think that a great deal of benefit might accrue to the tassar and lac industries if the department would fill in closed blocks with *asan* trees for the tassar worms and *kul* and *palas* trees for brood lac, the planted enclosures being, as far as possible, conveniently situated for the people engaged in the respective industries.

X.—General.

Industries needing development.

I am submitting a separate note* on the *sabe* industry, an industry which has, owing to trade disputes, come under my personal notice.

Speaking as a layman, and with the greatest deference to expert opinion, I would venture to suggest on general grounds the following industries as industries that might be extended :—

Indigo, sugar, tanning, glass, paper, fruit canning.

I also think that possibly umbrellas might be made in India.

Raw materials.

I know the existence of certain raw materials which might be developed, but I think enquiries by experts would first be necessary, as suggested in my answer to question regarding surveys for industrial purposes.

APPENDIX A.

Note on co-operation.

The people engaged in village industries either occur in groups of families more or less inter-related in the bigger *hâts*, or in much smaller groups scattered about the country.

In the case of the former, the question of applying co-operative principles is much simpler than in the case of the latter. The development will, in fact, be similar in character to that of the agricultural societies. The operatives will join themselves together into a co-operative society, each individual accepting joint and unlimited liability for the debts of all the rest. A panchayat for executive purposes would be selected within the society itself, and this panchayat would arrange for the financing of the society either by obtaining deposits or by borrowing money on the joint security of the society from the industrial loans fund. One difference between such a society and the present agricultural societies would consist in the fact that the members of co-operative societies only require loans at certain periods of the year, or, in certain cases, larger loans running over some years, while the members of such an industrial society, as has been described above, would be in continual need of small sums for the purchase of raw material, marketing of their products, etc. The recoveries would also be spread over the year in small driblets. A constant and careful supervision and account-keeping would be called for on the part of the governing panchayat. This would involve careful nursing in the first stage of such societies. Co-operative principles might also be applied not merely to the financing of such societies, but also to the assembling of raw material and marketing the finished product. It seems to me that under the existing conditions, an immense amount of time is wasted and human energy dissipated by each individual worker walking long distances to and from *hâts*. Where the number of families engaged in the industry is big enough, they could arrange to employ one man with a cart to market the produce and also to purchase fresh raw material. No doubt the form which the co-operative organization would take would ultimately depend very much on the nature of the industry. An industry like weaving obviously lends itself to co-operative effort.

As regards the scattered groups of operatives found here and there in the villages, I think they also could in many cases be combined into groups in such a way as to render co-operation possible. Where the families or small groups of families are far separated either by distance, or caste, or want of mutual interest, then the application of co-operative principles becomes a matter of difficulty. Such detached industries could, however, be greatly helped by ordinary industrial loans. There is, however, another form of co-operative organization which might possibly be applied to such detached industries. Where the operatives are few in number and poor, and where the consumers are mostly people of the same village, or of very near villages, a community of interests exists between the producers and consumers which might be made use of for co-operative purposes. A panchayat could be appointed which could obtain the initial capital necessary, partly by subscription and partly by means of an industrial

* Not printed.

loan granted on the joint and unlimited security of the members of the society. The panchayat could then finance the operatives by means of small loans granted as might be necessary, the rate of interest being a little higher than the rate paid for industrial loans. A fund would thus be built up for the improvement of the industry with beneficial results to both producers and consumers. Such a fund would in time, no doubt, enable the society to send a youth to be trained in an industrial school, some arrangement being made for the subsequent reimbursement to the fund of the expenses entailed. I merely throw this out by way of suggestion. The development is one which would come naturally at a later stage.

As the number of co-operative societies increased, a regular banking system would become necessary. The surplus funds might be deposited in some existing agricultural bank. I think there is a stage at which agricultural and industrial co-operative funds should be amalgamated so as to enable the one to strengthen the other Thus in time the provincial co-operative bank would finance both village agriculture and village industries.

Ready facilities for industrial education seem essential to the success of any co-operative scheme. I would go so far as to advocate the setting up of an industrial school in each subdivision, certainly in each district, if not in each subdivision. An Industrial Department with a Provincial Director at the head, would provide the necessary element of continuity, both in policy and interest. It would, of course, be one of the principal duties of the Director of Industries, I take it, to visit all industrial schools and co-operative societies.

(*Mr. Perrott also gave confidential evidence.*)

ORAL EVIDENCE, 17TH NOVEMBER 1916.

President.—How long have you been in the Civil Service ?—Sixteen years.

In this province ?—Yes.

Your views therefore represent the problem that we are up against from the point of view of Bihar ?—Yes, but they are my own private views only.

You advocate the formation of commercial museums at the head-quarters of districts or at the divisional headquarters ?—Yes.

You know the Calcutta Commercial Museum?—I do not.

In the Calcutta Commercial Museum they exhibit not only the article but the name of the maker and the price of the article. It would be obviously impossible, I take it, to carry on this system at the headquarters of each division, as it would be difficult to get a staff that would keep abreast of the time in the matter of prices ?—I understand you to mean that the museum should be a kind of advertising agency. If that be so I think it could not be done at the divisional headquarters.

You would prefer something like sales agencies to commercial museums ?—I am not quite sure about the meaning of sales agencies.

It is an institution that receives from the villager articles for sale at the fairest price obtainable and registers orders from customers for execution by the village workers ?—I have doubts whether a museum would fulfil that purpose. I think it should be confined to being an advertising agency. It would perform two functions; one is, to enable outsiders who wanted to know somthing about the possibilities of the district to come for themselves and see the things with their own eyes, see what sort of raw material there was and what kind of cottage products, and on the other hand it would serve as an advertising agency.

You do not think there is a danger of a small museum of that kind becoming dusty and neglected ?—I think it would depend very much, of course, on the amount of local interest taken in the matter. Generally, I do not think that it would become dusty—not in those districts where there was really anything worth seeing.

You say of trade representatives, "Unless trade representatives could be found who possess a very comprehensive knowledge of Indian industries, I doubt they would be of very much use, except as a medium for making enquiries." Don't you think that if we develop in India a system of departments of industries in the different provinces and if those departments are properly manned with a director and sufficient assistants we shall gradually build up a body of officials who will have a fairly comprehensive knowledge of Indian industries ?—Undoubtedly so.

Do you think that if the trade representatives abroad are drawn from men of that class they would benefit the Indian industries ?—I think they would.

In paragraph 16 you say with reference to the application of the land Acquisition Act to acquire land for an industrial purpose, "On the other hand, it is a very delicate matter to interfere with proprietary rights." Don't you think that the time is come in India when we have to consider the general interests of the country as sometimes superseding local and private interests ?—My personal view is that it is.

The position of this province and also of Bengal is rather peculiar in that the permanent settlement exists. Are you free to say definitely whether the permanent settlement has or has not been a drawback to the progress of the province ?—My personal opinion is that it has not made for the progress of the province.

You would not like to make any proposal with regard to how these difficulties have to be faced ?—The question is one of great difficulty. I think in the interests of industry it may be advisable to give very limited and carefully protected powers to interfere perhaps with proprietorship, but the difficulty of defining these and the method of using them seem to be very great.

Would it be possible to frame an Act so that due regard may be paid to these established rights when it is known to a recognized authority that an industry cannot be started or cannot succeed unless it gets certain lands, water rights or means of access ?—If an industry was in the opinion of some competent authority or the Local Government, one that would benefit the locality, I think that would justify interference with proprietary rights.

The Land Acquisition Act, as framed at present, is designed to promote the acquisition of land for a public purpose ?—Yes.

Would it be possible to extend the meaning of the Act to this extent that it would be justifiable for a recognized authority to say that an industrial enterprise is really in the interest of the public in spite of the fact that the person or company who undertakes the enterprise makes a profit ?—I think it would be clearly justifiable in the case I mentioned, that is to say, where the locality would obviously benefit by the industry, but I am not quite sure I am prepared to go further. The power to decide whether an industry would or would not be in the interests of the district, I should think, should rest with the Local Government.

You think that the people generally would be willing to accept some legislation of the kind ?—The only people who might object, of course, are the landlord. No body else would object. I could not say whether the landlords would or would not object.

In paragraph 35 you say, "The Forest Department is at present planting closed blocks with *gamhar* trees in the Santal Parganas. This is to meet the demand of certain firms for this wood for the manufacture of bobbins." Who has decided that this wood is suitable for the manufacture of bobbins ?—I do not know. I know the firm concerned.

Is it the same wood as what they call *haldu* in the United Provinces ?—I am not sure.

There is an enterprise being organized there for the manufacture of bobbins from *haldu* and so far as we can judge from hearsay there are favourable conditions locally for the successful manufacture of bobbins. I want to know whether the enterprise you refer to has been before the Forest Economist ?—I do not think so. Not to my knowledge.

Would an industry of the kind be referred to you as the Deputy Commissioner of the Santal Parganas ?—Generally it would be referred to me.

Whose business would it be to be quite sure that this enterprise was being undertaken with due regard to similar enterprises elsewhere in India ?—The Forest Departments.

In dealing with the development of the lac industry, would you not require technical advice of a special kind ?—I think so undoubtedly.

Has the Local Government got an expert to deal with questions connected with lac industry ?—Not to my knowledge.

Is it possible that an industry of this kind may be undertaken by officials without sufficient expert guidance ?—No, I do not think so, because so far we have not interfered with the industry.

But perhaps you ought to interfere with the industry ?—I think that is where we want expert guidance to enable us to know what industry should be developed.

The net result of your observations is that we have insufficient technical and scientific experts to give reliable and authoritative advice on most of these things ?—Yes, with the exception of tusser silk.

Have you sufficient guidance in that matter ?—I understand that tusser silk industry is being taken up very thoroughly at Pusa.

Your idea is, I understand, that the technical and scientific work ought to be the business of Imperial departments ?—I think that the research work ought to be the business of the Imperial departments. I would not have an Imperial Department of Industry in which the Provincial Governments would have no say.

Would it satisfy you if you had a Provincial Director of Industries to guide and control the cottage industries and to act as channels of communication to all the different departments concerned, acting in fact, as a sort of provincial switchboard, for the inquirer to be put into communication with the proper person who has the information, whether he is an Imperial or a local officer, while the purely technical and scientific work was done by the Imperial Department?—Yes.

Would it not be very difficult for each Local Government to provide all the experts required for the various industries?—My idea was that there should be an expert staff for the whole of India and it should be a movable staff, so that if one particular provincial Director wanted a lac expert, he could ask for one and get one within a reasonable time.

The Government of India Technical Departments would, in fact, be the central reservoir from which the Provincial Governments could obtain advice when required?—Yes.

Have you thought out the question as to whether it would be better to have, say a chemical department for the Government of India dealing with chemical problems of all kinds throughout India in the matter of research, or whether it would be better to have a research institute in the south of India dealing with botany, zoology, and all the other forms of scientific research, and another such composite institute in the north of India. Which do you think would be a more efficient system of classification?—I find it rather difficult to see the bearing of subjects like biology and zoology on industrial matters.

What about insect pests on tea, coffee, etc.?—That kind of research seems to me to come more properly within the purview of the Agricultural Department.

But some of them might come under the Forest Department?—Yes.

Let us then narrow the question to entomology. Is it better to have one department containing all entomologists with a common reference collection and library undertaking work for the Forest Department, for the Agricultural Department, planters and all others, or is it better for the Agricultural Department to have its own entomologist and the Forest Department to have its own entomologist, separate from one another, with different collections, different reference libraries, and different laboratories?—I think that if there was much overlapping, it would be highly desirable to have the whole thing in one place certainly, but if there was a small amount of overlapping I do not think it would be open to objection.

If it were possible to provide a fully equipped entomological department for agriculture and a fully equipped entomological department for forestry, from the administrative point of view, the two departments might be separate. But is it possible to provide in this country a full reference museum for entomology dealing with forest products and another complete reference museum for entomology dealing with agriculture products?—It would be possible of course. It is a question largely of cost, I take it.

Apart from cost, specimens are not obtained in a day. Separate collections of insects have already been made, for instance, at the Calcutta Museum, at Debra Dun, at Pusa, and at various agricultural colleges. Is this system likely to conduce to efficiency?—It might make for efficiency to have the whole of the entomological work done in one place, and similarly for each of the other departments; but, on the other hand, so long as there is no waste from overlapping, I should say it is just possible that having entomological work done in two places may lead to a certain amount of healthy competition.

Consider the question from another point of view. If you are going to get the best man you will have to give him suitable prospects. Would it be possible to maintain a service that would open to the junior scientific men sufficient prospects if you split your zoologists into these different groups? Would it not be easier to maintain a zoological department so that a junior officer may hope some day to become the head of the zoologists in India?—I think it would be sounder.

Could you now, with those arguments, balance in your mind which, in the interests of the country, would be the best form of classification—the splitting up of zoologists, making them handmaids to different departments, or the formation of one zoological department covering all phases of zoology, making it available, like any other service of India, for the help of other departments and the general public?—I think I would have a single department.

If other departments like the Forest department could borrow experts when they wanted them, without delay, then I think it would work very well. I am not qualified, however, to speak on this point. I know very little about the Forest Department.

You propose what you call the district intelligencer system by which at the district headquarters a list of all the industries will be kept approximately up-to-date. There will, of course, be a danger of such a list getting out of date and I take it for granted that you prefer that that list should be inspected regularly by the Director of Industries for the province?—Yes.

Hon'ble Sir F. H. Stewart.—You say, "There is a special law of acquisition in the Santal Parganas, which enables a proprietor to acquire village lands for the benefit of the estate subject to the approval of the Deputy Commissioner". Will you please explain this a little more fully?—Suppose a Calcutta firm has discovered coal in the Santal Parganas and wishes to work it and gets a lease from a proprietor. Then a part of the land which it was desired to take up may be covered with raiyati holdings or possibly village waste land, or what they call *gochar* land which is land reserved for village grazing purposes. That land could be acquired by the proprietor in this way. The proprietor would put in a petition before the Subdivisional Officer asking to be allowed to acquire this land. Then the Subdivisional Officer would work out the rates of compensation for the various kinds of land to be acquired and prepare the case and would send it up to the Deputy Commissioner, and the Deputy Commissioner would, if he thought the purpose was one which would benefit the estate of that particular proprietor, sanction the acquisition. In cases where the proprietor wanted to acquire land for a purpose which the Deputy Commissioner considered was manifestly contrary to the local good, then he would refuse. He would exercise a very wide discretion.

The Deputy Commissioner's decision would be final, subject to appeal to the Commissioner?—Yes, subject to appeal to the Commissioner.

Is it often exercised?—Very often.

Is it peculiar to the Santal Parganas?—So far as I am aware it is peculiar to the Santal Parganas. The regulation is one which applies only to the Santal Parganas.

The Land Acquisition Act of 1904 is Imperial?—Yes. Ours is purely a local Act and it only enables a proprietor to acquire the rights subordinate to him. It does not enable us to acquire the proprietor's rights.

Have you got the *tinkottiyah* system?—No.

With reference to your suggestion as to the Advisory Board, who do you think should be the chairman of the Provincial Advisory Board?—The Director of Industries should be the chairman.

You say that the Board's sanction should be purely advisory and that the Director's should be executive?—Yes.

Do you think that would work in practice?—I think it would.

You mean that the Local Government would pass a budget submitted by the Director of Industries and he would have power to spend the funds?—Yes.

Without the further control of the Local Government?—Subject to the general control of the Local Government.

Not subject to the control of the Board of Industries?—No.

Then you say that you think that the provincial Director of Industries should be an official. We have had a good many replies on that subject. Most of the people at another centre have thought that a business man would be necessary. Would you qualify your opinion with regard to the needs of different provinces?—I have no experience of other provinces.

With reference to your suggestion about the commercial college at what age would you send students to that college?—Sixteen to nineteen.

And then two years more practical training. It would be a long and expensive education?—I doubt if it would be more expensive than the education for the Medical and the Bar.

You put down a very comprehensive list of subjects. Would you include commercial English?—I do not know what it is.

Would you say that an average Indian boy of sixteen is sufficiently conversant with up-to-date English to be able to assimilate instruction usefully in all these subjects?—I think that a fair percentage of boys of that age would be able to understand the subjects in English text books.

The commercial college you suggest should be under the Educational Department?—Yes.

You are eliminating the Educational Department from the control of industrial schools?—Yes. I would not give them control of industrial schools.

You would substitute, in fact, to some extent the district officer for the Director of Public Instruction?—I think it does amount to that.

The President suggested that one of the principal wants in the development of industries was the insufficient number of experts, both scientific and technical, and you agreed with that. But don't you think that another class is largely wanted, practical demonstrators, practical foremen, not merely people to advise but people who will work and show?—I am not quite sure that I understand your question fully.

Take it this way. Would it not be at least as valuable, if not more valuable, if instead of men who knew in detail all the process of weaving and sat in a college or a school you had

a practical weaver going round showing the people in their villages how to weave?—I think that it would have a good effect. It would be desirable to have such men working in connection with the industrial schools.

My point is that it would be perhaps more satisfactory to show the people at any rate for many years, how to do a thing rather than to tell them about it?—Yes, undoubtedly. I consider that a very important point. I am convinced myself that there is no use in lecturing at all.

With reference to your note on co-operation have you any co-operative societies for industrial purposes already in this province?—I know of none.

Do you think that the governing panchayat can exercise sufficient supervision over a co-operative society for industrial purposes? It would be more complicated than in the case of societies for agricultural purposes? Yes. I think that if at the outset a very careful selection were made as regards local conditions and the right kind of men were chosen—always assuming that there is somebody either an official or a non-official.

You have the Registrar?—Yes. I mean that there ought to be some local person or persons of some position who would take an interest in the things and inspect them and in fact dry-nurse them for a certain period?—I think that would be necessary. There would be also the district officer. He should, of course, take an interest in them, but the actual dry-nursing would be more properly done by people like the smaller zemindars who have taken an interest in the subject of co-operation.

And they are beginning to do so in increasing numbers?—Yes.

Hon'ble Sir R. N. Mookerjee.—In paragraph 4 you say, "Many of the smaller industries in classes 3 and 4 are greatly hampered for want of capital". Can you suggest any remedy for that?—I suggested that in another of my answers. I have tried to show how it could be possible to get capital by co-operative methods.

Have you any idea of what amount can be got from these villagers by using co-operative methods? Do you say that all the villagers would subscribe money and you can thus raise the necessary capital? Do you mean at the start ultimately?—Say, ultimately. We know of the means of the villagers.

What amount of capital do you think would be thus raised?—I think that as co-operation spread from one unit to another and from small units to bigger units, the capital which now goes into the hands of mahajans would largely accumulate in the hands of the village societies.

Practically all the villagers are living from hand to mouth. As far as our experience goes they have never been able to save nor will they save anything in the near future?—Our experience is that co-operative societies go to show that they can save if the co-operative system is properly started and properly financed.

You have no idea as to the amount of capital required to develop these industries, that is, the village industries?—The amount of capital required would depend entirely on local circumstances as regards the industry and the people.

Take your own district. You say so many industries can be developed there?—I can say that a very little capital would have a very good return.

That very little capital up till now has not been supplied. If all these industries could be developed with very little capital, what was the difficulty in developing them?—At present the capital is not available and if it is available it is in a form which makes it difficult for the people to benefit by it.

Do you think that there should be an industrial survey other than the geological survey?—I think that an industrial survey other than the geological survey would be of great benefit. I think there are raw materials which would probably repay a survey of that kind. I think that the possibilities of certain raw materials would be worth the expenditure on a survey. The Director should have the administration in his hands of the industrial loans if there are such loans.

It is not like the Public Works Department where it would be clearly explained that it should expend so much money on such and such a repair. You say that the Director should have money and the power to spend the money. The budget must be a lump sum budget? He cannot, in anticipation, say that such and such an industry will come?—I think he should have a detailed budget in the same way as the Director of Agriculture. He would have to budget for the amount of loans he would issue in the following year.

You say the provincial director should have a number of experts. Do you know what the expenditure would be on the chemical expert and the other experts in each province? Do you advise the Government to spend that money in anticipation?—I think I have explained to the President. I would not have necessarily a fixed staff of experts, but a staff of experts,

which could be obtained from the central research institution. If a provincial director wants an expert on any particular subject he ought to be able to obtain him within a reasonable time.

As regards the commercial college, you say that the boys should have two years' practical training. In which branches?—You enumerate so many subjects. I think he should have a course of practical training before he goes into any business

Where and how? Say, for instance, a mechanic, you can ask him to go to workshop. How and where will students of all branches have their practical training?—They can get themselves apprenticed to the business which they wish to join ultimately.

If you allow lads of sixteen to go there do you think that they will be able to understand political economy, précis writing and currency system?—I merely suggested these subjects as a curriculum which would run over three years. Possibly they may not take political economy till the second or the third year. I do not see any reason why a lad at that age should not learn political economy.

If it is a college, one has to go there after passing the entrance examination. Would you be satisfied to call it a commercial school?—I do not think that it would matter very much.

You say that each subdivision should have an industrial school. Of course, you know that an industrial school must have a workshop?—Yes.

Have you any idea of the expenditure involved in having a properly equipped workshop? We have a school now which has a carpentry department and a metal work department and a weaving department and it costs us about Rs. 3,000 to Rs. 3,500 a year, but I ought to explain that it is run by a local mission and so we get free the supervision of competent men which of course we should not otherwise get. That mission is a Scandinavian mission.

Mr. A. Chatterton.—In paragraph 3 of your evidence you say that Government assistance should be in the form of industrial loans on the lines of Land Improvement and Agricultural loans. These should be given on the security of landed property? Where the land is saleable I would make the land as security, but I would insist as far as possible on joint and unlimited liability, that is to say, the industrial group should take loans on joint and unlimited liability.

You would not apply this system to loans by individuals? I would do so where no co-operative grouping is possible, but only in such cases. Where co-operative grouping was possible, I would apply the principle of joint and unlimited liability, but in cases where the workers are few and far between, co-operative grouping may not be possible and I would not debar individuals from the benefit of such loans in individual cases.

Would you apply that to the granting of loans for what you have classified as middle industries?—I think the industrial loans should, at any rate, primarily be for the village industries and not for class (2) industries.

How do you know that an industrial loan is going to be usefully spent on the village industry? Who is going to control the expenditure?—I think that the co-operative society should elect the panchayat and that panchayat should control the expenditure.

Have these men sufficient technical knowledge of their trade to be entrusted with the control of expenditure for improving the business? Suppose you have thirty weavers in a village and you form them into a co-operative society and you lend them Rs. 1,000, do you think that they will spend that wisely?—If left entirely without supervision I should say they would not spend it wisely.

Where will the supervision come from?—That is the difficulty.

What steps do you recommend to provide this supervision, to supply the proper supervising agency? I think that the best form of supervision is, I think as I have stated before, the smaller zamindar and the more respectable local men who take an interest in co-operation. That is for immediate supervision, and as regards the more remote supervision, the subdivisional officer generally takes an interest in co-operative matters and would be willing generally to give a helping hand to the system.

Your smaller zamindar and the local district official and other people are actuated by philanthropic motives. But are they competent to really supervise a scheme for improving the industry? Is it not a case of blind leading the blind?—No. I think that the ultimate supervision as regards expert methods should be with the Director of Industries, and his experts. Assuming that expert supervision is provided, then the local officers and local people will apply the co-operative principle

That is to say, the local people would exercise a certain amount of financial control to see that the money is properly spent? Yes. Also I would go a little further than tat, because

I think in the case of most of the village industries, such as weaving, the local consumer is in as good a position as anybody to judge of the product. He knows whether the cloth is a good cloth or bad cloth—at least his wife will if he does not.

The granting of these loans you would entrust to the Director of Industries?—Yes.

Who would be responsible for the recovery of the loans?—The local district officers. I think the administration should be exactly the same as, or on parallel lines with, that of the land improvement and agricultural loans.

In the case of land improvement and agricultural loans the loan is either granted by the district officer, or if it is a large amount by some superior authority. The Director of Agriculture has no power to grant these loans?—That is true. The system is that the district officer has so much placed at his disposal each year. The same thing may be done as regards industrial loans. The Provincial Director can divide up the sum at his disposal among the district officers.

If anything of this kind were to be done, the closer you bring the Department of Industries into contact with the villager without the intervention of any intermediate officer the better?—No, I would allow a perfectly free contact. I would allow the same freedom of contact as exists at present between the Director of Agriculture and the cultivators.

My point is this, that the Director of Agriculture does not disburse the money and you suggest that the Director of Industries should?—I think he should disburse money through the local agencies, that is, through the district officers. He might keep a sum in his hands out of the budget funds for immediate disbursement if he thought necessary.

You say that middle industries require financing only in certain cases. How would you be able to establish oil mills and sugar mills? They are very often important adjuncts to the development of agriculture in the district. Would you leave that entirely to individual effort?—I should at present leave it to individual effort until the development of industrial co-operative credit would admit of some provincial banking institution financing it.

You say that the Provincial Director should be an official?—Yes.

You mean a member of the Indian Civil Service?—I would not confine it to the Civil Service. I would leave it generally as an official. I take it generally that he would be a member of the Indian Civil Service.

Besides the administrative control over the department would it not be one of the functions of the Director of Industries to initiate matters?—I think so. You mean initiating a new enterprise?

To put a proposition before a private capitalist if it was a suitable one. Don't you think that you want a man who has some wider or deeper training in these matters than the average official?—You mean that he should be allowed to initiate private enterprise by collecting or helping to collect capital?

The Director of Industries would know that capital exists in certain parts of the country. He should be able to prepare a case for starting a mill or factory. To do this would you not want a certain amount of expert knowledge?—I do not think it should be the work of the Director to deal with such matters. The Government would be taking then a rather heavy responsibility in the matter.

What would be the functions of the Director of Industries then?—I think he should supply expert advice where necessary through the medium of his experts and he should do what he can to promote and encourage smaller village industries, one of the means being administration of the industrial loans, and he should do all he can to encourage the application of co-operative principles to village industries.

He would be a post office between the expert and the Government? He could combine in him the functions of the Registrar of Co-operative Credit Societies or a part of his functions?—I would not call him a post office between the expert and the Government.

In the Santal Parganas tusser silk cultivation is an important business?—It could hardly be termed an important business at present. It is rather on the decline than otherwise. I do not think it was ever important in that district.

Is it capable of large development there?—By co-operation and loans it certainly may be developed. It is on the downward grade at present chiefly due to want of capital.

In one of your letters to the Commissioner of Bhagalpur Division you stated that a district commercial intelligence was under preparation for your district and that it would be ready about the end of this month?—It has not been published. The material is here. It has not actually been properly collated yet.

Do you intend to go on with that preparation?—Yes. My idea was not to go to the expense of printing it but merely to have it typed and put into a book form.

You have some remarks in your written evidence about industrial schools. Do you mean that this statement should be taken as it stands. "It is hopeless to expect the workman to be really efficient if he has no general education"?—Yes. I think so. That is my opinion. There is only one industrial school at present in my district.

In this industrial school is general education carried on at the same time as industrial education? Does the boy spend half the time on general education and the other half on industrial education?—No. They have a night school.

There is a separate school?—The academic school is a separate school in connexion with the same Mission.

At what age do the boys come to the school?—The age varies considerably. We do not take boys under 16, but sometimes we take men of 20 or 21.

You do not advocate having general education in the industrial school?—I would have general education given entirely through the night school. It must be subordinate to the industrial education.

In these industrial schools would you aim at getting boys who had obtained literary education?—It would certainly be a consideration in selecting the boys, and we would consider that point. We would prefer to have a bright boy naturally to a dull boy, but on the other hand, if a boy showed special aptitude in some particular line of practical work we might have to revise that consideration.

If they cannot read a vernacular paper do you say it is of much practical value to them?—I think it must be of value.

In what way?—It enables them to keep their accounts which is certainly something, and I also think it should be an advantage that they should be able to read and write for their general work.

If they do learn a certain amount of reading and writing in these elementary schools they forget all about it in a year or two?—That is not my experience. I have some headmen and other village officers in the Santal Parganas who keep up reading and writing and account keeping and do not forget what they have learnt at school. It all depends, I take it, on whether they have had any occasion to do any work which invloves reading or writing. The headman of a village would have of course.

The artisans in the small town have very little work which invloves reading and writing?—I should say it depends on the nature of their business and the size of it. They might have to correspond with mahajans and merchants and others in a small town.

President.—When you say that you think that ordinarily this Director of Industries would be a member of the Indian Civil Service, do you contemplate that any member of the Indian Civil Service would be satisfied to remain for many years, say ten years, as Director of Industries?—I should think it quite possible.

Would you not consider that he would handicap himself in his career of a member of the Indian Civil Service?—I do not think so.

What amount of service would you expect him to have before he becomes a Director?—Say, eight to twelve years.

Let us take the average, i.e., 10 years. After another ten years as Director of Industries he becomes a fairly senior officer. Would the prospects be sufficient for an ambitious officer?—I cannot speak from the point of view of an ambitious officer. I see no reason why the ordinary officer should not accept it. After all, generally speaking, he would not become a Commissioner till he had put in 24 or 25 years' service.

According to the proceedings of your District Industrial Committee, which was held on the 26th September 1916, the Committee say that they had not received any benefit from researches conducted by Government departments. Does that include agriculture?—We were not thinking of agriculture at the time.

You think that has got in by mistake?—We were thinking of industrial departments. I am sure the members were not thinking of the Agricultural Department at all. The note is not put as clearly as it should have been.

Did the members include the Forest Department and the Geological Survey? Have you never had any benefit from the work of the Forest Department in your district?—Not to industries.

Is it responsible in any way for the work in connection with *sabe* grass?—No.

Or for the timber in your district?—They work their own business in timber. They have their own industry in timber.

Has there been any research in minerals conducted?—Not that I am aware of.

Your committee also says that there are no demonstration factories in this district and is of opinion that they would serve no useful purpose. I understand you said that you are in favour of peripatetic weaving demonstrations or other demonstrations of recognised industrial developments ?—I would be in favour of demonstration departments for cottage industries attached to the agricultural demonstration farms as a kind of department of agricultural demonstration farms.

But suppose the Government, or the Director of Industries, become aware of an improvement in handlooms, or in oil pressing machinery. Would you not be in favour of having demonstration factories in your district for showing the improvements to the people ?—Well, I think there is a good deal of difference between the two instances that you mentioned. The case of an improvement in weaving looms is a case in which it is perfectly easy to demonstrate at a cheap cost and the result of the demonstration is extensive, or ought to be extensive. But in the case of an improvement in an oil machine, the benefit that could be derived would only be derived by a small class of people and also the demonstration might involve considerable expense.

Your committee's resolution would require a little modification to make that clear ? You think that in some cases practical demonstrations could be made really useful to the people ? —I think that should be modified.

What experience have you had of the working of the mining and prospecting rules ? What minerals have been taken under prospecting licenses or mining leases ?—There have been several applications made for coal prospecting and mining leases by big Calcutta firms, and we have also leased out some—I think about a dozen—small coal mines to local people.

Is coal in the Santal Parganas in the Government lands or in the permanently settled area ?—Partly in one and partly in the other. Traces of coal on the surface are more numerous in the Government estate than outside, but there is a line which runs across the district.

The mining leases have been granted under the rules of 1913 ?—I think they are the latest rules.

And you have had no complints against the working of these rules ?—No.

WITNESS No. 45.

Rai Sahib Radhakishun Jalan. RAI SAHIB RADHAKISHUN JALAN, *Banker, Merchant and Commercial Agent, Patna City.*

WRITTEN EVIDENCE.

Financial aid to industrial enterprises.

In my opinion the modes of giving Government aid referred to in question no. 5 are in the abstract desirable modes, but in their practical application require to be scrupulously considered.

Money grants-in-aid may tend to cause hardship to existing or new concerns not so aided. Similarly more or less with the other modes. Mode no. 6 should on no account be adopted, as it fundamentally conflicts with the non-interference policy of the Government in matters of industry. It seems to me that the most suitable encouragement to industries will be by means of Government banks managed by a committee substantially representative of Indian interests. Aids by Government should be confined to industries and enterprises incorporated within the country. In the case of an aided concern, Government should have some control over the same, according to the nature of the aid, to see particularly that the aid is not misused. For this purpose Government should require the aided concern to furnish periodical reports and their accounts should be audited by the Government auditors.

With reference to question no. 13, I have particularly to note that to prevent abuse of aid, a Board should be constituted representing each province substantially, in order to advise the Government whether a particular concern stands in urgent need of any particular aid and subject to what restrictions and limitations such aid should be given. Further detail of the constitution of such a Board will be found in my answer to questions nos. 57 to 62 *post*.

Technical aid to industries.

With reference to question no. 20, I should say that the province of Bihar requires demonstration factories for sugar and paper, for the latter of which an ample supply of bulb and grass is available, and also mechanical demonstrations for making machinery of ordinary requirement out of the iron available in the province. The demonstration in agricultural processes should be popularised.

Assistance in marketing products.

Commercial museums are good institutions in their way and so are exhibitions, but I attach great importance to sales agencies, which serve the purpose of both and at the same time introduce the articles to the market much better. Sales agencies should be formed and developed, as far as practicable, in every principal town. For their proper development and utility, public should be invited to be interested in them.

Q. 34.—Yes. Their first qualification should be practical industrial experience in India, and of Indian resources. Their primary duty should be to push forward Indian products of industry abroad and bring home the experience of foreign countries for practical development of Indian industries.

Qs. 35-37.—Yes.

Q. 39.—There should be an Industrial Bank of India under a strong Indian body of industrial and banking experience and supervised by Government in each province.

This bank should have branches at all important places within the province to be in touch with and assisting the various existing sales agencies all over the country. Such banks will be under the control of the Board of Industries described in my answer to questions nos. 57 to 62.

Other forms of Government aid to industries.

Q. 40.—I think that it is not necessary for Government to supply raw materials on any terms.

Q. 42.—This matter should also be entrusted to the Board referred to in my answer to question no. 13 *ante* and questions nos. 57 to 62 *post*.

Training of labour and supervision.

Q. 50.—Of a department of Industries.

Q. 52.—They should be helped to enter as apprentices in bigger firms in India and abroad.

General official administration and organization.

Q. 56.—There is no such private organization to my knowledge.

Qs.—57 to 62.—Each province should have a Board of Industries consisting of 7 or 9 members of practical experience in local industries. The President of such a Board should be the Director of Industries, who should be, as far as practicable an expert official. This Board of Industries should control the matters referred to in my answer to questions nos. 13, 39 and 42. The principal function of this Board would be advisory to all the private industries of the province, which industries should be encouraged to seek its advice and assistance in circumstances of difficulty. The function of the Board of Industries would be executive with budgetted funds so far as it relates to the matters referred to in my answer to questions nos. 13, 39 and 42.

The Board of Industries should be under the control of the Provincial Government. The Government of India, through a special department, should finally control all the Provincial Boards of Industries.

Organisation of technical and scientific departments of Government.

Qs. 78 and 79.—Suitable portions of scientific works should be translated in the vernaculars and circulated to the people on the principle of circulating libraries. Such libraries should organize periodical popular lectures at various central places in the vernaculars.

Q. 80.—Yes. An important part of its work should be to impart training through the vernacular to special classes.

Q. 81.—By imparting industrial knowledge to the people specially through the vernacular and training them in commercial knowledge and also by training students who would be expected to utilize their commercial knowledge practically through the industries.

Government organization for the collection and distribution of commercial intelligence.

Qs. 82 and 86.—The publications referred to in these questions would have their utility vastly increased if they are also made in the vernaculars. As a matter of fact nearly the whole mass of Indian traders and industrial people are quite in the dark about the utility of such useful publications. I would therefore strongly urge their publications as far as practicable through the vernaculars also.

Q. 88.—Each province should have its special trade journal. Such a journal should deal with the descriptive and commercial aspects of the various industries within the province and should formulate suggestions for their improvement and for the creation of new industries.

Other forms of Government action and organization.

Q. 96.—I do not see any necessity for enforcing such registration.

Q. 98.—The existing railway freights are so tariffed that they afford greater facilities to big stations. This acts prejudicially over the trade and industry of intermediate stations. This state of things should be remedied and also special concessions should be allowed to products of, or materials for, industries at intermediate stations.

ORAL EVIDENCE, 17TH NOVEMBER 1916.

Hon'ble Sir R. N. Mookerjee.—You say that "commercial museums are good institutions in their way, and so are exhibitions, but you attach great importance to sales agencies which serve the purpose of both and at the same time introduce the articles to the market, much better. Sales agencies should be formed and developed, as far as practicable in every principal town, and for their proper development and utility the public should be instructed to be interested in them." How do you propose to interest the public?—By offering them special terms.

In answer to question 34 you say "Their first qualification should be practical industrial experience in India and of Indian resources. Their primary duty should be to push forward Indian products of industry abroad, and bring home the experience of foreign countries for the practical development of Indian industries." How do you propose to do this?—By having a number of agents.

In answer to question 39 you say, "There should be an Industrial Bank of India under a strong Indian body of industrial and banking experience, and supervised by Government in each province." Is there such a thing as an Indian body at present with industrial and banking experience?—I mean Indian and European.

How many Europeans are there in this province who have banking experience?—I know one, Mr. Collins.

You say that "the existing railway freights are so tariffed that they afford greater facilities to big stations. This acts prejudicially over the trade and industries of intermediate stations. This state of things should be remedied and also special concessions should be allowed to products of all materials for industries at intermediate stations." Can you give us an example?—From Delhi to Calcutta, for instance, the freight is Re. 0-7-10 for grains and seeds. This is a special concession rate for wagon loads at owner's risk. From Delhi to Patna the freight is Re. 0-7-4, and from Patna to Calcutta it is Re. 0-4-10. If the stuff comes from Delhi to here we would have to pay Re. 0-12-2.

With reference to the Advisory Board mentioned in your answer to questions 57 to 62, in what way would the Board use the budgetted funds?—According to circumstances.

WITNESS No. 46.

Hon'ble Rai Bahadur Nisi Kanta Sen.

HON'BLE RAI BAHADUR NISI KANTA SEN, B.L., *General Manager, Estate Nasarganj, Purnea; Vice-Chairman, Purnea District Board; and Member, Bihar and Orissa Legislative Council.*

WRITTEN EVIDENCE.

I.—Financial aid to industrial enterprises.

General.

At the very outset, I beg to state that the views I am going to express, in connection with the points at issue, ought not to be taken as those of an expert as my knowledge is limited and entirely confined to the province of Bihar. In my capacity as Vice-Chairman of the Purnea District Board, a lawyer, and a managing agent of a big estate, I had occasion to think of and consider the various aspects of the economic condition of the people and my experience is mainly derived from what I had seen and observed in Bihar proper.

In my humble opinion, the question of industrial progress connot be independently dealt with, without taking into consideration the various other problems which are inter-linked with the main issue. Industrial enterprises must depend mainly on the extent of the local agricultural and mineral products available. Although this province is purely agricultural in its nature and is capable of producing enough materials for several industrial enterprises, yet matters stand where they were half a century ago. We have made no progress whatever in this direction. Nature has its own freaks and the landholders and the intermedae tenure-holders are having their shares of the produce, irrespective of the fact, whether anything is left to the actual cultivators of the soil, whose economic progress is now under consideration. Their condition should be first improved, before any question of industrial enterprise can be considered. Further, in order to understand and deal properly with the question of economic progress of the masses, it should be borne in mind that the masses are uneducated, conservative and to a certain extent superstitious, though intelligent, simple and always amenable to reason. They are ready to accept any improvements or changes, provided they are satisfied that these would produce a prosperous and healthy change in their present condition.

The first and primary cause of the non-existence of any industrial enterprise in this province is—(*a*) want of education, and (*b*) the defective system of imparting education., Bengal is no doubt 50 years ahead of Bihar in this respect but that has made no difference. Both the provinces are exactly in the same position so far as industrial progress is concerned. Since the separation of this province from Bengal, there has been a remarkable display of zeal and spirit in this connexion. We are very thankful to our Government for the help we are receiving for the spread of "literary" education among the masses, but, in my opinion the existing system of education given to the masses is defective. The mere opening of schools and spending of public money for the said purpose are not what is wanted. Salvation really lies in giving the masses technical, agricultural and industrial education along with literary education, which would, in the long run, equip them much better in fighting the battle of life. It is admitted that primary education is absolutely necessary and that every child, be he a son of a cobler, a carpenter, a blacksmith or a tailor, ought to learn how to read and write. But, at present, a boy, who enters a public school, has practically no object in view and can have none, as his school can only give him a literary education by teaching him languages, grammar, arithmetic and history. Literary education should not, *therefore, be the only goal of "education," but, something* else has to be introduced which would enable the masses to utilize the literary education to their benefit. The after-effects of the existing system of education appear to me to be simply disastrous and, in my humble opinion, the existing system of education is the root and cause of all dissatisfaction and political disaffection. Boys who ought to have followed some craft are allowed to enter high schools and Universites, although they should never have been there with the result that men who would have proved skilled artisans, labourers or mechanics, are lost to the country, by reason of the education they received during the best part of their life. To my knowledge, a tailor's boy preferred to enter service as a clerk, instead of following the vocation of his father who paid income tax on Rs. 3,000 a year. The majority of the graduates and under-graduates who come out of an University every year is composed of men of no means, who have drifted through a certain course for several years, with the ultimate object of entering service and, failing that, the legal profession. When, coming out of college, they find that they are fit for nothing in this world, they get disappointed and begin to cherish all sorts of ideas which develop into political disaffection. In my humble opinion, therefore, the gates of universities and higher schools should not be open to all, but only to those who are found fit to enter them, by reason of their social position and means or exceptional intelligence, talent and merits. Boys of ordinary means and intelligence should, after entering a primary school, be given a special training which would enable them to follow any particular craft in an improved style and with success. The district boards should be entrusted with this duty. Technical and industrial schools should be opened along with primary schools in various centres of a district, where elementary technical and industrial education could be given to boys along with literary education. At the headquarters of a district, there ought to be a central technical and industrial school, where technical education of a higher standard could be given to those who passed out of the primary industrial schools and also to outsiders. Then there ought to be a technical and industrial college in each province either aided or entirely supported by Government, which should be affiliated to University. If this proposal be adopted, I am confident, the cottage industries and the handicraft systems would again revive and there would be no dearth of skilled labourers and trained mechanics, and supervisors and managers. Openings there are many, but we lack in trained men. A carpenter, a blacksmith or a mason will command better wages if he can get an elementary education in his own art.

Technical and industrial schools and colleges.

The second cause which retards the progress of industry is the absence of commercial honesty or what we may call commercial morality. The striking feature of this province is that no two men can co-operate or join together to start any business. There is no dearth of capital in this province, although it may be confined to the wealthy zamindars, landholders and the middle class people. But what is deplorable is that, up to this time, in the whole of the province of Bihar, there has not been even one company, worth the name, which was started either as a joint stock company or on a co-operative basis. The simple explanation of this is that there is a want of a confidence, in consequence of which there can be no co-operation. The present system of education, which has turned out graduates by millions, has not been able to show a good result in this direction in the sister province of Bengal and in all probability the same result will happen in Bihar, if the same mistake which was committed in Bengal is repeated here in Bihar. Without the intervention of Government no better result can be expected under the present circumstances of the province. Government should come forward to organize industrial business, start joint stock companies, supervise them and raise capital from the people, who, owing to their absolute confidence in the Government and their representatives, would not hesitate to bring out money which they have been able to save. What I mean is this that Government should act the part of an organizer, supervisor and adviser. Recently we started a co-operative provincial bank at Bankipore and I believe the money was subscribed in no time when the people came to know that the Registrar of Co-operative Societies was *de facto* the managing agent of the bank. This instance I cite only as an example to show that there will be no lack of confidence and there will be no difficulty in raising capital for any industrial enterprise, provided the Government keep supervision and

Government intervention.

Capital.

control in their hands. I, for myself, will hesitate to put my hard-earned money in any enterprise which is not either started and managed by a firm of established reputation or controlled by Government, as I have my sad experience of the Banga Laxmi Cotton Mill of Serampore, Bengal. Without the intervention of Government, great difficulty will be felt in raising capital in this province.

Government financial assistance.

I am opposed to financial aid being given by Government to any industrial enterprise. I am not in favour of any of the methods of giving Government aid as suggested in question 5. What the Government ought to do, in my opinion, is to find out, through a department created for this purpose, what particular industrial enterprise could be started in the province and in what place and also the method of working it and finally to give it a practical shape by raising capital to work out the scheme. Government should further supervise the working of the said business, so long as it is not safe to leave the business in the hands of the shareholders or their directors. Government should never come forward with money grants-in-aid or loans for industrial enterprises, as that is opposed to the principles of self-help and self-reliance. We have the capital, men, labour and the raw materials, but we lack in training and commercial honesty. This can only be removed by Government coming forward to help us in starting business, in raising capital and in supervising the working of the business. In very special circumstances, Government may guarantee dividends for any particular enterprise, or in supplying machinery and plant on the hire purchase system but that should not be the rule.

Government control should not be dependent on Government assistance. In the beginning in all cases, Government control should come in as a matter of course, until the province is prepared to stand on its own legs. A representative of Government should always be an *ex-officio* director of every company started and there should be sufficient control of Government over its expenditures, and on the method of working it. This is absolutely necessary to create public confidence. The aforesaid remarks of mine may not be applicable to other provinces whose conditions may be different from those of Bengal and Bihar.

Director of Industries.

There ought to be a Director of Industries in each province, just as we have got a Director of Agriculture or Registrar of Co-operative Credit Societies. This officer should have a special training and must be sympathetic and always approachable. This department should co-operate with the Department of Agriculture, and much would depend on the activities of this department in improving the principal crops of the country, both in quantity and quality. The Agricultural Department should be responsible for the production of improved raw materials which would form the subject of an industrial enterprise. The ordinary cultivators still adhere to the old system of growing and reaping their crops—a system which existed some 50 years back. The Agricultural Department has not been able to show any appreciable improvement in this direction, up to this time, probably owing to the fact that this department is not still fully equipped with an adequate staff of workers. For the present the Agricultural Department will be well advised to open experimental farms as many as possible in every district which would bring home to the cultivators the result of improved and scientific method of cultivation. When the Department of Agriculture is able to improve the raw products of the country, both in quality and in quantity, it will then be the duty of the Director of Industries to find out what are the raw products of the province which are sufficiently available to form the subject of an industrial enterprise, to lay out schemes and finally to give them a practical shape. In fact, the Director of Industries should be ready with his own proposals and schemes and be prepared to consider any scheme that may be brought to him for consideration and should generally supervise the working of all industries which may be opened at different centres either personally or through his agencies.

Industrial Bank.

There should be a provincial industrial bank in each province for helping industries, in case any financial help is necessary. This bank should be started on the same principle as the recently started co-operative provincial bank of Bihar and Orissa. In no case should financial help be given to any enterprise from this bank, unless such help is recommended by the Director of Industries who should be *de facto* the managing agent of the bank.

Pioneer factories.

In my opinion, there should be no permanent Government enterprises, but the Government will be well advised if they start pioneer factories by drawing capital from the people of the province. If such factories prove commercially successful, they may be handed over to the shareholders who subscribed the capital or to any private capitalist who might have advanced the entire capital. Such pioneer factories should be closed if it be found to be commercially unsuccessful after a working of two or three years which will sufficiently indicate the nature of the enterprise.

Co-operative Credit Societies.

I am not aware of any industry which has been developed or assisted by the formation of co-operative credit societies. In this province co-operative credit societies have been opened in nearly all districts and the only good that has resulted up-to-date is that whenever a co-operative society has been established, its members have been freed from the clutches of the village money-lenders. But this only is not the spirit of co-operation. Attention should now be devoted to see that the members of the societies learn thrift and economy. These societies should never be allowed to be treated by the people as loan-offices where money

on easy terms is available. At present, besides starting village societies, and advancing them money on easy terms, no attempt is made to improve their economic condition by improving their land and teaching them to improve the raw products grown on their land both in quality and quantity. We do not, at present, see from what sources the village societies secure money for the repayment of loans advanced to them by the central co-operative bank of the district. I think it ought to be the duty of the district co-operative committees to see that the members of village societies do adopt improved methods of agriculture, in order to ensure a better quality and quantity of crops than they used to get before. They should further see that the crops grown by the members of the village societies secure a good market and fetch a proper value. This will not only improve the economic condition of the villagers but will also afford opportunities to the district co-operative committees to know what crops are available in the district and to what extent and to inform the Director of Industries of these through the proper channel. The district committees should further adopt means to develop cottage industries on a co-operative basis, because, in my opinion, the existing co-operative societies may deal with cottage industries with advantage. The country, in my opinion, is not yet ripe for such a stage when big industrial enterprises can be started on a co-operative basis.

Cottage industries.

II.—Technical aid to industries.

I have no experience of technical and scientific aid provided by Government to industrial enterprises. In my opinion, it would be advisable to establish an institute of research in every province. This should be maintained by Government and should be subordinate to the Imperial Institute of Research. The latter should be fully equipped and self-contained so that there may be no necessity of going outside the country for any research.

The services of Government experts in charge of such institutes should be lent to private firms or companies, if necessary, free of charge. Whenever any such research is made, the result of the researches ought to be published without any restriction or limitation, so that others may be benefitted. If any private firm or company desire that the results should be kept private, such firm or company ought to make its own arrangements for research on payment of proper fees.

It would be advisable to have demonstration factories, some in each province. These demonstration factories may be established in connection with the following industries :— Demonstration factories.

1. Weaving.
2. Tanning hides and skins.
3. Jute mills and mills for making gunny bags.
4. Carpentry.
5. Dyeing.
6. Rice and flour mills.
7. Oil mills.
8. Paper mill.
9. Glass factories.
10. Sugar factory.
11. Tobacco factory.

It is not necessary to establish demonstration factories regarding all the aforesaid industries in each province. It will be enough if they are opened at proper places irrespective of the province where they may be located. These demonstration factories should practically serve the purpose of institutions for practical training and admission of apprentices on payment of proper fees. At present there is no such institution in our province with the result that an oil mill and a shoe factory started in my district are unable to make any progress or any profit for want of business-knowledge and want of proper training.

For industrial purposes a survey should be made of the available resources of the country at the end of every ten years and the result of every such survey should be published in official gazettes. These surveys, if made periodically, will enable the people to know the exact resources of the country and to decide whether capital could be profitably invested in any particular enterprise.

III.—Assistance in marketing products.

In my opinion, industrial exhibitions would prove as useful as agricultural exhibitions. Government should encourage such exhibitions as they do agricultural exhibitions. Such exhibitions will afford opportunities to the people to exhibit the result of their local industries. Government should collect exhibits of the best articles produced in the country so that such exhibits may have an instructive value. Government should get a list of all such articles prepared and published so as to enable the buyers and millers to come in contact, even if they do not attend the industrial exhibitions. Commercial museums will serve the same purpose as industrial exhibitions—the former being permanent and the latter temporary in their character. As regards sales-agencies, I have very little experience Industrial exhibitions.

and my own idea is that the Provincial Department of Industries ought to take up the duties of sales-agencies and afford opportunites to the sellers to sell and the buyers to buy their articles. This department should issue bulletins from time to time to be published in every district, showing the market rates of the raw products and the market for such goods. This department will get all its necessary information regarding the supply of raw products grown in the province through the co-operative credit societies and the Department of Agriculture and in return will inform the said departments where to find a good market for the said raw products. If this is done, the interest of the cultivators will be safeguarded and they will not be deprived of the real value of their crops either through the machination of the village *mahajans* or the contrivances of the middle men. There need be no trade representatives in each province. The Provincial Department of Industry should communicate with each other and find out the best markets for the raw products of each province.

IV.—Other forms of Government aid to industries.

If any private firm or company requires Government to supply raw materials from the best markets for the purpose of any industrial enterprise, Government may do so provided a certain percentage is paid as commission. There will be no necessity of making such a request, if the Government will supply all information regarding the supply of raw products. Parties will generally find it convenient to make their own purchases, provided they come to know where to find them.

To my knowledge, no check has been imposed on industrial development by the land policy of the Government. As regards the acquisition of land on behalf of industrial companies, I think this should be allowed and the Act should be amended accordingly.

V.—Training of labour and supervision.

I have not much experience regarding the training of labourers. I had opportunities to consider this point and I think two different methods should be adopted to improve the efficiency and skill of labourers. To improve the labourers' efficiency and skill *generally*, there ought to be industrial schools where the labourers might be trained for any particular industry. Such schools should be primarily under the control of the district boards and finally under the control of the Department of Education. These industrial schools should be in the nature of primary industrial schools and be maintained by district boards. I have already dealt with this subject and I have shown that the advantages of industrial schools will be that a boy going to such schools, instead of having simple literary education, will have special training regarding a particular industry which he may either start himself, or be engaged in, hereafter.

The Department of Industries should only concern itself with the practical training of the apprentices or of the students coming out of the technical and industrial colleges. They should be trained in the workshop attached to the demonstration factories. Special training of labourers which may be necessary for any particular kind for industry may be given through this department as such knowledge and experience can only be gained in workshops. Apprentices and students of the industrial colleges with practical training in demonstration factories will prove useful supervisors and skilled managers for private firms or companies.

If the supervisors, or managers, or technical experts of private firms intend to study the conditions and methods of other countries, they should do so, at their own cost or at the cost of the firm desirous of benefitting by such knowledge. As regards mechanical engineers there should be an uniformity in the standard of examinations and the certificates granted should be recognized by the Government of all the provinces.

VI.—General official administration and organization.

No provincial organization exists in this province for the development of industries. I have already stated that there should be a Department of Industries in each province under a Director of Industries. He should be an official and a member of the Indian Civil Service with sufficient business-knowledge. He may be trained for the purpose if necessary; much would depend on the selection made, as I am not prepared to characterize an official, if properly selected, to be a "brilliant amateur."

There should be an Advisory Board attached to the Director's office, the duties of which would be to advise the Director in all matters concerning industries and in framing his budget. It should consist of both official and non-official members to be selected by the Government in consultation with the Departments of Industry and Agriculture and Co-operative Credit Societies and the Commissioners of the Divisions. Under the Director of Industries there ought to be Assistant Directors with special training for each division who will be in touch with the Advisory Boards formed in each district with the District Magistrates as their Chairman. All the Directors of Industries ought to be subordinate to a Director-General who will be in charge of the Imperial Department of Industries. The functions of the Imperial Department will be to collect all materials and information regarding raw products of the empire, to keep an account of the supply and demand of each province, to give instructions in case of difficulties, to supervise and scrutinize any scheme involving a large capital which

may be organized by any provincial Department of Industries, to make researches and generally to act as a trade representative for India and as an adviser on technical and scientific points.

VII.—Organization of Technical and Scientific Departments of Government.

There is no organization of technical and scientific department in this province. Researches are made at Pusa, but, I believe, the Local Government has nothing to do with that department. There need be no such special department created either as provincial or imperial. All technical and scientific researches ought to be made and all questions relating them should be dealt with by a staff subordinate to the Director of Industries. Each of the institutes established for investigation and research should deal with a limited group of subjects which relate to the province where it is located. Such institutes should be started by Government and those which might be started by private firms must be under Government control. Such institutes ought to be provincial but subject to the guidance of the Imperial Institute of Research.

There ought to be co-ordination of research in all the institutes established in India. I believe the university colleges are not yet fully equipped for research for the success of industrial enterprises and probably the professors in charge of the laboratories have very little time to spare for this purpose. I think the university colleges should be left out of consideration in connexion with this particular kind of research.

If I have not stated anything regarding colleges of commerce, I beg to add it in my statement regarding industrial and technical colleges. Knowledge in commerce is an ingredient which will go to help the development of industrial enterprises.

IX.—Other forms of Government action and organization.

I will now deal with question No. 97. Transport facilities by road, rail or water are not yet perfect in this province. There are roads in each district but most of them are fair-weather roads which cannot be used for about six months in a year. Each district board should be made to connect all marts with the principal centres of raw products by good roads and all these should be connected with the railway stations. It will not be difficult for each district board to find out which roads they should make and how they should be improved. There are sufficient agencies for this purpose. Each district board should be made to publish district maps every five years showing how far the principal marts and centres of raw products had been opened out.

The road facilities of a district being kept in charge of the district boards it will be the duty of the Government to connect the districts by permanent roads and bridges.

The railways, we have at present, are not enough. There ought to be light railways in every district. There was a proposal to give power to district boards to raise a "railway tax" for the purpose of opening light railways in the districts. I do not know what has become of it. It will be advisable to have this proposal sanctioned and legalized. In fact more responsibilities and powers should be given to the district boards for the purpose of industrial development in a district.

There is one thing which I ought to bring to the notice of the Commission in this connection. There is a railway station in the district of Purnea, known as Manihari-Ghât, on the Eastern Bengal State Railway. This station is on the bank of the Ganges. Merchants and others generally find it convenient to get their goods from Calcutta, Patna, Benares, and other places by steamer to Manihari-Ghât and then to book them to Purnea, Kasba or Forbesgunge. The last two places are very big marts in this district. By this arrangement, not only is there a saving in freight, but there is a less chance of breakage and transhipment. For the last four or five years this ghât station is closed for all goods traffic. Nobody can now book his goods at Manihari-Ghât, but, must come to Manihari railway station which is about 4 miles from the ghât. The railway company has its own explanation but the popular impression is that the railway company does not wish that goods from Calcutta should come to Purnea by steamer but must be made to come *viâ* Lalgola railway station or Santhahar. If, for the sake of competition, such difficulties are put in, we can hardly expect any development of local industries.

X.—General.

I had never been actively concerned in any industry, as the difficulties in doing so were many. I started a small shop but had to close it, as I could not secure the services of a man who could honestly manage it for me. I am interested in agriculture and cattle-breeding. I have my own cultivation where I have been trying to adopt scientific and improved methods of cultivation. My chief attempt up till now has been to improve the quality and quantity of raw materials.

I can make no suggestion of any new industry which will hold good for all over India. I can only speak of Bihar and its resources of raw materials.

The following are the chief raw materials of this province and are fit subjects for industrial enterprises. I think if steps be taken by Government in the line suggested in this note, capital will be forthcoming for such enterprises :—

1. Rice and wheat.
2. Rape seed.
3. Tobacco.
4. Jute.
5. Sugarcane.
6. Hides and skins.

If these principal raw materials of the province be utilized there will be enough room for industrial enterprises for several years to come.

ORAL EVIDENCE, 18TH NOVEMBER 1916.

President.—I understand that you have a good deal of experience of some of the problems on which we are engaged and that you are the managing agent of the Nazargunj estate, Purnea. What is its area ?—I could not tell you the exact area. It comprises several districts, at least more than half of the district of Purnea. It has got some property in Bhagalpur, Dinajpur, Malda and Dumka.

In addition to agriculture what are the principal industries in the estate ?—There is absolutely no industry. There are some cottage industries, weaving especially.

You have had many opportunities of taking an outside view of many of our problems. You are the Vice-President of the Purnea District Board ?—Yes.

And you are also a member of the Legislative Council ?—Yes.

You say in your evidence referring to the cultivators of the soil: "Their conditions should be first improved before any question of industrial enterprise can be considered." I suppose you agree that if anything in the way of industrial development occurs there will be more money available for the purchase of agricultural products ?—That is my view. At the same time the object I have in my mind is this, that if their condition is improved they will give you more raw products than they can do at present.

If industrial development occurs and money is available to spend on the products of the soil, the cultivator will in that way improve himself ?—I think he will benefit thereby.

Would you consider the advisability of revising the sentence to this extent. Instead of saying that the condition of cultivators should be first improved before any question of industrial enterprise can be considered, would you rather not say that the condition of the cultivators and the improvement of their condition should be taken up as well as attempts made to develop the industries ?—I can modify my statement to that extent.

In one or two other places you have made similar remarks I wonder whether you really think that the Government ought to delay anything like industrial development ?—I do not want anything to be delayed.

In your opinion the defect in the existing system of imparting primary education is the cause of the non-existence of industrial enterprise in this province and in the adjoining province of Bengal ?—That is my own opinion.

How do you account for the difference between conditions in Bengal and conditions in Bombay. Are the educational systems equally bad ?—I have got absolutely no experience of any province except Bihar and Bengal. I am not in a position to make any comparison whatever with other provinces. I had no occasion to go into the question.

You say that salvation really lies in giving the masses technical, agricultural and industrial education along with literary education. We have had a certain amount of evidence which indicates that the people suffer from the handicap of customs that are expensive, for instance, marriage customs, and that many of the people would probably have a little spare money for industrial enterprises if they were not tied up by the excess of expenses in these customs. Do you know if there is anything like a social movement in India to help the people, apart altogether from the Government system of education ?—I think so. It is my impression that these customs will die out as education is given.

Do you notice that these customs are dying away among the more educated young men ?—My impression is that they are dying.

Of course one does not want to abolish customs of the people so as to make them lose their self-respect ?—Of course, that requires a little time. That will be accomplished when a man comes to know that spending money in marriages and other things will not raise his social position. The customs may stand for a little time but they will soon die away. The people are improving a great deal. There is no doubt about it.

Later on, dealing with the work of the Agricultural Department you say that it has not been able to show any appreciable improvement and you advocate the opening of experimental farms. I presume by "experimental" you mean "demonstration farms" ?—Probably, they are the same.

They are not the same. An experimental farm is for testing new methods ?—Then what I meant was the "demonstration farm."

Are there any demonstration farms in this province ?—There was one to my knowledge, which was established but was abolished subsequently.

Do you know where it was established ?—It was in Purnea district. It was in an out-of-the way place and nobody could even visit it.

When was that ?—Seven years back. It was a demonstration farm where they used to grow all sorts of crops. There was one inspector in charge.

That was before the Agricultural Department was organized ?—I believe so. At present they have taken some land from me to start a demonstration farm. They are now showing some interest.

Who made the arrangement for taking the land ?—The Deputy Director of Agriculture, Mr. Robinson. It is my own farm. It is under cultivation. He is going to convert it into a demonstration farm on condition that all the expenses will be borne by me. They will only keep a man there.

Referring to pioneer factories you say that in your opinion there should be no permanent Government enterprises but Government will be well advised if they start pioneer factories by drawing capital from the people of the province and that if such factories prove commercially successful they may be handed over to the shareholders who subscribed the capital or to any private capitalist who might have advanced the entire capital, and that such a factory should be closed if it be found to be commercially unsuccessful after working two or three years, which will sufficiently indicate the nature of the enterprise. Who is going to meet the loss ?—Of course if there is a loss, the shareholders ought to meet it.

Supposing the Director of Industries or some Government expert is of opinion that an industry ought to be started in a particular place in order to test the commercial feasibility of any new industry and the Government adviser is in favour of the experiment being made, would it encourage the local people to put together the capital required to start the factory ?—I am always in favour of that. I am not in favour of asking Government to finance any enterprise whatever. My impression is that the Government ought to teach the people how to help themselves.

Do you not think that in case of failure some of them will come to Government and say that they laid out the money because the Government adviser told them to do so and therefore Government ought to meet the loss ?—There should be a Department of Industries which would have every thing very carefully examined before it takes up anything new. They must satisfy themselves that there would be very little chance of failure.

There is no hope at present of our reaching that stage with certainty ?—I think every enterprise before undertaken should be thoroughly gone into and investigated. There were heavy losses in many cases owing to the lack of proper training in the men who undertook to manage the work.

Some of my colleagues who have been successful in business will probably tell you that no new business enterprise is a certain success ?—In several cases it ought to be a success. I think the people will be ready to meet loss, if there be any when they find that they are gaining in some other enterprises which have proved successful. I do not think there will be any difficulty in drawing capital even it there be an occasional loss.

Don't you think there is a danger of people coming to Government and asking for their money when they find that a particular enterprise has not been successful ?—My impression is that at present failure is due to want of public confidence. If an industry is opened by some private firm or gentleman, the general impression is that, in such cases, the investment can never be safe. But in cases where Government organizes the whole thing and a man has to lose something in the bargain he will never think that there has been any dishonesty in the matter. That is my honest opinion. Of course, there may be exceptions here and there but that need not deter the Commission from accepting my opinion.

You say "At present, besides starting village societies and advancing money on easy terms, no attempt is made to improve their economic condition by improving their land and teaching them to improve the raw products grown on their land both in quality and quantity. We do not at present see from what sources the village societies secure money for the repayment of loans advanced to them by the central co-operative bank of the district." Can you suggest any practical way in which a reform can be effected in this direction ?—I am myself a director of one of the provincial co-operative credit societies and also the district society. I have been trying to impress upon the district society the necessity of inspecting each village

society so as to find out what they are doing. My point is that it ought to be the duty of the central committee to see that each village society affiliated to it should be taught through some medium improved methods of agriculture so that they can produce better products, secure better value for them and a good market.

Do you think that this would be averted by the spread of elementary education?—I think it will take a long time. At least we shall never see it.

We should not be so pessimistic. Do you see any kind of attempt at mutual improvement? You know that in England practically all the industrial developments are the result of mutual improvement. They form scientific and technical societies in order to meet together and compare notes with regard to the experiments that have been made. All these things are organized voluntarily. Do you see any hope in the near future of a spirit of that kind growing in the country?—It, might but I do not see any hope of it at present.

Cannot these co-operative societies be used in any way for missionary purposes in this direction?—No, not at present. The central co-operative societies may take the initiative by keeping a man who has come out from Agricultural College. He must be trained both in theory and in practice. He can go round to all the societies and teach them improved methods of agriculture. At the same time, it will be his duty by the issue of bulletins, and otherwise to let the chairmen of the village societies know the market price of each kind of produce so that they can know the real price.

Would you propose that the Registrar of Co-operative Societies should have a larger subordinate staff?—I am only referring to the district central committee. The Government will have nothing to do with it. The district committees must have paid servants. They can well afford to do it.

You want then the profits to be utilized in the maintenance of the staff?—Yes, to some extent. I received 12½ per cent. last year as dividend. I do not want it. I shall be satisfied with 7 per cent.

That is a good practical proposal. You suggest that demonstration factories should be established in the case of eleven industries and you suggest a jute mill, rice and flour mills, a sugar factory and a tobacco factory. Is it necessary for these demonstration factories to be established in connection with industries that are already successful and conducted by people who understand the commercial and technical side of the industry?—Yes. My idea is that the Government should have demonstration factories. I said in my note that it was not necessary that these should be opened in each province. Supposing I want to teach my boy any particular industry, say, jute, nobody will take him as an apprentice What I want is that Government should maintain these demonstration factories and give an opportunity to the people who want to do so to learn these particular industries. Of course they will pay for it. I do not want anything to be done gratis. They must get an opportunity to learn. There are no such opportunities in India at present.

Mr. A. Chatterton.—You attribute the backwardness of the working classes very largely to the lack of education and as far as I can gather from your evidence you are rather in favour of a system of primary education with an industrial side to it?—Yes.

Don't you think it would be better if literary education was given in one school and when a boy has received education up to the standard necessary he was then transferred to an industrial school in which purely industrial work was taught?—That is a question which will have to be solved according to the particular circumstances of each case. We have in every district a District Board. It is the duty of the District Board to maintain primary schools. We have the lower primary standard, the upper primary standard, the middle vernacular and the middle English. My idea is that with every primary school there ought to be a side class with industrial or technical instruction according to the necessity of the village. The District Board ought to maintain it. The Government will have nothing to do with it.

You have a District Board which has sufficient funds to provide for industrial education?—Yes.

How much would you be able to spend on the industrial side of such a school?—I have not thought out the matter.

Don't you think that industrial schools will be a very expensive matter?—The kind of schools that I am referring to will be elementary and may not cost much.

What is the headmaster of the ordinary upper primary school paid?—Rs. 20 per month.

You think that you could get efficient industrial instructors to work under the headmaster?—He may not be subordinate to the headmaster. He may be a separate man altogether

Don't you think they will fight?—The Chairman of the District Board can solve the question very easily.

Would it not be better to have a number of upper primary schools in your district from which boys could pass on to a central industrial school in the district where they could be

given tuition by fairly good experts in the various trades you wanted to teach them?—This is what I have suggested in my statement but I will not be satisfied with a central industrial school in a district. I would like to have side classes in every primary school where boys desirous of industrial or technical education might have elementary technical or industrial education, so that they might be competent to have higher training in the central school when passed on to that school. Boys who want technical education or any sort of elementary industrial education do not require much knowledge of history or geography.

At what age would you like to send the boys to technical education?—Between 12 and 14.

Could they not be made to acquire some knowledge of reading and writing before that age?—In my district a boy only begins to learn to read and write at the age of 10 or 11.

Would it not be more efficient to keep him in the primary school for three or four years and then put him in the industrial school?—That could be done.

You seem to regard industrial schools as a sort of panacea for the promotion of industrial development. Is that not putting the cart before the horse? Don't you want the industrial first?—Industrial development will follow industrial education. If you take up industrial enterprises without training men for them you are bound to fail. You have then to get men from outside India. That is not what I intend. I intend that we should train our own men to enable them to become good workmen and mechanics.

Who is going to employ these workmen?—I have suggested that Government should start pioneer companies to set an example to the people. As soon as they are successful, people will come rushing in and then these trained men would soon be utilized.

In other provinces the system that you advocate has been tried for a very long period and it has not been a success and has not produced the results that you expect?—I have no experience of other provinces. It is my idea that this may solve the problem. I cannot get a carpenter in my place if I want to repair a chair. I have to send it to Calcutta. Nor are there good masons.

Is there any deficiency in industrial skill in the province? You say there are not good masons and yet there is an enormous amount of building work going on here?—Yes, the men are working like machines at the orders of superior officers.

In the villages that you are acquainted with are there not competent village artizans such as carpenters, potters and chucklers?—There are a good number of men and if they are trained they will do useful work. At present they produce all sorts of rotten things which nobody would like to purchase.

Can they not make the village ploughs?—I am a cultivator myself and I have got extensive cultivation. I never use the local ploughs because they are defective and of the most primitive character.

Cannot the local blacksmiths make them?—They are not trained men and they have not got the necessary implements.

Do you think that the best way will be to have an industrial school and attach it to the lower primary classes?—Yes. But I do not want you to stick to this particular method if there be a better one. My principle is that the village men should be educated for the purpose and they should be allowed to learn things in their own village.

You want one good artisan for the village?—Let there be a dozen. If they become competent and capable men they will be able to earn Rs. 50 a month or over.

Could your District Board of which you are Vice-President afford to spend Rs. 30,000 on industrial schools?—I think we can safely do it. We have a revenue of about 4½ lakhs and if I am allowed to say so, a very large amount of this money could be well spent on industrial education. At the end of the year we have to rush through the expenditure.

You say that in the whole of the province there has not been even one company worth the name. All over the world industrial enterprise has been a matter of individual effort. You state here that the industrial conditions are very backward in Bihar. Is not this want of confidence due largely to the lack of skill and technical knowledge on the part of the people rather than to commercial dishonesty?—The want of public confidence is based on three things. The first is the want of business knowledge, the second is the want of proper organization and lastly want of morality, which if I may say so, we lack. That is my own experience.

Do you not think that in the initial stages of industrial development it is desirable to encourage private individuals to take up the work rather than to try and start joint stock companies?—If a man wants to have his own enterprise there is no objection, but the masses will not be practically benefitted by one individual man becoming rich by an enterprize. What I want is that the masses should be benefitted by any enterprise that is started in the country.

Is not the district or the country benefitted by the fact that a man starts a successful business ?—Only so far, as he is concerned.

Would he not be a shining example to other people ?—He may be, but I do not think the masses would be benefitted in any way.

The point is this. Unless you have individuals who have done successful business on a small scale, how are you going to get men to run industrial undertakings such as are worked on the joint stock system ?—What I have suggested is that the Director of Industries must have an advisory council. He must first decide what enterprise they can safely take up and then he must draw the capital from the public on whatever basis he might think fit. It will then be the duty of the Director of Industries or the department to consider who is going to be put in charge of it. He may be a paid man, a man trained, for example, in America or England. The company will pay for it. The benefit will be derived by the masses of the people.

Don't you think that a man working himself is likely to use his individual energy and enterprise to much greater advantage than a man associated with half a dozen men in a small joint stock concern ?—Of course if a particular man is going to start an industry, nobody can object to it. That is his own look out.

But this is an important matter whether we should encourage individual enterprise or whether we should encourage the formation of small joint stock or co-operative undertaking ?—I do not object to Government advising and helping any particular individual regarding any particular enterprise. As I have already said money is out of the question By advice and suggestions and things of that kind, anybody can be helped. So far as the formation of companies and joint stock concerns are concerned, I think they are the chief need of the province.

Have you any personal experience of these joint stock companies ? Are they successful ?—I think they are very successful.

You give here an example of a bank which has been successful and you think therefore that an industrial enterprise on the same lines should be equally successful ?—What I am referring to is the provincial bank which has been started in Bankipore. I have raised capital for other little banks on the co-operative basis in the district of Purnea successfully.

The fact that successful banks have been started should not be the oreterion for the success of industrial undertakings on the same basis ?—If you get the required capital there will be no difficulty. There will be trained men who will work it out. It is not absolutely necessary that the trained man must be a man of the province. You can get him from other places also. He will make the enterprise a success and teach other workmen.

You have a fairly large number of individual money-lenders ?—Yes.

Do they understand the elementary principles of banking ?—Yes, to a certain extent.

And when they become associated in a bank they have some notion of what they are doing ?—Yes.

If you want to have joint stock companies for industrial work do you not want a similar class of men who have experience of industrial work associated with the directors of the company ?—Yes, I think I can give you an example. In the bank which we have opened we have got twelve directors. Only one or two men really do the work. The rest are directors only in name, but the hand of Government is there. There is the auditing of accounts, the checking of the working of the whole thing. They have supervision over it and also control. That is the thing which is wanted so far as industries are concerned. If the Government does this portion of the work and takes the responsibility to that extent only, I think the question can be solved.

I gather from your written evidence that you want the whole of the industrial development in the immediate future to be under the control of the Director of Industries ?—Yes, I think there should be a provincial Director of Industries

And you recommend that he should be a member of the Civil Service ?—That is my own personal view.

Do you think that the previous training and experience of an officer of the Indian Civil Service, whether on the revenue or the judicial side, is likely to be the best for this kind of work ?—Of course he might require some previous training. He could be sent out to acquire the necessary training.

How long would he take to acquire experience of industrial enterprises ?—That I cannot say. But I have great confidence in them. Put them to do anything and they will do it successfully.

Further on in your note you refer to demonstration factories and you say that you have experience in your district of the establishment of an oil mill and a shoe and boot factory. What was the cause of the failure ?—They have not failed as yet, because the men who started the business are very rich. These enterprises are not based on the co-operative system or on the joint stock company system. They are individual enterprises. They are more or less losing concerns. Although five or six years have elapsed they have made no profit for the

simple reason that they have got no man to work it properly. I met the gentleman concerned only yesterday. He said that he has engaged a Parsee gentleman from Bombay to work his mill. He could not get a man from the province. He has already invested nearly two lakhs of rupees in it.

How did he run it for the past five or six years ?—It was working at a loss. I have not seen the accounts He has not been able to get a trained man in the province. He engaged a B. Sc. of the Calcutta University and the result he anticipated has already happened.

What sort of shoe factory was it ?—The Purnea district has a big market for skins and hides. We get them from Nepal and other places. Recently he engaged a man of Patna who was trained in Madras. His training is insufficient.

Is there any machinery ?—Yes.

You want the assistance of the Director of Industries to indicate to them the sources from which they can get trained labour and men with experience ?—Yes, when they are ready to pay. They do not know where to get the men.

I understand that you are in favour of the imposition of a local cess for the construction of District Board railways ?—I am very much in favour of it.

Has not anything of the kind been done here ?—Not to my knowledge. I have no official information about it. When the opinion of the District Board was asked we recommended that the cess should be levied.

Is the act authorising a levy of the cess not in force ?—At present we are not authorised to levy. It will be very easy to raise the tax. We have started certain Union Committees. They tax themselves. The tax is a very small amount and I think there will be no difficulty in raising the tax in addition to what is paid now. If the District Board is empowered to raise the tax we can raise a good sum and construct light railways connecting the chief marts with the existing railway stations.

President.—Would you like to alter the wording of the first sentence of paragraph 3 of your note in which you speak of the absence of commercial honesty. Do you not think there is danger of some one taking that one sentence out and giving undue importance to it and exaggerating it It is not fair to people to say in a sweeping way that there has been a total lack of commercial honesty. Would it not be better to say that commercial honesty and commercial morality are generally things that have not been developed completely ?—That is what I mean. I had to write my notes in a great hurry and I hope you will excuse me, if there has been any sweeping statements.

What I am afraid of is that people will take out of your evidence that one sentence and attach to it exaggerated value :—What I mean is that in 95 cases out of every 100 concerns there has not been proper dealing and there has been quite a number of defalcations.

You may consider the advisability of altering the wording ?—You are at perfect liberty to change the wording.

Hon'ble Sir R. N. Mookerjee.—You say in your note that want of confidence is practically due to education. Do you mean to say higher education ?—I do not mean that I mean the bad system of education. Higher education, even, as imparted has not been able to create a spirit of co-operation.

Do you think that is due to higher education ?—No. What I mean is that the result is not what it ought to have been.

Have you any idea how to form a joint stock company ?—I have no large experience.

You say that Government should start joint stock companies. If the Government starts and the public do not subscribe the Government will have to find the money ?—When the Government starts a scheme it can easily know whether the public will subscribe or not. The Director of Industries will see about this.

Who would be responsible to see that the public subscribe ?—There will be absolutely no difficulty in raising the money when it is known that Government has a hand in the matter. In my district I can collect two lakhs in one month's time provided I know that Government is going to organize the whole thing.

The public will think that the Government is responsible for the money ?—The Government will have nothing to do with the working of the thing. All that is wanted is that the money is going to be in safe hands. We have put money into the co-operative credit society and there the people know that the Government is not responsible for money. I want the same principle to be adopted. They will have full confidence if they know that an officer like the Registrar of Co-operative Credit Societies is going to work it out.

You say that you are opposed to financial aid by Government and you want the Government to control all industries. Do you think that a private person will allow his concern to be interfered with by Government ?—It matters very little if private in dividuals do not allow Government interference, so long as the capital is their own. But if a private individual

draws money from people, Government interference and supervision are absolutely necessary. If a man however clever he may be, goes to the country and appeals for funds he will not get a penny as the country is in such a state now. On the other hand if Government or European firms with an established reputation begin the work, they will get the money at once.

Then you say that Government control should not be dependent on Government assistance and that in the beginning in all cases Government control should come in as a matter of course until the province is prepared to stand on its own legs. Do you include all industries?—If it is an enterprise of an individual with his own capital I do not mind. So long as the public money is involved either on the co-operative basis or on the joint stock basis, Government must control from the very start.

Supposing A starts a company, do you think that A should not be allowed to do so without Government audit and control?— If he uses public money I think there ought to be Government audit and control.

You mean greater control than is now admissible under the Companies Act?—I mean more direct control.

Do you mean that the Director of Industries should be the managing agent of the industrial bank?—He should be one of the directors. He must be an official.

The act does not compel him at present?—That must be done under a special Act.

You say that Government will be well advised if they start pioneer factories by drawing out capital from the province. What is your idea?—If Government will make a definite proposal to intending people I think people will readily come forward to find money for it.

In answer to the President you said that the co-operative banks ought to have a large subordinate staff. Are you allowed to do so under the Act?—At present they have got inspectors. Instead of inspectors who are untrained we might have one trained man, say, on Rs. 60 a month. The man must have some practical knowledge of agriculture.

Later on you say that Government may take some commission for the supply of raw materials?—Yes. If any firm wants raw materials through the Government I do not see why the Government should not charge for it. It is a question of business. If you do not want to pay them you must get the supply yourself.

May I enquire if you are a zamindar?—I am only a small landholder.

Do you think that any industries suffer on account of any land policy?—I am not aware. I have no knowledge of this.

President.—You say that research institutes should be started by Government and that those which are started by private firms should be under Government control. What do you mean by firms starting research institutes?—That is my own opinion. I have got my own reasons for saying that. If the Commission wants I can give my reasons confidentially in writing.

Hon'ble Sir F. H. Stewart.—You are the Vice-Chairman of the Purnea District Board. Can you tell us the constitution of that board as shortly as possible?—There are 24 members. 12 are elected and 12 are nominated. Out of those 12 nominated persons 6 are officials and 6 non-officials.

You are Vice-President?—I am elected Vice-President.

Who is the Chairman?—The Collector of the district is ex-officio Chairman.

Is your District Board richer and bigger than most of the Bihar District Boards?—Purnea district is probably second. The Gaya District Board is the richest.

Do you have a substantial balance at the end of the year?—We are bound to keep under the rules at least Rs. 13,000 a year always in hand. That is the minimum we have to keep. Our actual cash balance is nothing less than Rs. 50,000.

Are there any planters on your Board?—Yes, our district is a planters' district.

Are there any barristers?—There is no barrister on the District Board.

Your elected members are zamindars?—Zamindars and indigo planters.

You propose that elementary industrial schools should be under the District Board. Would it not be preferable to put them under the Director of Industries?—I think that will be giving the Industries Department too much work. I think the Education Department can very well manage such schools. They may be under the District Board or the Education Department.

You make certain recommendations about roads and transport facilities. Has your District Board done much in this direction?—We have got at present a ten years' scheme. We are getting metalled roads all round and we are going to improve them.

You refer to a cess for the construction of railways. Has a Bill been introduced in the Local Council?—An act is in force in Madras. A circular from the Government of India was addressed to us on this subject. We sent out our opinions and I do not know what happened to it.

The point is a very important one. You are proposing to increase the functions of the District Boards. From your experience of the Purnea District Board would you say that they are competent to deal with such questions?—I do not know much of Orissa. But so far as Bihar is concerned, I can say that they can take the responsibility.

You refer to the association of Government with industrial development. Do you think that people in general would put in their money and would not mind if there is occasional loss?—That is my own opinion. Until I am convinced otherwise I am not going to change my opinion.

You say that Government should also pioneer industrial enterprises. In pioneering especially do you not think that there are risks of failures?—My point is this. Nothing should be done in a haphazard way. If any enterprise is taken up it should be done very carefully. If everything is done carefully and systematically the chances of failures are few.

You think that the provincial Director of Industries should be an Indian Civil Servant?—Yes, but he should be given such training as may be required. It could not be of very long duration. I know Mr. Collins. He had absolutely no knowledge of co-operation. He went to Switzerland and received training. He is now one of the best officers we have so far as co-operation is concerned.

You would not allow any private business enterprise except under control of Government which would be exercised through the Director of Industries?—If it is the capital of an individual man no one will care for it. But when the public money is concerned, Government control must be there through the Director of Industries. He must have sufficient staff to supervise and he must have Assistant Directors who should be men of special training. The head of the whole thing ought to be a member of the Indian Civil Service. The Assistant Directors whom I have suggested should be trained men.

Do you not think that if you allow no business enterprise except under Government control, and that control is to be exercised by non-business men you will run the risk of more failures than is at all necessary, and that the result might be a great increase in the public want of confidence which you state to be so conspicuous already and that it might extend beyond mere business matters?—I need not go back on my assertion. I am now 49 years old and I have seen that wherever the civilians have worked as organisers they have been very successful. They are capable of anything.

Hon'ble Pandit M. M. Malaviya.—You say that enough is not left to the cultivator of the soil because a great deal too much is taken away from him. Have you any definite proposal to make to secure that more should be left to the cultivator?—If they grow a better quality of crop in large quantities.

But apart from that do you think that a larger share of the produce should be left to cultivator of the soil than at present?—What I meant is this. At present according to the land tenure system, the tenant has got to pay a fixed amount whether he grows any crop or not or whether there is failure or not. There is no allowance for freaks of nature. For example there has been inundation this year and last year there was no rain. The cultivator is suffering great loss.

Is there no provision for a remission of rent in such circumstances?—The zamindar is entitled to his rent whether the cultivator grows his crop of not. That is the present rent law of Bihar and Bengal.

You say that the condition of the cultivators should be improved. In what way?—By improving their method of agriculture, by training them to grow better crops, and teaching them to select land for any particular crop.

You mean by agricultural education and general education?—Practical agricultura education.

In answer to one of my colleagues you said that students should go to the industrial school at the ages of 11, 12 and 13. Do you advocate that prior to that they should have a course of general elementary instruction?—Yes.

You say that you want to modify the course of elementary primary education. You say that elementary education should not be the goal but that something else ought to be introduced with it. Do you mean that drawing, for instance, and manual work and other instruction of that kind which will qualify a boy to take up industrial and technical work should be introduced at an early stage?—Yes. They should be taught as optional subjects.

Would you not make drawing compulsory after a certain stage in the primary school?—Yes. The boy who wants to go to the industrial department ought to have a good knowledge of drawing.

You say that the after effects of the existing system of education are responsible for many evil results. Do you mean that if there were more careers open and if the kind of instruction were more various in kind there would be less dissatisfaction ?—Yes.

You say that the gates of the universities should be shut to all except those who are found fit to enter them. Is it that what you really complain of is that the education given at the universities is of too literary a character ? You would have no objection to young men entering universities if they were taught both the theory and practice of subjects relating to industries, such as engineering, etc. ?—If you open an industrial college or a technical school that is a different thing altogether.

You know that in the modern universities of the United Kingdom and America and Germany they regard it as their duty to give practical technical training of various kinds ?—I know that.

You know that degrees are granted by these universities in engineering, technology, commerce and agriculture ? Do you think that if the universities in India instituted similar courses of study, different from the purely literary courses, then the minds of many of our young men would be diverted to these channels and there would be less discontent in the country ?—Yes. There would be less chance of there being idle brains in the country.

What you want is a change in the curriculum by introducing a system of instruction which will be not merely theoretical but also practical ?—Yes.

Assuming that the courses at the universities are modified on these lines, would you then be in favour of giving equal opportunities to every boy who may find it possible to enter the universities ?—Yes. He will then enter according to his own choice.

You say that there has not been one company which is worth the name and you ascribe this to a want of confidence among the people in each other ? Do you not think that this want of confidence is born of want of business knowledge and habits of a business character ?—I have already said that we want three things, namely business knowledge, proper organization and commercial honesty. Time alone will cure this defect.

Don't you think that this will be cured if you had more widespread knowledge of a business character ?—This alone will not cure the evil. You must have in addition commercial honesty.

You say further on that Government should come forward to organise an industrial concern. Do you mean that they should give more encouragement to the organisation by giving the necessary information ?—The Government should come forward with a department which will make schemes and then float companies and draw public money.

Don't you think that it would be sufficient if Government simply published the information for the benefit of the business world ?—I think there would then be great delay in industrial progress.

In addition to that if the Government subscribe a portion of the capital, would it do ?—I am totally against that.

Suppose the Government do not do that, but arrange for the working of the business to be supervised from time to time by an expert appointed by Government and the accounts audited ?—That of course will help to a great extent.

Now in addition to this, suppose the Government in special cases offered to guarantee interest for a certain number of years in order to remove the shyness of capital, would that prove a great stimulus?—Certainly.

You say that you are against Government giving any financial help. Suppose you find that while Indian capital is shy, there are firms being established in this country by Americans and the Japanese to conduct business which would prove of great benefit to the country, if it were taken up by Indians, would you in that case modify your opinion and wish that Government should come forward to help Indians financially to start the business?— I have already given my reasons why I am totally against Government giving any financial help whatever.

What ? Even if you find that owing to our want of business habits, and our capital being shy, the Americans are taking advantage of the situation and investing their millions of dollars in this country, would you even in that case not modify your opinion that Government should not give any financial help to industries ? Do you not think that it would be for the benefit of the country and the people that Government should render financial assistance in order that truly indigenous industries might grow in the country ?—In view of the opinion that I have already expressed, I am not ready to change my opinion even in this case.

If you had not expressed that opinion, you might have been willing to reconsider it ?— Even then I am not in favour of financial help being given.

You have recommended that a representative of Government should always be an ex-officio director of every company. Don't you think that you are putting too great a burden on the Government ? Have you considered what it would mean in the way of multiplication of staff and department ?— There is already the audit department.

You mean only audit ?— Yes. I mean the control over expenditure and nothing else.

You advocate the establishment of an industrial bank. Do you think it necessary that it should have branches in every district or at least in every division of the province so that people may avail themselves of it ?— That will depend on the emergencies. If you have got many industries then as many banks as are required will be necessary. That will depend on the number of industries.

You say that research institutes started by private firms should be under the control of Government ? Can you give us your reasons?— I have already said that I have my own reasons for it and that I can give them confidentially in writing.

Do you advocate the imposition of a railway tax ?— I have said that I want more responsibility on the shoulders of the District Board. If the railway tax as proposed is accepted it will be no hardship to the cultivators. On the contrary they will get more benefit by getting the opportunity of marketing their products and getting better value for their crops.

You said that you do not want Government to contribute anything for industrial education. Should the District Boards find all the money ?— I meant only for elementary schools.

If the resources of the District Board are not sufficient, do you think that Government should increase those resources ?— I cannot say. So far as Bihar is concerned I think the District Boards do not want anything from the Government.

Your statement has reference only to Bihar ?—I am not in a position to say anything of other provinces.

Is it within your experience that men who have received practical education in any business enterprise find difficulty in getting employment ?—Not to my knowledge. In fact there is a great demand for such men.

You think that if the Government has any connection with private enterprises, that would inspire confidence ?—I think so. I want it to be organized on just the same lines as the co-operative society banks which we have at present.

Mr. C. E. Low.—You said that students of technical institutes find no difficulty in getting employment. What technical institute do you allude to ?—We had a technical institute about ten years ago in my district. It was abolished. There are some people who were trained as carpenters, etc., in that school. They are now getting better wages.

Do you think there will be enough work for all the men trained ?—I do not think they will be sitting idle for a long period. New industries will be constantly starting.

Why was the school abolished ?—I could not tell the reason. It was very successful. I find a resolution to that effect. It was abolished before my time as Vice-President of the District Board.

Speaking of village artisans, are not in your experience some of them cleverer than others ?—There may be a difference between existing carpenters but not a man is really skilful.

Is there any tendency in them to drift to the towns ?—There are some who have gone to the towns.

Do the more skilled artisans go to the towns ?—If the man is satisfied with what he gets in the village he does not go to the town. I know men of better skill who stay in the village.

You have a farm attached to the estate ?—Only two years ago a farm was started.

You are cultivating on improved methods ?—I have been adopting improved methods gradually.

What kind of manures do you use ?—I use country manures. I use minerals also. But I mostly use the ordinary country manure.

Have you sugarcane under cultivation ?—Only two or three bighas. It is not for the purpose of sugar manufacture.

What machines do you use ?—The ordinary iron mills.

Do you see that they work properly ?—There is a foreman there. It is his duty to see that the mill works in order. The iron machines give better results than the wooden ones.

Do I understand you to suggest in your written evidence that if any one in India starts limited liability company, the Government should audit the accounts of that concern ?—Yes. Of course there may be exceptions.

Where would you draw the line ?—That will depend on the confidence of the public.

Who is to decide ?—The public will decide themselves. The public know who are the firms with an established reputation. If Messrs. Martin and Co. of Calcutta want money they will get the money in no time.

You say that village co-operative societies are not being sufficiently educated in business methods. Is it not due to the fact that they confine themselves to credit and not to the distribution or the purchase of seed or manures or raw materials ?—That is what I have said. I think it is entirely due to that.

You have no societies which deal with the distribution of seed ?—No.

Perhaps there are such in other provinces ?—I do not know. I am not aware of that.

How do the ordinary raiyats market their produce?—They sell it to the intermediate buyer the middleman.

You have no cases where the cultivator sells direct to the big firms ?—Big cultivators who can afford to do so may take the trouble. Most of them do not.

Why do they sell it to the middleman ?—They get the money before their very doors.

Do you think that the co-operative societies could get over this difficulty ?—Yes. That is my idea.

In the markets where the larger tenants bring in their crops, do they know whether they are getting fair prices for their crops ?—Generally most of the cultivators do not know. They accept what the middleman says. In this way the actual cultivators lose a great deal.

Will the big firms buy direct from the cultivators ?—They may. There is the case of Ralli Bros. The man in the village does not know the current prices. He is away from the market.

Regarding the imparting of industrial education in primary schools, what classes of boys do you think will go to the school ?—There could be no difference of caste so far as education is concerned.

Do you think that any boy from any caste will come to the school ?—That will depend on the inclination of the boy and the wishes of his parents.

Do you think that a good number of boys will be coming forward for artisan education ?—Yes.

Do you think they would take their artisan training without scholarships ?—I do not think scholarships will be necessary except in exceptional cases. You might give one or two scholarships.

Have you been on a village school committee in Bihar ?—I have to inspect many village primary schools.

Do you find that the boys of the cultivating classes are often taken away from the school for work in the fields ? In my district there are about 600 schools. Almost every school is crowded. Most of the children are the sons of cultivators, carpenters, blacksmiths and cobblers.

Are they half timers ?—Full timers. There are night schools for actual labourers.

Don't you find a tendency on the part of the father to take away his son from the school too soon ?—It is not a rule that every boy is taken away by the father. If he knows that his boy is learning something useful, he keeps him there.

Do you think there would be a sufficient number of village artisans or cultivators who would pay for their boys to go and learn for three years or four years in a district industrial schools ?—The boys who will come to the district school will belong to the middle class. The artisan class will be satisfied with the education given in the village in the primary industrial schools.

Do you mean to say that every village should have a village industrial school ?—They may be in selected centres according to requirements.

How can they attend schools at a distance from their houses ?—In some places they are already going four or five miles a day to schools. There is nothing to prevent them from doing so.

President—Don't you think that the boys who go to the towns for education will have a tendency to drift to the towns ?—If they get higher education my suggestion is that the district school should give a higher standard of industrial or technical education which will make them fit for higher posts.

You do not want these boys to leave the village ?—If they can get better wages in the towns they can go. Ordinarily people will remain in the village after getting elementary education. Some of them may go to the towns to get better education and draw better wages.

You told us that there was an industrial school in Purnea. Was it abolished without any reason ?—At any rate I could not find out any reason.

Was that school established with the consent of Government ?—It was by the District Board. It was under the Director of Public Instruction. Probably the reason may be found among the Bengal records. I could not find out any reason in my office.

Witness No. 47.

Rai Sahib Thakur Das, *Contractor, Mankatha and Ranchi Distilleries and Proprietor of an Oil-mill, Ranchi.*

Written Evidence.

I have about 40 bighas of land of my own and I cultivate it and do not let out to other men. I have made several experiments and find the following results as my personal experience—It matters little whether the land is good or bad. The most important thing is the manure and the next to it is the depth of spade, that is, the nature of bullocks used in ploughing, and the next is the timely watering of the lands

Agriculture.

Our cultivators are not fully supplied with materials quoted above.

Manure.—Bone is one of the first class fertilizers and is at present wholly exported. Its export should be prevented. At present cow-dung is entirely used for fuel purposes. The existing *chulha* used in villages is of crude type and an improved pattern on the principles of a boiler will save 75 per cent. of the cow-dung. Some cheaper kind of improved *chulha* is, therefore, necessary to save the waste of cow-dung.

For the supply of powerful bullocks catt'e-breeding farms are necessary and loans without interest should be made to cultivators through proper channel. It would be much better if the co-operative societies purchase bullocks and make them over at cost price to the cultivators.

Although our benign Government has tried and is trying for irrigation it is not to our satisfaction. For, in my opinion, Government does not spend so much money in irrigation as on railways. Railway is a secondary thing. First have products and then arrange for carriages. The present Government experimental farms do not help the cultivators a bit. In my opinion it is only a waste of public money inasmuch as the institution is not a self-supporting one. Example is better than precepts.

Oil pressing.

Some twelve years ago I started an oil mill for pressing all kinds of seeds. I selected Ranchi as raw materials were found in abundance and were exported to other districts. I purchased from Marshall and Sons, Calcutta, a hydraulic press (Rose and Downs). The press was set up and work was commenced. I found the out-turn per maund less than what is obtained in our ordinary *ghani* mills, at present working in Calcutta. The oil from the hydraulic press was very pure. It had no pungent smell and the consumers did not like to buy it. There was no hydraulic press in any other place except at Gauripur where only linseed is pressed and the factory did not allow anybody to pry into its secrets. Although Messrs. Marshall and Sons gave me an assurance that the plant should work, when I went to the firm they gave me evasive answers and I was left to myself. The plant was given up and again I started *ghani* mill and found it workable and profitable. This is the main reason why Indians prefer *ghani* mills to hydraulic press mostly adopted on the Continent and in America. I did not give up the idea of abandoning the hydraulic press and I further enquired from some tradesmen as to why hydraulic presses are preferred in the Continent. Some of my friends informed me that the value of oil cakes depend upon the percentage of oil left in it and this is not the case in India. I have no personal knowledge as to how far these statements are correct. My failure in hydraulic press was due to want of an expert or of demonstration factories.

Indian *ghani* mills find it very difficult to press pure mustard seeds and they mix generally *surguja* and ground nuts. But now they have commenced adulterating the oil with various unhealthy seeds, such as *kurkur* and *kusum* so there ought to be some legal provision to prevent this adulteration.

Sugar.

India is the largest sugar-producing country in the world and at the same time the largest consuming one. The increase in consumption of refined sugar has lately arisen and is progressing. Formerly Indian people were content with *gur*, *rava* and molasses and only the gentry used to take refined sugar. Civilisation coupled with prosperity led to the importation of foreign sugar and hence the necessity of improvements in cultivation and refining.

The European system of cultivation and refining is, in my opinion, inapplicable in India, for in India the cultivators do not cultivate more than 10 bighas at a time per family and even this not in a single plot. So the scientific way of ploughing is quite impracticable here. They have improved methods of pressing sugarcanes and the cultivators in India have not yet learnt the joint stock system so they are unable to purchase the machine adopted on the Continent.

Our agriculturists are mostly illiterate and they do not know fully the value of manure other than cow-dung and charcoal dust. Some religious principles also hamper the use of other manures, such as, night-soil and bone-dust. Bone is one of the best fertilisers and our cultivators are at present deprived of bone manures.

Various patterns of improved ploughs as shown in exhibitions or in Government farms are not suited to cultivators in general. They require power and Indian bullocks, for cultivation are very poor in physique so the prevention of bone export and supply of powerful bullocks are necessary. So loans from Government without interest for purchase of bullocks are necessary.

Formerly bones were used unconsciously as fertilisers. The so-called improved Behia pattern iron rollers have also done great harm in the pressing of sugarcane juice although they facilitate persing but leave a certain percentage of juice. There is no arrangement at present to crush the sugar refuse a second time. The old system of pressing in a stone mill with *jatha* yielded better results and the time and output made people give up their old mills.

Alcohol. It is true that if sugarcanes are left for some days, about 20 to 30 per cent. of the juice is lost but our cultivators for the most part cut as many canes as they can press in a day and they are not to be blamed for this. Formerly cultivators used to press sugar not earlier than the month of *Aghan*, that is, unripe canes. Now owing to family wants and pressure of money they press immatured canes and thereby suffer heavy loss. It is a common saying that *maghi gur* and *khand* (*rava*) are the best and fit for storage. Hence arises the necessity of Government loan on raw sugar canes.

Refinery.—At present sugar factories are not situated in the centre of sugar cane areas. There ought to be a sugar refinery on a small scale amongst a group of say 25 villages and hence the necessity of starting a factory with Government support.

Some ten years ago the Government of Bengal wanted to introduce a contract distillery system in its province. There was a private distillery at Asansol but it was not sufficient and more such distilleries were needed. The then Commissioner of Excise asked me to set up a distillery on western principles and I agreed. I purchased machinery, etc., and set them up but unfortunately I lost the major portion of my capital. The business was and is a sound and profitable one. I wanted a loan on the security but for want of our industrial bank I could not secure it. I lost a part of my contract.

In order to help me and other distillers Government secured the help of distillery experts. I do not know from what sources they were recruited. The distillery experts were not experts in the process of distillation and in the handling of machinery. They were only Revenue Officers and outwardly distillery experts. Thus arises the necessity of technical experts recruited from practical firms.

There is an Imperial Excise Laboratory and the samples of wash, liquor and materials, etc. are periodically sent there for analysis and the results are very useful in correcting the mistakes in the distillery processes. Hence arises the necessity of increasing the number of Imperial Scientific Institutes.

Lac dye. The Commissioner of Excise, Bihar and Orissa, noted above encouraged the Indian distillers to set up modern up-to-date machinery and the result is that the Province of Bihar has got three native distilleries and one European. The Indian distillers are now prepared to compete with any European distillers. This example should be followed by other provincial Governments in point of other industries.

We are in a position to manufacture denatured spirit but for want of and owing to the high price of caoutchoucine and pyridine bases we are unable at present to manufacture the same. Moreover, the duty is the same. So to encourage the manufacture of denatured spirit Government should grant either grants-in-aid or supply raw materials on favourable terms or abolish the duty on locally manufactured denatured spirit.

Lac dye was one of the exported dyeing substances. Owing to faults on the parts of the Indian dye manufacturers and to the discovery of aniline colours it has almost died out. To a very little extent it is now used in making alta, colouring country leather, silk and wool.

Faults of Indian manufacturers.—They used to adulterate it with mud, etc. They could not eliminate offensive smell and they did not aim at making it fast and they did not pay particular attention to extracting the colour from the best possible materials.

I have a mind to start a vegetable dye factory on a commercial basis but for want of machinery and owing to forbidding prices of raw materials I do not take up the business at present. If Government is willing to place reserve forest colouring products at my disposal and supply other colouring materials from neighbouring States on a nominal duty, I am prepared to start the work at once.

Manufacture of lac into shellac. While reading in the Queen's College, Benares, I resolved to take up the profession of a business man and not to enter the services of Government. My family carried on and are

still carrying on raw lac business, so I knew the varying prices of it. Lac from peepal trees was available to a little extent in Benares. While reading in the college I used to buy raw materials in a very small quantities and export them to Mirzapore for sale. Mirzapore was the nearest manufacturing centre. There were no industrial exhibitions or demonstration factories or any books on the subject to enable me to study its manufactures. So I had to fall back on the mercy of Mirzapore manufacturers. They did not allow me to pry into their trade processes. With much difficulty and great expense I secured some workmen. I started a very small experimental lac manufacture concern. I went down to Calcutta to sell my shellac. There I learned from some friends of the places where raw materials were available and where lac was also manufactured. After a short time I came over to Ranchi, where I found raw material in abundance; I thought that if raw materials were manufactured here, there would be a great saving in freight, etc. But I had to get skilled labour from Mirzapore and it was a hazardous and tedious task. First I learnt how to do the various processes of lac manufacture. Still I had to face one of the most difficult problems, that is supply of money. The business was a profitable one but no money was forthcoming as there was no industrial or commercial bank. There was a bank at Ranchi but it dealt with landed property only. I had to borrow from the market and the interest I had to pay was not less than 25 per cent. per annum. Even at this rate of interest I could not secure money on pledging raw materials. Anyhow I started the business. I had to spend a large sum of money in indenting skilled labour from Mirzapore. As Act XIII of 1859 could not apply to these labourers they were at liberty to go away at any time they liked without even refunding me the railway fares paid in advance. I thought that the factory could be maintained only if local labour was trained. I asked several of the skilled labour to train local men but at first they refused. When I promised them a high reward for training one hand I became successful. In course of time I got all the necessary hands trained in this way. Other lac traders seeing my business successful started manufacturing concerns. At present I and other manufacturers are working in the old crude process. There is a vast field for improvement. There is an European factory belonging to Messrs. Angelo Brothers of Calcutta. The firm works with machine power and with the help of denatured spirit and gets a better outturn. The firm does not allow any outsiders to enter into the factory. I am prepared to start the same provided I am in touch with the details of the plant and its workings.

Q. 1.—I could not raise capital till my business was fairly established and I won the confidence of the money-lenders. There ought to be some sort of industrial banks in close proximity to manufacturing centres.

Q. 2.—From money-lenders and banks.

Q. 5.—Clauses (1) to (7). All the methods are required according to the nature of industries.

Q. 6—In all these methods there should be Government control.

Q. 7.—In my opinion Government pioneer factories are as useful as pioneers in a military campaign.

Q. 8.—Government should pioneer industries which are at present urgently needed and specially those that are concerned with German and Austrian imports into India. They should be closed or handed over to private capitalists when they have shown that they can stand on their own legs.

Q. 10.—By making the bank a kind of ware-house which may advance money against the goods stored and as a commission agent for sale and purchase of the articles for the industry.

Q. 11.—To some extent to weaving industries. Loans are provided and yarns supplied at cost prices.

Q. 12.—For cottage industries.

Q. 14.—Yes. No sooner it competes with an established external trade its aid should be withdrawn.

Q. 16.—I have derived much benefit.

Q. 17.—(1) On payment of their salaries and (2) a certain percentage of profits.

Q. 18.—I would allow publication of the results of research when any private business has recouped its cost.

Q. 19.—Government demonstration factories should be of a touring nature.

Q. 20.—Yes.

Q. 21.—Vide my answer against question no. 16.

Q. 22.—No.

Q. 25.—Yes.

Q. 26.—The survey should consist of Government experts in company with practical business men. Its precise objects should be to tap hidden raw materials.

Q. 27.—By publication in English as well as in vernaculars.

Q. 28.—They are very useful and are a kind of inactive demonstration.

Q. 29.—They should be situated in industrial centres. A description in English and vernaculars should be placed side by side with the exhibits and there should be an expert to explain difficulties.

Q. 30.—Commercial emporia are preferable to sales agencies and if they are attached to public markets I think they will be developed.

Q. 31.—Its value consists in its being a temporary medium for sale and purchase notices.

Q. 32.—Yes. Government policy should be to show the public the foreign articles that have been replaced by indigenous ones. By foreign articles I mean articles coming from the enemy countries.

Q. 33.—They should be popular in character.

Q. 34—Yes. The representatives must possess knowledge of the export and import articles, their places of manufactures and prices, their duties should be (1) to push Indian indigenous articles, (2) to secure imported articles at low prices.

Q. 35.—No.

Q. 36.—No.

Q. 37.—They should exhibit them in the commercial museums.

Q. 38.—It is rumoured that the working is not done honestly.

Q. 39.—Vide my answer to question no. 10.

Q. 40.—Manufactured articles to be supplied to Government if necessary on favourable terms.

Q. 41.—I do not know any.

Q. 44.—Practical teachers have been recruited and labourers are trained under their supervision.

Q. 45.—To obtain an expert for training of labourers and encourage them by paying remuneration.

Q. 46.—I used to train apprentices by giving them short wages, rewards and hopes of their future prospects. I appoint experts for imparting technical knowledge to apprentices. Sometimes I offer rewards to experts.

Q. 47.—An industrial school is in a sense a concentrated factory to train apprentices in different subjects in one place.

Q. 48.—Students from industrial schools should be required to undergo the training of apprentices.

Q. 50.—Industrial school should be under the control of a department of industries. A department of Industries should be independent of the Department of Education.

Q. 51.—There ought to be schools with boarding houses attached to them.

Q. 52.—Government should bear half the cost.

Q. 53.—Industrial reciprocal circumstances and conditions.

Q. 55.—Yes. An engineer in charge of a prime mover must be certified by Boiler Inspectors.

Q. 56.—Engineering and industrial schools under the supervision of the Educational Department. It should be under a Board of Industries and the members of the Board should be recruited partly from amongst Government experts and partly from industrial farms. Their functions ought to be to tap the mineral, forest and agricultural resources, to provide raw materials, markets for manufactured articles and to find out the possibility of opening further industries.

Q. 57.—There should be a Board of Industries having executive powers with bugetted funds.

Q. 58.—Vide my answer to question no. 56.

Q. 60.—Yes. There should be a Director. He should be an expert official.

Q. 61.—The Board of Industries should be under the Director of Industries and the Director under the provincial Government.

Q. 63.—For technical organization, vide answers to question no. 56. No organization of scientific department at present exists.

Q. 64.—Yes.

ORAL EVIDENCE, 18TH NOVEMBER 1916.

President.—You are a merchant in Ranchi?—Yes.

A general merchant?—I am a manufacturer of lac into shellac, proprietor of an oil mill press, and also of a distillery.

You say that "bone is one of the best fertilisers and our cultivators are at present deprived of bone manures" and that its export should be prevented. Would the export be prevented if we teach the people here the value of the bone, that it has special value as a manure, and so get them to make use of it?—They were using it before.

Why have they given it up?—They used it unconsciously. It was lying on the fields and purified, and they used it as manure.

You would not like us to propose that an industry that is already established and is employing a large number of men should be suppressed forcibly?—No.

If we did that, bone would still not be used by the people unless people were educated to realize the value of it?—Now that we have come to know the value of the bone we want the bone not to be exported.

So that sentence in your note will have to be modified. You wish the Government to pass orders preventing the export of bones?—I wish that.

Before the people are able to absorb the bones and use them?—People are ready to absorb the bones.

Then they need not allow them to be exported; they need not sell them? The question is why should they allow the bones to be sold?—Some measures should be taken by Government to prevent the export.

The measure is to let the people know how valuable these bones are. We cannot pass an order prohibiting an industry that is going to throw people out of employ?—That is very important for our people.

Mr. A. Chatterton.—You have been experimenting with the manufacture of oil?—Yes.

What seeds were you using?—Except castor oil seeds, I used all seeds.

You purchased a plant from Messrs. Marshall Sons & Co.?—Yes.

Was it a single press or two or three presses?—A single press having some 17 plates.

Would you mind telling us how much you paid?—About Rs. 6,000.

That gives me some idea of the size of plant. And you say that Messrs. Marshall Sons & Co. gave you evasive answers in regard to the non-working of the plant. Did you write to Messrs. Rose Downs and Thomson?—I did not buy the machinery from them; I bought it through Messrs. Marshall Sons & Co.

But they are the agents?—I went personally to Messrs. Marshall Sons & Co.

What is the difficulty you had?—The outturn was very poor, poorer than the outturn from the *ghani* mills, and the oil had no pungent smell. In the case of the *ghani* we get a strong smell which people like, but in this we did not.

Who is your manager?—I am the manager.

When you got into difficulties in regard to the working of this hydraulic mill what steps did you take?—I had an engineer supplied by Messrs. Marshall Sons & Co.

An European?—No, an Eurasian.

How much did you pay him?—Rs. 175 a month.

Had he been working an oil mill before?—He professed to be a skilled oil mill operator.

But apparently he was not?—No.

Did you get rid of him?—Yes, I dismissed him.

Are you working this mill now?—No, I am working with the *ghani* only.

You say the *ghani* mills were more satisfactory than the hydraulic mill?—Yes.

Are these *ghani* mills worked by power or by bullocks?—By power.

In what way is the *ghani* mill more profitable than the hydraulic mill; do you get a larger percentage of oil, or are the working expenses less?—We get a larger quantity of oil.

When you were working the hydraulic mill, how much oil was left in the cake?—I weighed the quantity of oil and found it only 11 seers, while that from the *ghani* weighed about 13 seers.

Were your pumps working satisfactorily ?—Yes.

I suppose in consequence of your inability to get the plant to work, which was sold to you by the firm in Calcutta, you would like to have a Government Department to which you could go and obtain assistance, so as to get over the difficulty which you experienced in this experiment ?—Yes, that is what I would like to have established.

Then yau have some notes here on sugar; you say that "Civilisation coupled with prosperity led to the importation of foreign sugar, and hence the necessity of improvements in cultivation and refining." Was it not more likely that it was the shortage of the supply of *gur* that led to the importation of foreign sugar ?—If there was an ample supply of *gur* in the country at reasonable prices, would not the people of the country prefer this *gur* to foreign sugar ?—Not at present; they are not preferring *gur* to sugar.

Have you any practical experience yourself of the manufacture of *gur* ?—No my brother-in-law has a sugar refinery, so I have learned from him. I have no practical experience. But as regards the hydraulic mill, it is certain that there is a percentage of loss in the extraction of the juice.

You object to the improved iron roller mills ?—They are not sufficient; there should be some double pairs.

But you say that "the so-called improved Behia pattern iron rollers have also done great harm in the pressing of sugar cane juice, although they facilitate pressing but leave a certain percentage of juice" ?—Formerly there was some method of extracting more juice than is obtainable at present.

What is the method ?—They used to cut the cane in small pieces, crush it, and put a certain quantity of water and crush it again.

They had a sort of diffusion process ?—No, extracting process.

Don't you think that you can get a 5-roller mill which would crush the cane twice ?—I advised the introduction of that system.

How many of these Behia roller mills would work in the season ?—Four or five in each village.

Are there any power-driven mills in the village ?—No.

Do you know of any other province that has them; I mean small ones ?—No, I don't know.

You have not seen them at work anywhere else ?—No.

I don't understand why you make a definite statement that these improved mills have done harm ?—They have not provided a second time crushing, so there is a loss of about 10% juice.

Previous to these iron mills you had wooden mills ?—No stone mills with jars.

Did you get much juice ?—Yes.

Who did the work ?—The men attended to the work. After crushing they put some water and pressed it for the second time.

Why don't you do that with this mill ?—I don't understand how it comes, unless there is some arrangement of double rollers.

Why not put the cane through the mill first and put it through a second time ?—This involves double labour. A mill with two pairs of rollers would be more economical.

That is to say, your system of working the mill is unsatisfactory ?—The present working is imperfect.

In your village that you are acquainted with, would it be possible to get raiyats who grow sugar cane to combine together and purchase one mill to deal with a whole lot of work ?—No.

Why ?—Unity is unknown in India.

Would it be possible to start a village co-operative society for the purpose of establishing a modern cane crushing plant to deal with all the cane for the village in a satisfactory way ?—A sugar plant on a small scale would be possible.

Could you get a co-operative society together and raise funds, with possibly Government assistance, to purchase plant costing, say Rs. 4,000 ?—Yes.

Do the villagers suffer from the difficulty of providing cattle for crushing sugar cane ?—I don't think so. In summer some cattle die and they purchase new ones.

But the work is very hard on the cattle ?—Yes.

Hon'ble Sir F. H. Stewart.—I do not want to enquire into your private affairs, but can you tell me how much capital you have put into these different businesses of yours ?—I had no capital at all, I did the work with my energies.

But surely you had some money ?—I had to borrow the money.

I want to get some idea of the scale of your operations ?—I am now doing distillery contracts of two or three lacs.

You have that amount of capital sunk in the business ?—Yes.

When you went to borrow the money to begin with, what security did you offer ?—Really I had no security.

Whom did you borrow the money from ?—Money-lenders, Marwaris.

And they made you pay 25% interest ?—Yes.

And you had no security to offer them ?—No; even with security I would have had to pay the same.

You wish the export of bones to be prohibited ?—What is the comparative value for agricultural purposes of bones and crushed bones or bone meal ?—Crushed bones are far better.

Then you do not want to do away with the bone crushing industry ?—No.

You merely want to prohibit the export to other countries ?—Yes.

Is that not merely a question of relative value as to what price the owner of the bones can get for them ?—There should be some preventive measures, some restrictions, as, for instance, the imposing of an export tax.

You say that you used to train apprentices, and appoint experts for giving them technical knowledge. Why have you given that up ?—I have all my men trained; I have got as many as I want.

Hon'ble Pandit M. M. Malaviya.—I want to understand your meaning in regard to this export business. You want an export duty so that if the export is not altogether stopped it should at least be discouraged ?—Yes.

Do you mean that even if people do not use bone meal at present in this country, in view of its importance to agriculture, and in view of the difficulty of obtaining bones when you want them, you would rather keep the bones in this country for future use than allow them to be exported now ?—The bones should be kept in this country.

Even if it should not be used at present, you would keep it for future use ?—No, it would be unnecessary to keep it.

Supposing you do not see any immediate prospects of its being used here, then would you or would you not object to its being exported ?—No, I have no objection to its being exported.

You want its export to be discouraged, if along with it arrangements are made, or facilities provided for its being crushed in the country ?—Yes.

You have said that "civilization coupled with prosperity led to the importation of foreign sugar". Was it not really the great cheapness of the imported sugar that led to its extensive use in this country ?—Not entirely. At present the price is Rs. 15 a maund, but the consumption has not gone down.

But the increase in the consumption from one hundred bags to one thousand, to what do you ascribe it; is it not largely due to the cheapness of the article ?—No, it is only due to our men taking sugar instead of *gur*.

Are you sure that it is not because it is one-third as cheap as it used to be ?—There is only a difference of two or three rupees a maund in price.

I am speaking of what it was fifteen or twenty years ago ?—It was also cheap then.

What is the difference between the price now and that which prevailed twenty years ago ? What is the proportion roughly ?—Twenty years ago there was very little import.

When there was not so much import of foreign sugar what was the price of sugar ?—It varied from rupees twelve to rupees sixteen.

What is it now ?—At present the price is twenty rupees.

But before the war ?—There was only a difference of nine rupees.

You say "the Commissioner of Excise asked me to set up a distillery on western principles .....but unfortunately I lost the major portion of my capital". You say "I wanted a loan on the security but for want of an industrial bank I could not secure it". Did you apply to the Government to help you ?—The Commissioner recommended me but the Government refused, because there was no rule to lend to private firms.

You say that if Government encouraged the establishment of industries by the people, there is every reason to expect a similar measure of success as in the case of distilleries?—Yes.

Mr. C. E. Low.—Are not bones ground into bone meal in Calcutta?—Yes.

Do people here purchase bone meal from Calcutta?—No, I do not think so.

Why not?—Hindus do not take on account of religious scruples.

You think they never will take?—I do not think that these orthodox Hindus would.

Supposing that the bone meal was treated with acid and it was turned into superphosphates, which is a kind of manure, would they take it?—Yes.

You suggest that in order to prevent people from crushing their canes before they are ripe, Government should give a loan on raw sugar canes on the standing crop?—Yes.

Is there any reason why Government should do that in preference to a co-operative credit society?—A co-operative credit society, in my opinion, is run on a very small scale; it cannot help to the extent required.

Supposing it were made bigger?—That does not matter.

Then you think that if co-operative credit societies were working on a large scale they could give you such loans?—Yes.

You say that the distillery experts did not afford you any assistance because they did not know anything about the technical side of the work?—Yes.

Do you allude to the Distillery Inspectors or to the experts employed in each province?—The expert selected three years ago was unable to give us practical help in the different provinces.

Was he an European?—Yes.

What did he know?—I hear he was only a revenue officer, not a practical distillery officer.

Where was he recruited from?—From England.

You mean an officer of the English Excise Department under Government?—Yes.

You were speaking about the high price of denatured spirit. Do you allude to the present position or the position before the war?—The present position.

Before the war was denatured spirit not so dear?—No.

You think that the high price is due to the war?—Yes.

Did you attempt before the war to manufacture denatured spirit?—No, on account of the Java competition the price was too great.

But Java can make it for rather less than half of what you can?—They were selling it at twelve annas a gallon in Calcutta.

You were making your alcohol from what?—From *mowha* and partly from Java molasses.

To what extent do you think you could have reduced your cost by working on a larger scale and more efficiently?—We are working at present on a large scale.

Not so large as the Java people?—We have no demand for the products; I could work on a larger scale, but there is no demand.

I am speaking about denatured spirits?—In Calcutta the consumption is more than two lakhs of gallons.

You don't think it would be worth your while to set up a larger plant to make denatured alcohol; you don't think there would be sufficient demand for it?—We have already got a large plant.

For making denatured alcohol?—We can use the same plant.

But you cannot use the same plant for two different things at the same time?—Yes, when we want to have denatured alcohol we purchase denaturants and mix them; we dont require separate plant for making denatured spirits.

You do not think that you could manufacture denatured spirit much more cheaply than at present in order that you might be able to compete with Java?—No, because the price of *mowha* does not go below one rupee.

At the factory?—No, at the places where we buy. They have other bye-products which they sell at even twelve annas a maund. They export to Calcutta and we have to pay Rs. 1-12 in Calcutta.

WITNESS No. 48.

KHAN BAHADUR MUHIUDDIN AHMAD, *Officiating Registrar of Co-operative Societies, Bihar and Orissa:*

WRITTEN EVIDENCE.

NOTE ON INDUSTRIAL POSSIBILITIES WITH THE AID OF CO-OPERATIVE SOCIETIES.

The province of Bihar and Orissa is peculiarly lacking in the matter of industries. The few that do exist are all of the nature of the cottage industries. Among this class, the first place is taken by the weaving industry. There is a fairly large number of weavers scattered over the province but they especially abound in the districts of Cuttack, Sambalpur, Bhagalpur and Ranchi, and the subdivisions of Khurda (Puri) and Bihar (Patna) and in Manbhum district. In the Sambalpur and Bhagalpur districts and in Khurda silk of an excellent quality is turned out. Brass and bell metal wares of very good quality are also made in some parts of the districts of Puri, Balasore and Saran, but on a very limited scale. Durries and carpets are also made in parts of Patna district and in the subdivisions of Sassaram and Aurangabad. In Sassaram coarse blankets are made on a small scale. All these crafts may be developed by means of co-operative societies. But there is a powerful limiting factor to expansion. These crafts are confined to certain families and to all intents and purposes they have become separate castes with all its exclusiveness. I have very serious doubts whether people belonging to other "castes" would be allowed by their seats to leave these crafts, and even if they could overcome the caste prejudice there is a strong inherent diffidence among the people to attempt to learn any trade or profession which did not belong to their ancestors in the direct line. And I am not sure that these people are not right in the belief that the skill necessary is acquired more by heredity than by practice! However that might be, that is how matters stand at present. Societies of the type of "Production and Sale" offer the greatest advantage to these craftsmen. The constitution would be to raise a share capital. The societies would buy all the raw material at wholesale rates and distribute it to the members who would work either at home or in some building of their own. They would be paid for according to the quantity and quality of the work turned out at rates which they get at present. The finished products would then be sold by the societies at the most favourable markets. There will be no distribution of profits until they have accumulated a reserve fund and working capital of their own to be more or less independent of outside financial help. I have great hopes as regards the improvement of the weaving industry by means of co-operative societies. At present everywhere the actual weavers are greatly handicapped owing to the monopoly of a few traders who supply the yarn and take the finished product giving the weavers only a mere pittance to live on. Besides the looms that are used are still of the most primitive character. At present the two great difficulties are the limited knowledge about the business of buying yarns at the cheapest place and the want of technical knowledge necessary for improvement of the loom as well as in the methods of weaving. The solution would be in devising some means of dealing direct with the firms that supply yarn and thus avoid the middlemen, and in the employment of qualified peripatetic demonstrations to teach the advanced methods. In both these cases expert advisers appointed by Government would be necessary.

There is unlimited scope for the development of those industries which aim at converting the raw agricultural produce into consumable forms. These mills and factories would be run as co-operative concerns in which the Central Banks, the affiliated societies, as well as individuals will hold shares. The Government should provide assistance in the shape of expert advice. The company would carry 25 per cent of the net profits to reserve and about 15 per cent to a depreciation fund before declaring a dividend. I am of opinion that a combined mill doing duty as rice-huller, wheat-grinder and oil presser should be established at each centre of a Central Bank. The Central Banks should, however, not be allowed to finance these concerns except by buying a limited number of shares in it. These mills would aim at collecting all the paddy, wheat and oil seeds from the members of co-operative societies and turn them into rice, flour and oil and sell them at wholesale rates to approved customers. In this way a great portion of the profits that go to middlemen will be shared by the cultivators themselves. There would be a great demand for the products of those mills as they would be absolutely pure and free from adulteration. The financing of these mills will, of course, present the greatest obstacle and it will be a matter for consideration whether the provincial bank will finance these ventures. I am not prepared to make a recommendation as regards this as the question needs very careful examination as it would have an important bearing on the credit movement. But generally speaking I may say that I do not think that there is any great risk involved in money invested in such mills if the money so invested be merely for the purpose of providing the necessary raw material. While the entire cost of the plant and machinery should be raised by share-capital, it would together with the stock held by the mill be available as security.

There are great possibilities of development in the organization of combined dairy and breeding farms. A beginning in the direction can immediately be made in all municipal areas by starting milk co-operative societies on lines similar to the societies in Gaya and Bhagalpur. In these places, the *goalas* who have formed themselves into a society, keep their own cows and make arrangements for their feeding themselves. They merely bring in their cows to the society's office at some stated time and milk the animals in the presence of the Manager, who sends it to regular customers in sealed cans through paid carriers. The society takes the milk from the members at a slightly lower price than the market price at which it is sold to the public. The members get all the milk sold without much trouble. They get the attendance of a Veterinary Assistant free and get money at a cheap rate for increasing their stock. The public get pure milk supplied to them at their own houses at market price. Dairies started on these lines could in time become breeding centres. But one cannot make much progress in this direction without substantial help from the Municipalities and District Boards. It might be necessary in many cases to exercise the powers under section 263 of the Bengal Municipal Act of 1884. Government should also be prepared to help in the shape of free assistance from the Veterinary Department.

ORAL EVIDENCE, 18TH NOVEMBER 1916.

President.—How long have you been in charge of the co-operative societies in Bihar ?—I am in direct charge since March last, but I have been connected with this department for the last four years.

Do you think the co-operative movement is making satisfactory progress in the province ?—I cannot say that these societies have come up to the mark, but we are trying to progress on the right lines.

How do you think progress in Bihar compares with the progress in the Central Provinces ?— As regards number we are less than the Central Provinces but as far as quality is concerned we are better off.

Judging by your experience in dealing with these agricultural co-operative societies, what do you think of the prospects of introducing co-operation into smaller industries like weaving and the village industries generally ?—I think there is a good deal of prospect in encouraging weaving as a cottage industry through co-operative societies.

The weavers, I understand, are greatly indebted ? —Very much.

Do you think the introduction of co-operation would save them ?—Yes, if we work under expert advice.

Would your department under its present organization be sufficient to extend co-operation to these industries ? —Yes.

In addition to the agricultural co-operation ?—Yes.

Would that be the best way you think of organizing ? — That is my idea.

Supposing we had a Director of Industries in Bihar, how would you work in conjunction with him ; he would not superintend these co-operative societies ? —We have very great difficulty in getting yarns; we could not make satisfactory arrangements with any mill. Sometimes the mill would not sell direct to us and would tell us to take the goods from their agents. Probably an expert adviser would be able to tell us where to get our yarn from. Then about looms and other things, he would be able to suggest improvements.

We are told to-day that your system of co-operation here has done a great deal in the direction of relieving the raiyat from the clutches of the money-lender, but the present system does not help the raiyat also to learn anything about his own business, to learn the value of improved methods, new machinery, etc. ?—We are trying to teach them improved forms of agriculture.

Is that being done through the Agricultural Department ?—Yes.

They are training juniors who are taking charge of demonstration farms ?— They are just beginning in our province by having demonstration in the villages and by giving us good seeds.

Do you think there is a noticeable improvement in the agricultural condition of the country ? — They are taking to it ; I cannot say they have made any improvement. They are beginning to accept suggestions ; formerly they were very shy.

Of course it takes a long time to get any results in agriculture in noticeable quantities ?—Not if the Agricultural Department has a good thing to offer; for instance Pusa wheat has become very popular, because the result was at once noticeable.

Mr. A. Chatterton.—You say that there are certain number of Weavers' Co-operative Societies in this province ?—About ten or fifteen.

How have they been organized ? Was that done by your assistants or has the initial movement come from local people ?—We had to form all these societies by our own exertions, with one or two exceptions.

Where do they borrow money from ?—Various sources. Where we have got Central Banks, the Central Bank finances ; where we have not got Central Banks, the Provincial Banks finance, or we get money from private investors.

Are these loans granted on your recommendation ?—Yes, always.

Do you take any responsibility for making the society repay the instalments for loans ?—Yes.

In regard to the local management of these societies, is there usually a school master, or some person of more or less education, acting as Honorary Secretary to the society ?—Where we have got Central Banks, these societies are affiliated to the Central Banks and the latter have their own officers to look after these societies. They have a well-paid Manager and inspecting clerks, and the Directors also look after them ; but they are all honorary workers.

How many weavers have you got in the biggest society ?—Not more than 50.

The principal work they do is the purchase of yarns, I suppose ?—Yes.

Do they take any steps to procure orders for marketable goods ?—At present it has not advanced very much, but just now they are free from those monopolists. Formerly they used to take yarn from the same man and sell their finished product to the same man. At present they are free to sell to some other man.

That is a very material advantage ?—Probably we can do more by helping them to get yarn at better rates than they are getting now.

You have taken no steps just now to improve their technique ?—At present we have got one weaving demonstrator lent by Government. He is introducing fly-shuttle looms.

Is he meeting with any success ?—It is getting popular. The first obstacle was the price of the loom, Rs. 25, but we have made it locally now for Rs. 15, and it is getting popular now.

Nothing has been done to help to find a market for these goods ?—Nothing at all.

In this note you say there is great difficulty in getting into touch with suppliers of yarn ; what is the difficulty ?—The difficulty is this. We want to be dealt with a little leniently and not very strictly on business principles, because we do not know business ourselves. Sometimes we make some mistakes in ordering the yarn and want to change it. They make difficulties. We had a contract with the Bengal Luxmi Mill some time ago. At one time we might keep to our part of the contract ; there was just a little difficulty, but they were very strict about it. We want a firm which would deal with us a little leniently.

Are you prepared to pay a little more for your yarn under those circumstances ?—We want better and cheaper goods for the poor weavers.

Do you know whether these weavers that are in your co-operative societies have full time work ?—Yes.

How many hours a day does the ordinary weaver work ?—I think about 8 hours.

Does he work at night much ?—Seldom.

How does he sell the cloth that he manufactures ?—He brings it into the bazar and goes from shop to shop and hawks about. Sometimes petty itinerant merchants go round villages what we call here *biparies* go round and make purchases.

Do you think it would be possible for the Registrar of Co-operative Societies to establish a mart or market for the sale of products of your co-operative societies ?—No. I don't think so. It would be done by the officer in charge of industries.

You know that large quantities of piece-goods come out from Europe, and there are agencies in Bombay, Calcutta and elsewhere to sell these piece-goods. What are the difficulties in the way of starting some kind of mercantile organization in connection with the marketting of hand-loom goods. Have you considered that side of the problem ?—No, up to this our outturn was not sufficient to meet local demands.

In some parts of India they have met with great success. The weavers have been enabled to get large orders for work, and when assured that he has a market for the goods he manufactures, he turns out 20 per cent or 50 per cent or even double the quantity he formerly did, as he has got an incentive to work ?—It is quite possible if we are put in touch with some mercantile firm in Calcutta, for instance, Messrs. Whiteaway Laidlaw & Co., we could increase our outturn. Some towels were turned out in Bihar, and they wanted to buy large quantities of those towels.

Have you considered the question of developing these co-operative societies, not only in the direction of selling them yarn but of providing them with warps ready for weaving : for instance have you got anywhere a Co-operative Warping Mill worked under the management of the society ?—Not yet.

Is there any society where a technically qualified master weaver has been sent down to improve the working of the society?—We have one at Ranchi.

I understand that he is only introducing the fly-shuttle loom?—As soon as this work is finished perhaps he will make further suggestions.

How many has he introduced into Ranchi?—About 50.

Is it not time you moved on a step further?—In Chota Nagpur there is a great demand for loom-made cloths. Very few use foreign cloth, so just now they are making a good profit out of this fly-shuttle.

While they are making good profit is it not an opportunity to get them to move on a step further?—We will do it.

How are you going to provide the organization; are you going to do it or hand it over to some Industrial Department?—Assuming that there is a Director of Industries, would you work in co-operation with him or have your own staff, or hand over the society to the management of the Director of Industries?—We will have our own staff. The Central Bank can afford to pay for such demonstrators.

Who is going to supervise their work?—Probably the Director of Industries in co-operation with the Registrar.

Is there not a little difficulty in one Department doing the work of another Department?—We are doing the same with the Agricultural Department.

So far you have not done very much with the Agricultural Department?—Because the Agricultural Department has not got anything tangible to offer; so far what they have offered we are going on very well with.

If you are going to start industrial co-operative societies, it is important to settle whether the inspection of the societies should be under the Director of Agriculture or the Director of Industries?—I should think under the Registrar. There are two portions of work, financing and the technical portion. In regard to financing, it must remain in the hands of the Registrar, because he will be responsible for the public money lost.

But the whole object of the co-operative credit movement is to make the member of the societies responsible. You do not take any responsibility?—No, but I am bound to audit these societies accounts under the law, and if my societies fail, it will have a bad effect on the movement.

Would it not be better to hand over the society, after it has been properly formed, to actual industrialists to supervise the industrial work, and that you should audit the accounts at the end of the year?—We will always have power, but I am not yet prepared to make any recommendation like that.

Have you any agricultural co-operative societies, I don't mean money-lending societies, but dairies, sugar mills, etc.?—We have co-operative dairies.

Are they working satisfactorily?—Yes, one of them is working very satisfactorily.

Where are they?—One in Gaya and another in Bhagalpur.

How are they worked?—The *goalas* formed the society and the latter purchased the milk at a certain rate. Here our rate is ten seers, and the society sells it to the townspeople at the rate of eight seers. The society advances money at a cheap rate to buy stock and 50 per cent. of the nett profit is paid after the monthly accounts are made up, as bonus to the members. We have got a common shed where all the *goalas* bring their cows. We have got special milking cans in which the cows are milked, and then they are sent away in sealed cans.

The society guarantees the purity of the milk?—Yes.

And makes an addition of 25 per cent of the price?—Yes.

Have you any other agricultural societies working?—No, except credit societies we have none.

You have nothing of this kind; you say "I am of opinion that a combined mill doing duty as rice-huller, wheat-grinder and oil-presser should be established at each centre of a Central Bank?"—No, we have none.

I suppose you have considered how you would run such a society?—I have got a very vague idea.

The society you have an outline of would involve the expenditure of possibly Rs. 20,000?—I should think more.

How do you propose to finance such a society?—My idea is that there should be sufficient share capital to build a factory and buy machinery, and the floating capital should be supplied by some bank, possibly a provincial bank.

That comes to an ordinary joint stock concern?—It is a co-operative joint stock concern, because any profit left will be paid back to the cultivators as a bonus. We limit our dividend to shareholders.

I don't understand why you want a combination of a rice-huller, wheat-grinder and oil-presser?—Because there are the chief products we get from the members of the co-operative societies.

Do you propose that this central factory should simply be for the benefit of members of the society?—Only for the members.

Would you allow other people to send their products to the mill?—Yes, but they would not get any bonus; they would be charged at market rate.

In a case like that you would get a manager on Rs. 100 or Rs. 150 a month to look after it. How are you going to exercise control over him?—We want to run on the same lines as we are running the Central Banks. In the latter we have got two sorts of shareholders, and on the Board two sorts of Directors, those elected by the society and those by individual members. We will have a Director of Industries who will inspect these concerns and a manager who knows about the business. That will be the constitution.

Practically it comes again to the fact that the success or failure of this society would largely depend on the way that the Director of Industries would be able to assist you in getting a suitable manager and looking after that manager?—I think we have a lot of people who can act as directors, but of course about technical knowledge, the Director of Industries will have to make suggestions and inspections.

Do you know whether in any other province industrial societies of this type are established?—I don't know of any.

The important question is whether the Registrar of Co-operative Societies, after initiating the society and seeing that it carries out the rules, has the proper organization for dealing with the control of the society during its working existence. The fact that very few of these societies have been established, and such as have been established have been established under control other than that of the Registrar, seems to point to the fact that it will be necessary to look to some other source of assistance in dealing with them?—Yes, that is why I say that if he is helped by the Director of Industries, he has enough people to look after it.

You want the Director of Industries to help but that you will retain responsibility. Would it not be better that you should divide the work and that the Registrar of Co-operative Societies should leave the technical or business control to some such organization as would be created in the Department of Industries?—I have no objection, but unless there is the Registrar's influence there will be difficulties. Without the Registrar's control, if the Director of Industries wanted to work alone he would not be able to succeed. He might take only the technical portion, but the Registrar's control will be absolutely necessary for all sorts of purposes, collecting raw materials, share money, etc.

In societies of this kind that have been established, there have been no difficulties of that kind, if you have a proper constitution in which the Registrar or his Deputy are represented?—There is some difficulty in dealing with rural societies; they want a lot of goading. People are very ignorant still.

Hon'ble Pandit M. M. Malaviya—You know how these co-operative societies have worked in other countries?—I have studied only in books; I have no practical knowledge.

Do you think that there is good room for expanding the work of these societies throughout the province, not only in matters of production and sale, but in other directions where artisans might usefully combine?—I am speaking of Bihar. There is a possibility of the weaving industry being helped. I have mentioned the industries which can be helped by co-operative societies. There might be artisans, but it is very difficult to combine. Excepting these weavers and milkmen, and in those places where we have Central Banks to collect raw materials and turn them into finished products, there is nothing else.

Do you deal in metal ware and make utensils?—Utensils, I have not much hope of. There are certain utensils whose manufacture cannot be bolstered up Public taste is; changing they have had their day and I don't think any amount of help would keep them. Cheap things have flooded the country in such a way that people do not care for them.

Are not the people who have been dealing in this trade practically a close guild?—Yes.

If you instructed them in the advantages of co-operation, could they not combine for making purchases of brass sheets in large quantities for manufacturing the different kinds of articles and for selling them?—It is possible to keep them on for some time, but I say that public taste is changing about those sorts of utensils, and I don't think the trade will prosper. We can help them to a certain extent, but I don't see any future for those trades.

But so long as they continue to deal in these articles, don't you think it will be an advantage for them to co-operate both in respect of production and sale?—Oh, yes.

Have you got *kachchis* here who grow vegetables and fruits?—Yes, we call them *koonjras*.

Have you any co-operative societies among them?—We have a credit society, not a sale. They only borrow money to improve their cultivation, sink wells, etc.

Is it a part of your Department's work to spread a knowledge of co-operative principles among different combinations of men dealing with industries and trade; is there any special effort made for that purpose?—We make a special effort to teach co-operative principles to members of registered co-operative societies. Now people are themselves coming, and where there is a nucleus we encourage them. We did propagandist's work at one time in the beginning, but we don't need it now, for have we time.

Don't you think there is much room for more propagandist work in that direction?—I think there is room.

Mr. C. E. Low.—You said that you thought it might be desirable, in the case of industrial societies, for the Director of Industries to take care of the technical and business portions of the work?—Yes.

You did not commit yourself to a definite acceptance or rejection of that proposal; you said you thought it might be so?—I have not formed any definite opinion about it.

In the case of agricultural societies, do you think that similarly the Director of Agriculture should look after the technical and business sides of it?—At present the Agricultural Department are doing it.

And if the Director of Agriculture looked after the technical and business sides, what work would be left to the Registrar?—Simply to lend money.

Is it not the case that the spirit in which business is carried on in co-operative societies is very largely different from that in which business is carried on by joint stock companies or by private firms?—It is quite different.

Is it not the case that in respect to co-operative credit societies the principal end is the betterment of the members and that monetary help is a secondary object?—Yes.

Is it not generally also accepted that some special training is required for an officer before he is capable of carrying on that policy of guiding societies on co-operative lines?—Yes, a special training is required.

How would you arrange that in the case of a Director of Industries?—You mean to say that he should be initiated in co-operative work also?

How would you deal with the situation supposing he had to run the business part of these societies?—It would be very difficult to do it. If the society has got two masters to serve I don't think it would work well.

Would your District or Provincial Banks, your financing agents, raise any objection to lending money to a society in which the business portion was managed by somebody who was not the Registrar?—I don't think they would work without the advice of the Registrar; they would hesitate.

How is the Registrar to do that unless he looks after the business side of it? That he can know only from the report of the Director of Industries.

How much do your weavers earn a day, as a rule?— Not more than 4 annas a day.

I do not mean the co-operative weaver, but the ordinary weaver?—I mean an ordinary weaver does not earn more than 4 annas a day.

How much can you increase the earnings of a weaver by his belonging to a co-operative society?—I think it adds a couple of annas more. At present he earns 4 annas, probably it comes to 6 annas.

How much do you think you can increase his earnings by the use of the fly-shuttle?—We have seen by actual experiment that an ordinary *sari* with the use of the fly-shuttle can be turned out to a length of 12 to 13 yards in the same time that it would take them by the old system to turn out 6 yards.

You speak about difficulties with mill agents. In what mills do they purchase, only the Banga Luxmi?—We started a society among durrie makers. There are 1,200 houses here in the city. We could not make any satisfactory arrangement about the yarn. We first made arrangements with the Banga Luxmi. Sometimes they could not keep their promise and sometimes we broke our promise, and then we arranged with the Cawnpore Cotton Mills. There also they were very strict about the agreement, and we could not keep to it.

You did not go along the lines of getting it from the mills where the weavers got it from before.—You had to get into contract with the mills. You had to take so many bales per month.—In the infancy of things we could not do things like that.

You could not arrange for the minimum number of bales?—No, there we wanted a little slackness in business. If they had said "You can take any amount you like," probably it would have gone on very well.

Did you find that they charged very large profits, because one finds as a rule that when a mill is compelled to sell through an agent, he charges very small profits. Did you find mill agents of that type charging very large profits?—We took the yarn in Ranchi from the Empress Mill.

How much was the charge?—I do not know, about half pice or one pice.

About purchasing brass sheets, is it not the case that the price of brass sheets before the war used to fluctuate violently?—Yes.

Was this not especially the case with brass and copper sheets?—These people generally buy old things from Marwaries.

That is a different class of workers.—They generally buy old utensils.

I am speaking about the men who hammer. One kind of man casts brass vessels and the other hammers them out?—In some parts of this province there are such people, but here they all cast.

Does the price of that old *mal* fluctuate much?—I have not studied it.

In any of your weaving societies do you get one or two weavers who can keep very simple accounts?—Yes, in fact in this province in almost all our societies we have literate men.

I would like to pursue this point a little further, about the allocation of functions between the Director of Industries and the Registrar. Do you consider that if you divided the work into business and technical questions that that is exhaustive; is there anything else left?— I do not think there is anything else: that would include all the financing, etc.

Of course the technical side would relate to the purchase of yarn, advice about crude implements, and also I understood you to say that you had inspectors in your agricultural societies who are employed by the societies?—Employed by the Central Banks.

Do you have any of those inspectors who, for instance, have had a training in agriculture?—Up to this time we have not.

Or a training in industrial questions?—No.

You have not asked the Director of Agriculture to train these men and control them from the technical point?—No.

Witness No. 49.

Mr. H. H. Haines, F. C. H., F.L.S., *Conservator of Forests, Bihar and Orissa.*

Written Evidence.

Mr. H. H. Haines.

In no trade or other journal that I know of, is there any information available as to what raw forest products there is a special or comparative demand for. One might *indirectly* gather demand from careful scrutiny of prices, but Forest officers have not time for that. In some cases, of course, we can tell the demand from the prices offered, as, for instance, our cutch coupes. Cutch is a tanning material and we have several other tanning materials, and if I want to know which are especially wanted, I look at quotations for them and find, e.g., "Cutch (basket) market for which quoted 'Rangoon' Rs. 35 to Rs. 38 per cwt.; myrobalans, Indian, market for which quoted 'Calcutta' Rs. 1-10-0 to Rs. 2-14-0 per maund," and I am just as wise as I was before as to whether cutch or myrobalans are in great demand. Then we have sonari bark in demand in Orissa. There is no quotation whatever for this. Now the collection of sonari bark (as I have just remarked on another case) involves the destruction of the tree, and the timber of the tree is valuable, but I can find no data to decide whether it will pay us to grow the tree for its timber or for its bark or (not knowing whether the wood is *largely* used) at all, i.e., whether there would be a large demand for it *if* supplies were available and whether it would pay to grow regular plantation of it which must necessarily exclude some other raw product. The mere quotation of incommensurable prices will not help. We want plain statements by the traders concerned of whether they could take large quantities of products if grown, and of several different products used for the same *general* purpose which they would *prefer* to have. Among tanning materials some give one kind of tan and others a tan of different character, and they often have to be combined, but if I wanted to know which particular products were in defect, I believe I could not do so.

Another difficulty is trade names. They are often incomprehensible to an ordinary individual and the scientific names are, I suppose, similarly incomprehensible to the traders. We want to bring the two together. Take the case of myrobalans. They *probably* are the fruits of terminalia chebula, but how do 'Indian myrobalans' differ from 'Bengal myrobalans'

and 'Madras myrobalans'. At one time the fruits of terminalia belerica (also called myrobalans) had a commercial value. Whether they still have or not I am unable to say, as technical specific names are never mentioned. Perhaps some of these points bear on section VIII of the questions suggested by the Indian Industrial Commission.

With regard to question 105 of the questions suggested by the Commission, I take it, that this is not for members of the Forest Service to reply to and Nos. 106 and 108 bear on communications, which we continually try to improve within *budget limitations*.

With regard to question No. 107, it is usually practicable to concentrate special kinds of trees in limited areas, *provided the soil is good*. In questions of Indian forestry, it is so often lost sight of that the only lands left to the department are of such a character that nobody has thought it worthwhile cultivating them. Frequently, the land is barren rock. On such lands, unless the tree referred to is of naturally a gregarious habit, it is useless trying to grow it gregariously. But giving the certainty of a permanent demand for a timber, and that that timber will pay a better price than some other that is already on the ground, there is no doubt that the Forest Department can do a great deal more than has been done in the past in increasing its numbers. Forest officers, in my opinion, too often pay attention to one or two trees only to the entire exclusion of other valuable trees on the ground which ought to be encouraged and favoured.

Of industries proper I have no experience; having been merely concerned with a few raw products for industries, and in their connection I have already submitted a brief note through the Secretary of the Revenue Department which, so far as it is considered relevant to the enquiries in hand, will no doubt have been, or will be, communicated to you.

Survey for industrial purposes.

Qs. 7 and 25.—So far as forest and agricultural surveys are concerned, it appears to me more important to press to a conclusion the results already obtained. Not having been in contact with research institutions now for several years, or even with the publications of the agricultural research stations, I am not in a position to give an opinion of what has recently been done; but it used to appear to me that products were taken up, reported on, perhaps well reported on, more than once, and then no more was heard of them. This seems to point to the desirability of pioneer factories which will actually place on the market finished products manufactured from raw products already reported upon.

Pioneer factories.

Such a pioneer factory should be in itself a demonstration factory for those branches of industry concerned. In making these remarks I have in mind especially the question of fibres alluded to in my note to Government above quoted.

Drug manufacture.

The case of drugs seems a more difficult one. Government has already manufactured opium and quinine, and with the exception of nux vomica and one or two other cultivated plants, of which it is known very large quantities are consumed, it would require a pharmaceutical chemist to say whether there is sufficient demand to make a general factory for Indian drugs profitable. Apart from the drugs of the British Pharmacopœia, however, there are very numerous indigenous products used in Indian medicine. In K. M. Nadkarni's 'Indian Drugs' some 400 are described (including of course many already in this British Pharmacopœia and also minerals). In the 'Materia Medica of the Hindus' by V. C. Datt, about 190 plants alone are dealt with, many of them quite common weeds. It is probable that although many would be found quite worthless and many others already replaced by superior drugs, yet with improved methods of manufacture by expert chemists, a number of others might be found to be worth introduction into European medicine.

Statistics. Commercial Intelligence. Industrial and trade journals.

Qs. 82 to 84.—The difficulties pointed out in my note alluded to regarding the want of knowledge of what raw products are especially required by the trade and regarding trade names are perhaps merely personal, from ignorance of where such information can be found. The publications alluded to in questions 82 to 84 are not seen by me, but I noticed a similar difficulty regarding nomenclature raised in the *Pioneer* not very long ago. The first difficulty, if it really exists, is probably a matter that could be easily dealt with by the Director-General of Commercial Intelligence. The question of trade names is international, but although it might not therefore be possible to lay down that particular products must bear particular names, a Board of Industries (or whatever organization is decided upon) could insist on Indian products being known by specified names and issue lists showing as far as possible the corresponding trade and scientific names of all raw products imported into India.

(*Mr. Haines did not give oral evidence.*)

Witness No. 50.

Mr. Jhon White.

Mr. John White, *Messrs. Christie, White & Co., Merchants and Managing Agents, Calcutta.*

Written Evidence.

Development of oil-pressing.

I consider that the oil-pressing industry of India is capable of considerable expansion, and that there is a great future for this industry. I have had a little experience in oil pressing, inasmuch as I have assisted in establishing an oil mill in Dehri-on-Sone, Shahabad District. Results of the working of this mill so far have not come up to expectations, due to the difficulty experienced by the owners in competing with jail made oil.

Jail competition.

The question regarding jail industries and competition with private enterprise seems to have a direct bearing on this particular industry. In Calcutta sufficient pure oil seems to be manufactured in jails to meet the demand, to the exclusion of oil of equal quality of privately-owned mills. Attempts to place in the Calcutta market the out-put of the oil mill above referred to, met with no success, as users purchase their requirements from jails. With the markets of big cities like Calcutta closed to private enterprise due to jail competition, and with the present limited demand for export, the outlook for the industry at present is certainly none too bright, but there is no reason why with a return to normal conditions and a little assistance from Government referred to below, the industry should not be in a healthy condition.

Trade representatives.

It seems to me that there is room for trade representatives to represent this particular Indian industry in Great Britain, the Colonies and other countries. I understand that before the war, ship loads of seeds were exported to Germany to be converted into oil there, and while the seeds were allowed into German ports free of duty, there was a heavy import duty on the finished product. The industry was, therefore, lost to India, while Great Britain derived no benefit. Were Government to assist, and appoint trade representatives operating in Great Britain, the Colonies and other countries, through the medium of sales agencies or commercial emporia in India, I am of opinion that it would give a great impetus to the industry generally which would be reserved to India. In my opinion the chief qualification of the representative should be that he has a thorough knowledge with practical experience of the business he represents. Trade agencies might also be established in other provinces to represent the industry there.

With more scientific methods of agriculture, in the sugar industry for example, an outlet would be found for a big percentage of the oil cake for fertilizing purposes.

Development of supply of kaolin.

There are extensive deposits of China clay (kaolin) in many parts of India, the development of which is retarded by preventible causes; one of these causes is lack of transport facilities. Until, and unless there is a chance of improving methods of transport, this industry is not likely to be extensively developed, as, with existing transport charges between the deposits and the nearest railway line, kaolin can, in normal times, be shipped to Calcutta at a price which leaves little or no margin of profit on the working of the local article. Due to the war and present high rates of steamer freights, the price of imported kaolin is very high, sometimes as high as Rs. 60 to Rs. 70 per ton, and for this reason the mining of kaolin has recently been attempted in India on a very modest scale. Given reasonable transport facilities either in the shape of railway extensions, or even facilities for motor transport by road, it seems that there is a great future for this industry in India.

The imports of kaolin into India are very great. The paper mills of Tittaghur, Kankinarah and Raneegunge alone, I understand, use about 50,000 tons of kaolin yearly. There is also a demand for it, for soap-making and tanning, while in Bombay the demand for kaolin for sizing calico is enormous. With china clay available at a reasonable price, a demand would undoubtedly arise for it in the manufacture of chinaware in India. That the local article is good is beyond doubt, as the following analysis will show.

There are known deposits of kaolin in the Manbhum and Bankura districts which, with reasonable transport facilities, could be developed largely. In Manbhum, among other villages, Kridiara contains kaolin, while in Bankura District it is known to be contained in many villages in the Bhelaidaha zemindari.

Analysis of washed kaolin (Phillips Engineering Chemistry) by Dr. Miller.

From	China.	St. Yrieix.	Cornwall.	Analysis of washed kaolin (From Christie, White & Co.'s miners (R. V. Briggs, Esq.)).
1	2	3	4	5
Silica	50·5	48·37	46·3	47·03
Alumina	32·7	34·95	35·74	38·94
Ferric Oxide	1·8	1·26	0·27	0·76
Lime	...	...	0·36	0·42
Magnesia	0·8	Trace.	0·44	0·24
Potash and Soda	1·9	2·40	1·67	0·85
Water	11·2	12·62		12·06

(*The rest of the written evidence of Mr. White is confidential. He did not give oral evidence.*)

MUZAFFARPUR.

WITNESS No. 51.

MR. J. HENRY, *Cane Manager, Darbhanga Sugar Co., Ltd., Lohat Pandaul P. O., Bihar.*

WRITTEN EVIDENCE.

Sugar works.

I do not think the large central mills, which are now being started throughout the province, require any active help from Government in technical, financial, or business matters; but it might be beneficial if all officials were informed that the Government consider such enterprises tend towards the good of the country. A case in point, is the circular issued about a year ago, by the Registrar of Co-operative Credit Societies, to Central Banks, and Unions, calling on them to warn the members of village societies not to take advances from the large sugar companies. In many cases the Chairman of the local Central Bank is the Subdivisional Officer, and as the ordinary raiyat does not distinguish between his two capacities, the story goes round that there is a Government order against dealing with the sugar company. I know of a case where something of this nature has happened, and have corresponded with the Registrar, on the subject.

Communications.—The whole success of a company such as ours depends on getting the cane to the mill, rapidly and inexpensively. I think a good deal can be done in the way of laying down light railways and tramways, and the Bengal and North-Western Railway will possibly find it pay to extend their system in the east of this district. The District and Local Boards have always been ready to assist in this matter, but there is no fixed policy. At present, they think it their duty to charge a rental for the use of the roads for light lines. The annual flooding of this Subdivision, for the last three years, has considerably damaged the cart roads, and more especially those country "duggas", which are not kept up by the public funds, but which are very important to the raiyat. The Madhubani Local Board has been considering the question of spending money on such cart tracks, which are outside their charge, as at present understood. It would be of the greatest benefit to what may be called the back-block raiyat, if this policy is carried out, not only from a sugar point of view, but for all his produce.

I know the whole question of the floods and their cause and prevention is having the closest attention of the district officials. The direct damage to cane has of course been serious in places.

Technical supervision.—The manager of this mill informs me that there is a very great difficulty in filling such specialized posts, as "pansmen", if a vacancy occurs. Good class men of sound education are wanted. A suitable man, with proper training, would earn about Rs. 150 a month, in time, or even more. The men would have to learn by working in a well-run sugar works, after a sound general technical training.

ORAL EVIDENCE, 21ST NOVEMBER 1916.

President.—Have you been long connected with the sugar industry?—I was an indigo planter before, but I have actually gone entirely into sugarcane for the last one year and a half.

I suppose that most of the men who have taken up sugar were previously indigo planters?—Most of them,—almost entirely, I *should say*.

Had you any special technical training before you turned from indigo to sugar?—No; my own post is merely arranging for and supplying canes to the mills. I have nothing to do with the work inside the mill.

Can you tell us what proportion of those engaged in the sugar industry here have had any kind of technical training at all?—I should say that as a rule the cane branch, that is the arrangement for and supply of cane, is mostly in the hands of planters and the work inside the mills is mostly controlled by engineers and technical sugar men.

You are speaking with general knowledge?—Yes. I have visited various mills and I know what happens there. The engineer is subordinate to the mill manager and his branch is entirely to look after the machinery; and the manager who is the sugar maker, controls the chemical and specialist branch as regards sugar.

Mr. C. E. Low.—I do not understand what the relations between the planters and the cane mills are?—They vary considerably. In my own case I cannot be called a planter. I am merely the cane manager of this company. We simply buy cane from the raiyat. In other cases other men would be better able to give an opinion. Indigo managers control certain areas and supply the central factories, and a great deal is done through the managers of the indigo concerns and not direct with the raiyat. I would rather leave that point to the other men who are coming to give their evidence.

Indigo planters put money into these factories?—In a great many places they have been raised on the site of indigo factories or alongside of indigo factories in many cases. In one or two cases indigo factories have been broken down and sugar factories put up, and the original proprietor of the indigo factory either holds shares in, or is otherwise connected with, the new sugar factory.

You allude to the question of communications. You think that tramway and light railways for supply of cane to the factory would serve your purpose?—I think so.

The factory is usually on the main line?—Some are and some are not.

You think that if light railways or tramways were laid which would serve the factories and also carry the other produce of the raiyats that would warrant your asking for the help of the District Board?—Yes. Personally I have laid down a line of about five miles. That goes up to a point which puts it eight or nine miles from any railway. If there was a line connecting it with the railway, it would enable the raiyat to bring all his produce, say rice, etc.

Did you address the Railway on the subject of their extending the line?—I had informal discussions. They seem to think that they have no money for anything now. I do not think they would build light railways merely as an extension of their own line.

If it were a case of light tramways the only organization would be the District Board?—Yes.

Hon'ble Pandit M. M. Malaviya.—Is it your experience that raiyats who have not taken advances from the company come as cheerfully to serve the company as those who have taken advances?—It is only in the last two years that we have had to give advances on any scale.

Have you had any occasion to purchase also from those who have not received advances from you?—It is getting more rare every year. As the advances become publicly known they are more anxious to get advances. But we actually get about 25 per cent of cane without advances.

Do the supplies of that 25 per cent come to you as cheerfully as those who have taken advances?—There is no question of cheerfulness.

I mean, willingly?—They must come willingly or not at all. We have no control over them. They must come of their own accord or not at all. We have no zemindari or other control of any kind.

But you do not find any difficulty in getting them to come? They come to you entirely of their own will?—*Yes*; a certain number. There is such a demand for advances that there are few left without advances. Last year was the first year we gave advances on a large scale.

Before last year you purchased cane from those raiyats who were under no obligation to you, who had not taken advances?—The circumstances were different. Up to last year this mill was close to here. Last year it was moved to the place where they grew cane. Another mill has been placed close to us, about ten miles from us and they started giving advances on a big scale and we had to follow suit. We do not bind the raiyat in advance in any way.

Is there any difference in the price paid to those to whom advances were made and to those to whom they were not made?—None whatever. There is a fixed price for everybody.

Before two years where did you use to get all your sugarcane from?—A large percentage of sugarcane came from Darbhanga District.

Was that grown by your company?—We simply purchase cane for cash. We merely give a portion of the advance as part price without interest.

For how many years did this company work at Ottar, before it was removed two years ago?—They started buying in 1906 or 1907.

And even during the years it existed at Ottar so far as you are aware, you had no difficulty in buying cane from cultivators who were under no obligation to you?—They got a certain amount of cane. I cannot say they always got all they would have liked to have.

You did not hear of any great difficulty in obtaining cane under that system?—No. The system of advances arose from the demand of the raiyat and not from our desire to give them.

You would not have started the system of advances but for the other company?—No.

You will be glad to get rid of this system so far as you are concerned?—If we fill our mills without advances we shall be prepared to. I won't say that that company was the direct cause; many other causes also led up to it.

It was an important determining factor?—Yes.

Apart from that, don't you think that the persons who take advances are placed in a disadvantageous position?—All our bonds state that we are to pay for the cane at four annas but we never pay less than 5 or 5½ annas, although in the bond the rate is only four annas.

So far as you are aware, is that the practice in other factories also?—I could not say.

You say that you find great difficulty in filling such specialized posts as pansmen. Where do you get your men from at present?—I think our men are from Bengal. They are Indians.

What education have they generally received?—No particular education or training. I think they merely picked up their knowledge when the company was first formed at Ottar.

Do you agree that if they had had special training they would be more useful?—They would be more intelligent. In that note I merely report the views of my manager.

Have you made representations about the roads to the District Boards?—The Local Boards are helping us, but they have not any fixed policy. They are very much inclined to help us, but they think they might be going out of their rights if they put down a line.

Hon'ble Sir F. H. Stewart.—Has your company any land on which to grow cane?—Our company has no land on which to grow cane, but we buy cane.

You have no control beyond the particular crop which you buy?—We have no control over beyond what is actually planted in the ground.

What proportion of the value of the crop do you give as advance?—I should say about 30 to 40 per cent. We pay on the maunds of cane brought week by week. The cash is paid at the end of every week and no distinction is made. If the man has taken an advance we deduct the advance and pay the balance but if he has taken no advance the full price is paid to him.

Hon'ble Sir R. N. Mookerjee.—Is this industry paying?—I think it is paying at the present prices.

Do you always realize the advances?—Last year was the first year when large advances were made, and something like Rs. 30 are outstanding out of a considerable number of thousands. I can say that practically all has been realized.

The advantage of giving advances is that the man cannot go and sell his cane to anybody else?.—Yes. The chief advantage is that I know where the cane is coming from. I know how many waggons will come for me.

There is no instance that you can point out in which you made an advance to a certain man and he did not supply you cane?—Generally, I do not think it has happened on any large scale.

Dr. E. Hopkinson.—You buy the whole crop of any particular cultivator?—The man mentions the survey number and the extent of his field, and the bond is made out in this form, that he is paid in advance and all the cane grown in that plot is sold to the company and should be delivered when ripe to the company.

You fix a price?—If we do not give a fair price they would simply crush the cane in the mills. We have no doubt a legal remedy, but it is impossible to enforce it in practice. Last year the price was raised from 5 to 5½ annas because the price of gur went up.

I suppose the price is more or less arranged between the different factories?—Yes.

There is an understanding between the factories to arrange the price?—There is an understanding between ourselves and our neighbours. The price we have to pay is fixed entirely with reference to the local price of gur. We fix it at a point so that the man may not leave us.

Is the price fixed before the advance is made?—We cannot fix the price in advance. All our bonds are made out nominally at four annas, but we have never paid less than 5 or 5½ annas. We never hope to get the cane for four annas.

Do you think that the raiyat recognized that it pays him better to sell you the cane?—Undoubtedly. For instance, I gave an advance in a certain subdivision and in the following year the cane area doubled.

I understand that the cultivator can make gur and so ensure that he gets the proper value for his cane? Yes.—It is the alternative job. If he considers the price unsatisfactory we won't get cane.

Mr. A. Chatterton.—I understand that you consider yourselves to be very much in the hands of the raiyats?—Very much. The cane is grown in about one-third of the high land. There is practically no irrigation to this land. The cane is planted in the beginning of February and the crushing commences in the beginning of December. The crop takes about ten to thirteen months.

Can you tell me about the cost of cultivation?—It is a fairly expensive crop. We must write off ten per cent for seed. I should say roughly Rs. 5 per bigha. About 1·3 bighas make an acre.

I want to know the total cost from the beginning to end, including the rental the raiyat pays for the land?—Somewhere between Rs. 15 to 20 an acre.

You are making these advances to facilitate the extension of cane growing?—Yes.

Do they use manure?—They may take a little of the house ashes.

If they did manure they would get a very much better crop?—Yes. I fear the advances we pay do not go for manuring.

What time of the year does he pay rent?—The biggest call is probably in November.

That is about the time he gets full payment?—Yes.

Does the man grow cane again on the same land?—You cannot grow cane in the same land successively because it overlaps.

The raiyat in one year grows cane but in the next year on the same land he raises other crops?—He grows maize, etc. If he has to grow cane the cultivation has to be done in December while the old cane is still standing.

Does the cultivation shift from village to village?—Certain villages seem to have a large amount of cane handed down. One village is a cane village and the other is not a cane village, probably for no particular reason.

In the matter of getting facilities for transport, a certain village this year may have a thousand acres of cane, and next year it may have no cane at all?—I do not think it is so. I think the lands come into cane by rotation in each cane village.

How long do these mills work, for three or four months?—Yes. Till towards the end of March.

And then they are shut down?—We personally shut down the mill last year, but we may have work this year. I cannot say.

You say that a pansman can get Rs. 150?—Our pansman does not get it. It is the pay for the working season.

What becomes of the staff of these mills?—It is a large staff engaged in the season and you work day and night?—Yes.

What becomes of these people?—We keep all the staff.

How far does it pay you to bring canes by cart?—I dislike cane being brought more than five or six miles by country carts. Cane cutting takes all the day, because stripping the cane takes a long time.

What do they do with this trash?—They take it home and use it for fuel, and the top leaf is used to feed the cattle. We get one train every day. In the evening the waggons are collected and the train arrives at the mill next morning, and each of the weighment stations is a payment centre for the raiyat. We simply pay the raiyats on the maund.

At different times of the season the value of the cane differs very much in sugar contents?—In the beginning of the season the extraction is never so good. It is good at the end of January.

Do you pay at the same rate for the cane at different times of the season?—Yes. Subject to any market value changes.

Can you tell me what is the percentage of land under cane cultivation to the total amount of cultivated land?—I should say one-third of the high land is under cane cultivation. It varies enormously.

President.—What percentage of the area growing sugarcane supplies cane to the factory?—I cannot say.

About one-half?—It is possible. More than one-half in our case.

Are there enough gur-making installations to enable a raiyat to find a competing market?—Hundreds of mills were working last year.

In case the raiyat was not satisfied with your price would he go to the gur maker?—Yes.

Could you make advances to the raiyat in the form of fertilizer instead of cash?—He would not take it. He is intensely conservative and ignorant.

What is, roughly, the average produce of sugarcane per acre?—What do you call a good crop in this district?—About twelve tons of sugarcane would be a fairly good normal crop.

Hon'ble Pandit M. M. Malaviya.—Can you tell us shortly what phases your company passed through before it came into existence as the present company?—It was originally started as the "Indian Development, Limited." For some financial reasons it did not pay and the company was mortgaged and bought in by the mortgagees. The Ottar Mill was afterwards transferred to the Pandaul district as Darbhanga Sugar Company, Limited.

Before it became the Darbhanga Sugar Company, Limited, how many times did it change hands?—It changed hands once before and once to Darbhanga Sugar Company.

Is this not one of the largest companies in Bihar?—I think it has the largest mill.

It has invested a large amount of capital also?—I could not say.

I have been told that eighty lakhs has been invested; could you give me any idea of the capital invested?—Eight lakhs is absurdly above the capital. I am not quite sure whether I am at liberty to tell you the capital.

Have you got a form of the agreement for advances?—Yes.

Have you any objection to sending us a copy of it?—None whatever. (a copy was subsequently sent by witness).

Could you also give us a copy of the agreement with the Ryam factory about the boundaries?—I think I could get that. I shall write to the agents at Calcutta.

My whole object is to see how the matter is arranged?—The agreement merely mentions that the Ryam factory shall not buy east of certain boundaries and we shall not buy west of certain boundaries; and before any questions of price or any grave matters are decided upon by either of the companies, it shall consult the other company.

It is entirely a voluntary arrangement?—Any one with a sense of honour would not go back upon that.

Is any period fixed for which this agreement is to run?—No.

Hon'ble Sir F. H. Stewart.—Your relations with the raiyats are quite good?—I have nothing to complain of. I have had no friction.

They regard what you are doing as beneficial to them?—Yes. We have never had the least friction with them of any kind. Our whole aim is to avoid friction.

WITNESS No. 52 .

MR. GEORGE RAINY MACDONALD, *Manager, Barah Factory, Champaran.*

WRITTEN EVIDENCE.

Sugar.

Central sugar factories were started in Bihar on the decline of the indigo industry. At present there are about ten working and probably more would be put up if certain difficulties were removed. The chief ones that occur to me are :—

(1) *Factory areas.*—In Japan and, I rather think, in Java, areas for growing and purchasing cane are apportioned to individual factories, so as to prevent interloping and its consequent evils. This is, I think, very necessary so as to give confidence to capital. The principle of restricted areas or *dehats* is thoroughly understood in regard to indigo. Almost invariably neighbouring factories have boundaries and sometimes the boundaries are embodied in bonds with penalties for encroachments. Once boundaries are made they are strictly adhered to. It is only in this way that indigo planters have been able to conduct their business amicably for all these years. Something of the same kind is required in regard to sugar. It is much more difficult to arrange areas for sugar than for indigo, as a larger area is generally required for sugar than for indigo. In Bihar the places where central factories have been established may be divided into three classes :—

(*a*) Where the old indigo area or *dehat* is sufficient. That is a simple case and the owner of such an estate has only to be protected against outsiders drawing cane from there.

(*b*) Places depending for cane supplies partly from their own estate and partly from the surrounding country where there are no indigo *dehats*. Such places should have, not only their indigo *dehats* secured, but also sufficient country to provide cane for their mill.

(*c*) Places depending partly on cane grown in their own *dehat* and partly on cane from surrounding indigo factories having well-defined boundaries. In such cases the sugar factory should be secured in its own boundary and the neighbouring factories in theirs. The sugar factory would need to come to some agreement with its neighbours before it could take cane from their *dehats*.

To arrange and enforce areas some authority would need to be created. In other countries I believe it lies with a sugar bureau and no factory can be started without the sanction of the sugar bureau.

(2) *Facilities for the acquisition of lands.*—In Java, I believe, facilities are given for acquiring lands in blocks. This might be difficult in India, but if any way could be devised it would be a great boon. It is well understood that cane cannot be properly supervised where it is in small patches. This is particularly the case as regards manuring and irrigation and also for guarding against theft and damage by wild animals such as pigs, etc.

(3) *Facilities for expansion.*—When cane is in scattered blocks light railways are very necessary. In my own case I am told by my neighbours that if I put down a railway 10—12 miles long, I would get large supplies of cane Such a railway would probably result in the putting up of a jute mill and a great impetus would be given to trade generally. In fact it would open up a large tract of country at present unserved. It would be a heavy business to put up such a railway for cane alone, but with other industries in prospect it would be a good proposition. In a case of this kind, which would be for the public good, interest might be guaranteed. In addition to railways, facilities might be given for obtaining capital for other purposes when required, but in such cases I would only be inclined to give it to bonâ fide growers of cane on their giving security. Otherwise it would probably be taken advantage of by machinery jobbers and people of that class.

(4) *Protection.*—The sugar industry on the central factory system is still in its infancy and we have still a great deal to learn as to the best kinds of cane to grow and the best ways of growing them. The Sugar Committee of the Board of Agriculture of India recommended that a sugar station should be established north of the Ganges. I think this is very necessary. Till Indian canes give us better field and mill returns we cannot compete with (say) Java, but as I said, I think, we have a great deal to learn, and that in time we might be able to hold our own. Meantime I think we should get a certain amount of protection against prices falling to pre-war rates. At the prices then ruling Indian central factories were scarcely able to make both ends meet. An import duty of (say) 25 per cent instead of the present one of 10 per cent would, I think, meet the case.

Saltpetre.

I have never manufactured saltpetre : but I have a good deal to do with the letting of saltpetre *dihs* or the places where crude saltpetre is made. In this way I come in contact a good deal with the Nunias, the caste who make crude saltpetre.

The manufacture of saltpetre is at present in two distinct stages :—

1. *The manufacture of crude saltpetre on* " dihs ".—All Nunias say that were it not for the restrictions as to making salt they could get a higher extraction of saltpetre and make a better quality. This would be a great advantage to them as they would get more saltpetre for practically the same amount of labour and get a better price for higher quality. Nunias are a hard-working body of people. All facilities should be given to them to carry on their work to the best advantage. This is not the case at present and, as they can hardly make a living out of the manufacture of crude saltpetre, they are taking to other kinds of work.

2. *The selling of crude saltpetre to refineries* —These places are generally run by other castes. The Nunia is quite capable of running them : but generally he is a poor man and has not the capital. If instead of salt restrictions, a tax were put on refined saltpetre, I am told it would be very popular and that the out-put would at once increase as the Nunias, in addition to making a better thing out of crude saltpetre, would take to refining also, as probably they would then be able to raise capital.

Oil-mills.

People are rather shy of the industry on account of previous failures, but I cannot help thinking such must have been due to avoidable causes. A great proportion of the oil-seeds of the country are exported. I am informed that the great difficulty is to get a market for the oil. Oil-cake is about the best manure. There is a market for cane, potatoes, etc.; but it is difficult to get enough of the oil. It is a great loss to the country that the greater part of the oil-seeds is exported.

Superphosphate factories.

We are told that Bihar lands are very deficient in phosphates and yet large quantities of bones are annually exported from this country. So far as I know, no superphosphate factory exists in India. I believe the manufacture presents no great difficulty. If it pays to export the raw materials and import the manufactured article, surely it would pay to manufacture on the spot.

Pioneer factories.

In regard to both the above industries, I would respectfully submit that the Commission could give great help by collecting and publishing information and having some research work done. Probably pioneer factories would be the best way of arriving at and demonstrating the advantages and disadvantages of these industries.

ORAL EVIDENCE—21ST NOVEMBER 1916.

President.—Could you tell us roughly what experience in sugar you have had ?—I have been in charge of, i.e., looking after sugar factories for the last ten years, i.e., since 1907.

And previous to that you were in indigo ?—Yes.

Have you been in charge of sugarcane growing?—Yes, I am not in charge of the manufacturing part of it.

You have not had any special scientific training in regard to it?—No, of course I have a general, but not a special training.

Have you had much assistance from Pusa ?—No, I cannot say we have. We have not asked them for anything as we knew there was no special Cane Department. We buy their surplus cane, that is all we have had to do with Pusa.

What about seed ?—We have not had any seed from Pusa.

To what extent have you been able to take advantage of their experimental research work in improving the quality of the cane ?—I cannot say that we have had any improvements from Pusa. We have had help from other sources ; for instance, Mr. Clarke of the United Provinces has been down, and Mr. Somers Taylor from Bhagalpur. They are chiefly concerned with sugar. There is not much sugar work done in Pusa. There is no regular expert there.

Have these two officers been in direct association with you ?—They have just come down and visited the place, and we have picked up ideas from them in the way of improved kinds of cane, and that sort of thing. They have never been on special service connected with cane.

Are you using any special kind of cane now as most suitable for the district ?—My main canes are the country canes. They are the standard canes, because they stand drought, floods and diseases that we are subject to here better than imported canes. We have tried other canes such as Mauritius, Lousiana, etc.

Have you tried the famous J33 ?—We are trying that now, and it is promising very well.

Would there be any difficulty in introducing improved strains of canes, say Mauritius, generally in the district ?—We have found that other canes, such as Mauritius canes, are not adapted to our ripening season. That is an important point. Mauritius canes have a long ripening season, and we have a very short one. It takes a long time to get a proper kind of cane which would suit ripening conditions and withstand drought and floods, etc. One cannot get cane to replace country canes in a hurry.

Of course you know that those conditions are being taken into account by Agricultural Officers engaged in research work ?—Yes.

I want to know wnether, as the result of their research work, you can definitely say that you are using an improved type of cane ?—I cannot say so. The most likely cane to suit us is J33.

That has not been definitely proved ?—No.

Supposing that you proved that cane to be suitable, would it be easy to introduce the raiyat to it and get him to grow that kind of cane ?—When a thing is proved to be a good thing, the raiyats will take it up. They are slow to take it up, but when it is actually certain that it is a good thing, I find that they do take it up. But they want a long time, and they want to be absolutely sure of their ground.

Does it not seem also that most people in districts are rather slow in applying results obtained at Pusa ? J 33 has been known for a long time ?—There is no great supply of seeds. We were last year unable to get any seeds.

You tell us that "in Java facilities are given for acquiring land in blocks, etc." Where did you get your information from about Java ?—From Professor Geerlig's book and also from a Java planter.

What kind of literature generally do you people consult in order to keep yourselves up-to-date ; do you take the "International Sugar Guide" ?—Yes and pamphlets from bureaux. If there are special pamphlets we get them. The American pamphlets by Stubbs are very good.

I understand you have no Association of sugar producers or sugar manufacturers ?—No, we have not, except as a branch of the Bihar Indigo Planters' Association.

And consequently you have not so far made any organized effort to employ your own scientific staff for experimental work ?—No.

When you take up an area that has peculiar features, would it not pay you to do so ?—I think it would. At the present moment there are comparatively few of us. It is only in the last three or four years that central factories have increased.

Are you definitely of opinion that sugarcane growing in this division is an industry that will increase very largely ?—I think it would.

Is it an industry in which some public authority, either the Government or an association of sugar people would be justified in laying out considerable sums of money in experimental work ?—I think the prospects would certainly warrant it. The past results warrant it.

Mr. C. E. Low.—In regard to these thick canes, such as Mauritius, do they give you a notably bigger yield ?—Yes, but it all depends on the kind of manure. Undoubtedly with thorough cultivation and good manure it would give a heavier yield, but whether these canes will suit the climate here is not proved.

Have you worked these thicker canes on a commercial scale ?—Yes.

What yield have you got ?—Up to 80 tons ; that is not on what you would call a very large scale, say 10 or 15 acres.

Do you find that the yield of sugar is in satisfactory proportion to the weight of the cane ?—Yes, from these big canes you will get an extraction of sugar amounting to 12 per cent.

Have you given out any of these seeds to any raiyats at all ?—Yes, I have, but they did not take to it. They would not put the labour into it. It requires heavy manuring and much labour.

What system are you adopting ?—The trench system, 2 ft. 6 in. centres (2ft. 6 in. trench and 2ft. 6 in. banks.) 2ft. by 2ft. is also very good for big canes.

You could not get the raiyats to copy that practice from you ?—So far they have not ; they may in time.

Do you think that a properly organized Agricultural Department would have a greater chance of succeeding than you would, in getting the raiyat to adopt it ?—A great deal is done by object-lessons. When the raiyat sees that crop pays and is not very liable to disease, he will take to it. It is a matter of giving him an object-lesson.

Are you troubled by pig ?—Yes, a good deal.

Have you tried any form of wire fencing ?—In a neighbouring factory they have. I have not got it myself.

Did it give satisfactory results ?—Yes.

Would it keep out jackals ?—I could not answer you that exactly, but I don't think it would ; it is a big mesh.

Do you think it would be of any assistance to a raiyat to give him facilities of that sort ?—They grow very small plots, so that expenses would be prohibitive.

What manure do you use for cane ?—I use all sorts.

What have you fixed on as a standard practice ?—The best results I get are like this. I keep land fallow, and manure it with farm-yard manure, then plant cane and it gives the best results of any. Sometimes I use seeth and oil-cake and ground-nut meal.

You don't use any form of artificial concentrated manure, such as sulphate of ammonia ?—Never : next to farmyard manure, I find oil-cake best.

With reference to this idea of light railways or tramways, have you had any discussion with the Railway Company or with the District Board ?—We have not with the Railway but with the District Board, and in that connection there is the difficulty of acquiring the land. The Local Government have no authority in regard to the matter of light railways where lands in addition to the roadsides are required.

Would such a railway be of public utility, or would its use be restricted to certain persons ?—We would not restrict it. Our proposal was to make a light railway alongside the road, but they did not seem to be very keen on it.

You mean they said they had no power to admit it or thought it inadvisable ?—They thought it inadvisable.

Do you consider that it would be a good thing for a company to pick out a certain number of raiyats and purchase their land from them and start a centralised sugar plantation ?—It would be rather difficult to do. My idea more was to get blocks of land in exchange or for temporary use, paying rent for same, so that you could manure them and irrigate them properly, instead of having to go all over the place where irrigation is quite impossible.

Is the land very scattered ?—Yes, very scattered, indeed ; a raiyat has several fields each in a different place.

Hon'ble Pandit M. M. Malaviya.—You say, "In Japan and, I rather think, in Java, areas for growing and purchasing cane are apportioned to individual factories, so as to prevent interloping and its consequent evils." ?—Yes.

Are you quite sure of your facts ?—I quoted to you from Mr. Geerligs and from information received from a Java planter. It is a well-known fact.

Are you referring to Japan ?—To Formosa, and in Japan too.

So far as Formosa is concerned, all that this book tells me is that when the Japanese Government failed in their efforts to induce the natives of Formosa to plant a better kind of cane than what they grew, though they offered many facilities and a subsidy for the purpose they introduced certain ordinances in 1905 to this effect :—

"Anyone wishing to erect a modern sugar factory must first obtain permission from the Director of the Sugar Bureau, who will mark out the district within which the applicant is to be allowed to buy sugarcane, and where no other sugar works may be started. Anyone planting sugarcane in that district is under obligation to sell it to the factory and is not free to export it outside the district, nor use it for any other purpose, so that the factory enjoys the monopoly of buying all the sugarcane planted there. On the other hand, the factory is bound to take all the cane planted in the district and is not free to refuse a part of the planting should the supply exceed their wants."

Is it that which you are referring to ?—Yes.

Do you know that in Java "most of the sugar factories get their arable land by voluntary agreement with the population," and are you aware of the restrictions that have been laid down in this connection with the object of protecting the indigenous population against encroachment from the manufacturer of sugar ?—I did not know that.

According to the Civil regulations in force in Java, "it is forbidden to hire more than one-third of the arable land belonging to a dessa ; moreover a maximum planting area has been fixed for every factory, which cannot be exceeded when hiring". That would show that the regulation has been made in the interests of the indigenous cultivator, so that the portion that he needs for cultivating foodstuffs and other necessary things like that should not be reduced below the right quantity ?—I think it has two objects in view, one is the protection of capital and to a certain extent the protection of the indigenous population. My point was for the protection of capital. My restricted area does not apply to the amount of land taken. Supposing there was a sugar factory here (*witness indicates on a piece of paper*), well, all the cane within that area should be within the area of that factory, and should only be sold to that factory. I am quite willing that prices should be fixed at market rates, and not at any restricted rates ; that the prices should be fixed by arbitration or any fair way, but that no other sugar factory should be built within that area.

My object in asking you what I did was to find out whether there is any justification for the view you expressed here that in Java, areas for growing and purchasing cane are apportioned to individual factories ?—That is my information.

This book does not show it. I will quote another portion. It says :—

"When people wish to found a new factory or extend the plantation of an existing one, permission from the Governor General is first required, and only granted when it is sufficiently proved that the step will not be detrimental to the economical interests of the native population, which are, that enough ground shall be left for the cultivation of articles of food, and that there is sufficient irrigation water for both the cultivation of these articles and of cane."

That does not show that this regulation was made in the interests of capital, and does not support your view that in Java areas are apportioned to individual factories?—Well, that is my information.

But you say that you have derived that information only from this book?—I did not say only. I have derived a good deal of information from a Java planter.

Then you still hold to the opinion that the system you have described does prevail in Java?—That is my opinion.

You say that "the principle of restricted areas or *dehats* is thoroughly understood in regard to indigo." Will you kindly tell me briefly what that principle of restricted areas is? Is it the fixing of boundaries between two factories?—The fixing of boundaries by mutual agreement. The Government has nothing to do with it.

Then you do not suggest that Government should do anything to fix or restrict areas?—I write below that some authority would need to be created to arrange and enforce sugar areas.

But you have not found any difficulty in practice in settling boundaries among yourselves?—There is a reason for that. Indigo is a very perishable crop, and the only possible person who could use that indigo would be your neighbour.

Excuse me, my point is this; you have not said that you have found any difficulty in fixing boundaries between two concerns?—No, so far as individuals are concerned.

And therefore there is no justification yet for asking Government to intervene in this matter?—So far as I am concerned I had no difficulty whatever, but I know of one case where there has been difficulty. I don't care to mention names, but my point is that it was a very easy thing to arrange boundaries with your neighbour, with whom you are generally on good terms, because your indigo could only be of use to them, whereas a sugar factory might be 100 miles away and he might come in and cart your cane away. That is the difficulty. It is quite easy as to indigo, but not so as to sugar.

You say that you divide these indigo areas, which are sugar areas now, into three classes; (*a*) Where the old indigo area or *dehat* is sufficient. There you say that the owner of such an estate has only to be protected against outsiders drawing cane from these. Has that become a real danger yet?—I only know of one case at present where it has happened.

What has happened?—Where outsiders have been drawing cane.

President.—You will find evidence given on that point.

Hon'ble Pandit M. M. Malaviya.—The second is, places depending for cane supplies partly from their own estate and partly from the surrounding country where there are no indigo *dehats*. In your opinion such places should have not only their indigo *dehats* secured, but also sufficient additional area to provide cane for their mill?—What I mean by that is, it should not be possible for another central factory to be put up in a place interfering with the supply of cane to the central factory. As I said before, the price should be fixed by anybody at market rates.

By whom would you have the price fixed?—The price might be fixed by anybody selected or by arbitration.

How long had you been in indigo before you took up sugar?—I came out to this country in 1887.

Then from 1887 onwards you were dealing in indigo before you took up sugar?—Yes.

Are you aware that there has been a great deal of complaint on behalf of cultivators of indigo in regard to the fixing of the price of articles which they were compelled to supply?—That is all pretty well settled; they are absolutely contented.

Is it quite settled?—So far as I know.

Do you know that when His Majesty the King-Emperor came to this country a lot of cultivators from Bettiah went up to him and asked for redress of their grievances in this and connected respects, asking that the *incottia* system should be abolished?—They may have; it did not happen in my presence or in the part of the district near me.

You have not heard of it?—It did not happen in my presence; I do not know anything about it.

Do you know anything about the Champaran riots?—Yes.

Were they not the outcome of the *tincottia* system?—I do not know what the origin was.

Do you know that recently cultivators in Bettiah and other parts of Champaran were compelled to execute agreements to supply..... ?

Witness.—This is a sugar inquiry.

President.—It bears on the principle which you suggested here that sugar land should be taken up, so that if you have any special knowledge on this point, it would help us to form an opinion on the question. If you have no special knowledge it is quite easy to say that you have none, and we will have the question settled elsewhere.

Hon'ble Pandit M. M. Malaviya.—I am only confining myself to the last few years: is it within your knowledge that these cultivators complain that they were forced to enter into agreements to supply cane cheap, and they did not willingly execute those agreements, and that there is a suit already pending in appeal, in which they say that they are not bound to supply cane to the factories?—Yes, it is within my knowledge.

Then you know that there is a great deal of feeling among cultivators in Champaran against being forced to supply either indigo or sugarcane under an agreement?—I do not think so; there are a few who object, but most of them like it.

Then are you willing to do away with the *tincottia* system?—Where the rights of *tincottia* exist I do not see why anybody should give up a right that they had.

You say that most of the cultivators are agreeable to supply indigo?—I think so. They give their lands voluntarily, there is no difficulty about it.

In that case you do not think it necessary to keep up the tincottia system?—I do not say that because the *tincottia* is an incidence of tenure and in case when such incidence of tenure exists, I do not see why anybody should give it up, unless they receive an equivalent in some way.

Under this *tincottia* system they are bound to cultivate 3-20ths of an acre of their plot with indigo, is it not so?—Yes, that is so.

And if they do not cultivate it, what would be the result?—It depends; they are liable to breach of contract.

Do you think that this agreement is necessary to compel them to carry out the contract which you think they are bound to carry out?—I do not think so at all. Where an incidence of tenure exists, the agreement simply shows the terms of the contract.

How long has this system existed now; over 100 years?—I could not tell you.

So far as you are aware?—I could not tell you.

Are you satisfied from your experience that if the system were done away with a sufficient supply of indigo could be obtained?—That is a very wide question; I could not say that off-hand.

In the tincottia system who fixes the price of the article that has to be sold by the cultivators to the factory?—It is a mutual agreement I suppose.

Between whom?—Between the cultivator and the manager of the factory.

Suppose the manager of the factory refused to purchase the indigo at a price higher than what he offered, do you think these cultivators would find a ready market there and then for their articles?—I could not tell you.

You have advocated the system which prevails in Formosa. Don't you think that if anything like that were introduced here, it would give rise to great dissatisfaction among the cultivators?—I don't think it has anything to do with the cultivators.

But every one planting sugarcane then in the "district" marked out for a factory is under obligation to sell it to the factory?—My only point was restricted area, with reference to capital, not with reference to prices at all.

With reference to capital in what sense?—So that other central factories should not start.

You do not advocate that the cultivator of sugar in the area of your factory should be compelled to sell to your factory?—Nothing of the sort. My sole point was with reference to other central factories springing up within such an area that it would kill them both, and not your other point as to compulsion. I would not advocate that for a moment.

Except to the extent indicated above you do not advocate the Formosa system to be introduced here in India?—Certainly not.

Hon'ble Sir F. H. Stewart.—Where do you get most of your cane from?—I get it from a very wide area. I grow a certain amount myself and get some from surrounding factories.

What proportion of your total requirements do you grow yourself?—Say one-third.

I don't quite understand your suggestion with reference to a sugar bureau; what would be the composition of such a bureau?—A committee of some kind.

Not official, nor Government?—I would not mind if it was Government.

What would be its functions?—Its chief functions would be with reference to areas of central factories.

But have you not managed very well up-to-date?—I have had no trouble whatever, but I see a very possible danger to capital.

You would like to provide against that?—Yes.

You buy your sugar more or less in the open market under the advance system; that is the regular thing?—Yes.

Would the sugar bureau have other functions?—I would not mind if it had the regulation of cane prices; it would not be a bad thing. My sole object is the protection of capital.

It would be a little arbitrary to have the bureau fixing prices; you could hardly have representatives of the sellers, the raiyats, on the bureau?—It would be very difficult, I think. I think it should be confined solely and simply to regulating areas.

You say, "To arrange and enforce areas some authority would need to be created." By "enforcing areas" you mean limitation of areas, not to enforce certain areas being put under sugarcane?—No, I had no idea of that sort. That was very loosely written. I referred to limitation of areas.

In fact in your remarks about the *tincottia* system you say that where it existed, (i.e., where there was an incidence of tenure) it should only be given up after compensation of some kind was paid?—Yes, that is my point.

Your relations with the raiyats with whom you deal are satisfactory?—Yes, on the whole my relations are very friendly.

And you find them increasingly willing to put land under sugarcane?—Yes. In reference to that we have got two classes of land, land which is on farm and land where the villages are not on farm, but any amount of my cane is grown in villages where I have no authority whatever.

You get a good deal of your cane in the open market?—Yes.

President.—A large proportion?—It is an increasing proportion.

What would it be roughly—one-half?—No, as people see that it is profitable they take it.

Hon'ble Sir F. H. Stewart.—In regard to advances, do you make advances in most cases?—In almost every case we make advances, because they have not got much ready cash.

And to raiyats over whom you have no control?—Yes, it is becoming very common.

You take an interest in fertilizers; supposing you were in a position to supply raiyats fairly cheaply with fertilizers, would you have any difficulty at all in inducing raiyats to take them?—Not in the case of oil-cake; they understand and are willing to pay for it; they use as much as they can get.

There would be a gradually increasing demand for fertilizers in these provinces?—Yes.

Hon'ble Sir R. N. Mookerjee.—The sugar industry, generally speaking, has become a paying industry?—Of course prices just now are higher.

Before the war or after the war?—Before the war it was profitable to a certain extent, but not very profitable.

Then you are not afraid of any competition?—From where?

From any factory starting near you?—We don't know what is going to happen to sugar or anything when the war is over.

I understand that you prefer leasing land. Suppose you leased 100 acres this year, next year what would you do?—I would grow indigo or cereals.

The fertility of the land is not taken away?—It is.

My point is, you take 100 acres of land, manure and drain it, and grow sugar. Next year you would let the raiyats take it; would not its fertility be deteriorated for the purposes of their crops?—No, it would be so as far as sugar is concerned, but not in other cases. It would be improved.

Dr. E. Hopkinson.—I suppose land growing indigo is tending to increase?—Yes.

And the same land is suitable both for indigo and sugar?—Generally speaking.

Is there anything in the nature of competition for land between indigo and sugar?—People have their own land for indigo.

In that respect there is a tendency for sugar land to diminish?—The present prices of indigo are so very high that there is more inducement to grow indigo.

You can swing back again?—Easily.

You say that the land under sugar might be further increased?—Yes.

What crop would it replace?—If indigo was to go, it would replace indigo, and any other crops that are grown in lands suitable for cane, such as wheat, barley, etc.

I understand there is much difficulty in getting J33 seed; how did you get it?—I think it was got from Saharanpore; I forget exactly without reference to my books

There is no recognized channel for getting it?—No, I got none from Pusa, and have not heard of anybody getting it from there. I get the surplus of the cane they have got for crushing purposes. They have never supplied me with J33.

It was the Pusa researches that drew your attention to J33?—No, it was the Cawnpore agency.

You said that if the sugar areas were restricted, it would give you all the protection you required. Do you think protection is required to prevent the cultivator selling a large part of his crop as gur?—They would make some of it into gur, and anyone wanting to do so might do so. I don't include the small mills under the restriction I ask for. Let the raiyat make his gur.

They are simply making it at a loss?—Yes, they take no account of their own labour or expenses, and are doing it at a loss every day.

Mr. A. Chatterton.—Is there any tendency to establish small model factories for the manufacture of eating gur?—I believe they are now making better gur for eating purposes. I believe that is a trade that is springing up, and I think there is a factory being put up near Gorakhpore with the idea of making a better class of gur.

You have got a water-supply; the general level of water is pretty high?—Yes.

Are there many wells?—Not a great many in the Champaran District.

Do they use well water to supplement the rainfall or during periods of drought?—No, they are very much against irrigation on the whole; they have got a prejudice against irrigation.

That is due to the fact that they don't manure sufficiently?—It has got a good deal to do with that.

Is there likely to be any inducement to pump water, and at what time of the year would this pumping be necessary?—The time we suffer most is the dry period from, say, the end of April to the break of the rains.

Is it within the range of your experience that irrigation during that period would enable you to grow a better type of cane?—Yes.

So that to a certain extent their difficulties are due to the fact that they do not irrigate or cannot irrigate?—And to the fact that they grow it in such small patches that to get distributing channels would cost a small fortune. It would not pay. In our case we have fairly large blocks and it would pay us.

If there was any scheme by which cane cultivation could be much more concentrated, would it lead to the extension of irrigation?—Yes, that is my point. You can supervise it better, irrigate it better, manure it better, and conserve it better; in fact you can scarcely cultivate cane except in blocks.

Then you would subscribe to the statement that the present system of cultivation in this province is an uneconomical one, and that you have to teach the raiyat how it should be done?—Yes, he takes a long time to learn, but when he does take it up he goes in harder for it than we do.

Has anything been done by co-operative attempts to grow sugar?—No.

President.—Could you give us some idea as to what you would define as a "central factory"?—By central factory I mean a factory capable of crushing nothing less than two to three hundred tons a day.

Would it be practicable to define a central factory in that way?—Yes.

For practical use?—I don't think any central factory is economical under 200 tons The supervision and the scientific knowledge required for working a factory of 50 tons a day is as much as for one working 200. Two hundred would be the lowest figure.

Do I understand clearly that this regulation would be for the purpose of protecting capital; to prevent the springing up of factories of the same kind too close together?—Yes.

And it has nothing whatever to do with the conditions under which the raiyats are at present cultivating?—None whatever.

You would not object to the conditions as they exist in Java, as read to you by the Hon'ble Pandit?—No, that is absolutely required.

From your knowledge of this district is there anything in those conditions that could not be conveniently applied to this distrit?—That is practically what happens here.

In Java most of the sugar factories get their arable land by voluntary agreement with the population, i.e., they hire the land and work it under State control?—My proposal has nothing to do with the raiyats or anything of the sort.

Do you think that is the general feeling among sugar planters of the district?—I think so.

We have had that opinion expressed to us this morning. Do you think it is general?—Yes, most decidedly so.

Hon'ble Sir R. N. Mookerjee.—With reference to central factories, can you give us an idea of what would be the capital required for such factories?—For machinery, apart from buildings and every other expense, anything from 3 to 3½ lakhs.

And taking buildings and everything?—Say 3¼ to 4 lakhs. But these figures are pre-war.

Hon'ble Pandit M. M. Malaviya.—In regard to the manufacture of crude saltpetre on "dihs" by Nunias, you say that "all facilities should be given to them to carry on their work to the best advantage." Have you any definite recommendation to make on that point? What would you wish Government to do?—I think it is suggested that they should be free to take saltpetre out to the last limit. In that way they would develop a certain amount of salt, and that instead of there being restrictions as to the salt, there should be a tax put on the finished article, the refined article.

Or that the salt made in the course of refining saltpetre might be exempted from the tax?—Yes, because they tell me that the salt is really useless, and is often thrown into the river.

So that you would wish that salt to be exempted from taxation?—Yes, I am only talking from general information.

President.—If I were a Nunia I should pass through a great deal of salt for very little saltpetre? They get nothing for the salt. I don't suppose any regulation of that kind would be practicable?—But the Nunia does not get the salt. He is quite willing to give it away. Let Government or anybody take the salt, but let the Nunia get the best out of his labour.

You say in the last paragraph, "In regard to both the above industries, I would respectfully submit that the Commission could give great help by collecting and publishing information and having some research work done." Do you think that would help the manufacture?—I think so.

Then why do you say that pioneer factories should be established? To demonstrate such information as could be gathered and bring it home to the trading public.

WITNESS No. 53.

Mr. H. C. Finzel.

MR. H. C. FINZEL, *Manager, Pusa Sugar Factory, Champaran.*

WRITTEN EVIDENCE.

Q. 5.—When loans are given by Government for helping any industry, in my opinion a reasonable interest and security should be taken, otherwise it would be a hardship on those firms who are in the same business and possibly still paying interest on loans secured previously from banks, and would not be able to compete with a firm started on more favourable circumstances.

This answers question no. 13.

Q. 41.—At present in this district the land is held by the raiyat in the form of *kashtkari* right, and as long as he pays rent regularly he cannot be dispossessed.

Q. 42.—Powers might be given to the Local Government to assist sugar factories or other industries in acquiring lands for the purpose of putting down light rails or making roads or for any other purpose that the Local Government might think would benefit the industry, at a fair valuation. At present any sum can be demanded by a raiyat or he can absolutely refuse to give up his piece of land.

Qs. 44 and 46.—My experience of this district of Champaran is that although every encouragement is given to men or boys to apprentice themselves and become skilled labourers, they much prefer agriculture to the regular hours of factory work and better pay. Educated natives with a very few exceptions refuse to soil their hands in the workshop.

ORAL EVIDENCE, 21ST NOVEMBER 1916.

President.—How long have you been engaged in the sugar industry?—For ten years.

Have you had any technical training in sugar?—No.

You suggest that power might be given to Local Governments to acquire lands compulsorily. Do you think it would be really worthwhile and desirable, that some regulation of the kind should be devised?—Yes. I think some form of Government control is necessary.

Is it your opinion that this is the general feeling of the sugar industry here?—I think it is.

In making any regulation of the kind would you introduce any regulation also with reference to the relations between the cultivator and the owner of the factory or would you allow them to deal with one another in the open market?—You don't wish the cultivator to be forced to put a certain amount of his land under sugar cane?—I do not mean that the cultivators should be forced to grow sugarcane; by all means let them grow the crop that pay them best.

Is it a fact that sugarcane is one of the most profitable crops that a raiyat can grow?—No. At the present moment it is, but it is not always.

You are aware that in this district the average production per acre is low compared with the rest of India?—I think it is very low.

Are the conditions in the district such that the construction of a light railway would be of general benefit to the district and to more than one company?—I have a project of my own.

Will that benefit some other company beside your own?—It will benefit the raiyats.

In getting a better market?—Yes, and for those who have no carts for getting their cane to their mill.

And that better market will be your factory?—Only my factory, and that is all.

Would that not in fact cut them off from other markets?—The raiyats need not sell it to the factory.

He can do absolutely what he likes?—We only save our carting.

What would be the length of the line?—Nine miles.

You cannot say that it will benefit any other company?—Only if the other industries built light railways to the station.

Would the light railway carry any other goods except sugarcane?—Yes, the railway cannot keep idle.

Would the railway company work it and would you provide the rolling-stock?—Yes, if it is profitable, I should be willing to do so.

If you construct a railway of that kind it would not be an easy matter to say whether that railway ought to be useful for a distance of nine miles or whether it would be better to draw cane from a more compact area?—There are about 120 villages. The sugar factory is in the centre. At the present moment we have to cart the cane. If we put down a light railway we should be able to cart it at a very much cheaper rate.

What is the longest lead that you have got?—12 miles.

If the roads were improved would that suit your purpose equally well?—It would not.

Mr. C. E. Low.—Do you not think that if motor transport were provided it would be useful?—I think a pucca road is a very expensive thing. Motor transport would require a pucca road.

What manure do you use?—We use the refuse from the indigo.

How many tons of cane per acre do you get under your own cultivation?—We get about 12 to 14 tons.

Do you grow thick or thin canes?—Thin.

Was the thick cane unsatisfactory?—We had it and disease crept in and we gave it up.

What variety of thick cane did you grow?—We grew Mauritius and Bourborn.

Could you not get any advice as to the liability of this cane to disease?—We did it seven years ago.

You are not now in a position to get any expert advice as to the canes which would be suitable to grow here?—We are waiting for Dr. Barber. He was here once.

In the meantime you did not ask the Pusa people as to the kind of cane which would be suitable and least liable to diseases?—We did not.

Do you know anything of their work in these parts. Do they demonstrate to the people?—Not in my own district.

Hon'ble Pandit M. M. Malaviya.—You advocate that the Government should acquire lands for sugar factories for the purpose of putting down light rails or making roads. Do you think there would be any justification for private individuals being ousted from their dwellings for the benefit of another individual or individuals who might be working the factory?—It all depends on what the Local Government thought.

Supposing you owned some dwellings and were compelled to give them up in order that the factory might be extended, would you like it?—No.

In the case of railways and public roads there is justification for individuals being put to hardship because a large number of the public will be benefited. Do you think that the same justification exists in the case of private individuals carrying on business?—I do not see why it should go through the dwelling. It might go round them.

You would not wish Government to take up anybody's dwelling for the benefit of a factory?—No. What I meant was the land for cultivation. In case you were blocked, I said that Government might help.

There again do you think that the principle which holds good in the case of acquiring lands for public purposes applies?—That is all a very big question.

You say that the Local Government might assist sugar factories or other industries in acquiring lands for the purpose of putting down light rails or making roads or "for any other purpose". Would you indicate what other purposes you have in mind?—I have in mind what they do in Java. The quality of the cane produced is deteriorating. The raiyat does not care. It does not affect him what sort of cane he supplies to the factory. He gets paid by weight, not by quality. I think that patches of land might be taken up and cane grown there and the production of good cane demonstrated.

You mean that Government should take away the lands from the cultivators and start demonstration factories on these lands and show them how to procure a superior cane?—I say that in the event of the cane absolutely deteriorating something might be done.

You can not recommend any definite course?—No.

You say that educated natives with few exceptions refuse to come to the workshop. Have you had experience of educated men coming to your factory?—I know the educated man does not want to come in.

What salary did you offer?—They start from Rs. 15 and go up to Rs. 40 a month.

Hon'ble Sir F. H. Stewart.—Is your factory a private concern?—Yes.

You say "at present in this district the land is held by the raiyat in the form of *kashtkari* right and that he cannot be dispossessed so long as he pays the rent regularly. Do you imply that this acts as a check on the industrial development of the province for the reasons that you have given?—Yes.

Witness No. 54.

Mr. R. Meyrick.

Mr. R. Meyrick, *Planter, Patahi Concern, Champaran.*

Written Evidence.

Financial aid.

For a rice mill and four zemindari concerns, in which I am interested, I have had no difficulty as regards capital being self-supplied.

The sources from which capital can be drawn are European investors, if Government give aid in the beginning to new enterprises. Such Government aid can be best given by loans with easy rate of interest, provided the shareholders supply at least 50 per cent of the capital required for plant and property. Considerable assistance could be given to new and existing industries in North Bihar by a bank or branch of a bank being opened in a headquarters station such as Muzaffarpur, with a view to giving financial aid to enterprises on security of their plant, property and stocks. The absence of such a bank handicaps all business enterprises considerably.

Railways and roads.

The shortage of waggons considerably hampers selling of produce from Bihar,—specially so to Calcutta, its biggest market. It takes at least 10 days to get the produce there, and sometimes longer. A great cause of delay is apparently due to congestion at Mokameh Ghât. I feel that a greater use might be made of Palezza Ghât at such times.

At railway stations there is insufficient godown room, with the result that produce is damaged by stress of weather, etc. Facilities should be given by the railway to those desirous for the building of store godowns in the station compounds.

Road communication could be greatly improved. Owing to lack of culverts and bridges many roads are impassable during five months of the year. River ghâts and the approaches to them are very bad. With regard to these ghâts, it would probably lead to great improvement if the District Board were to acquire all ghâts on their main roads (many of them at present being privately owned) and were to put the same under the jurisdiction of the District Engineer.

Also no charge should be made at these ghâts for the crossing.

Weights.

The variety of weights used make trade conditions difficult. It should be insisted upon that the standard bazar maund be used in all bazars, and anyone selling grain, etc., by other weights, should be severely punished.

Oral Evidence, 21st November 1916.

President.—You say that considerable assistance could be given to new and existing industries in North Bihar by a bank or branch of a bank being opened in Muzaffarpur. Is there no branch of any bank here?—No, except the Bank of Benares.

This is known as an industrial centre for indigo, sugar and saltpetre and yet there is no bank at all?—I approached the Alliance Bank of Simla. I spoke to the Manager about it and he said that during the war they could not do anything.

When you are referring to the need of a bank you are thinking only of ordinary business and not of any particular industry?—I speak especially with reference to my mill. If there was a local bank which would control stock they would give money.

Did not the Bihar Planters' Association make any representation in the matter?—We brought it up at a meeting and we interviewed the Manager of the Alliance Bank of Simla. He said that this could not be done during the continuance of the war. Since then the matter has dropped. Since I started my mill I have felt the need of a bank more keenly.

Would it be possible to form an organization among yourselves for the purpose of mutual help?—I have not gone into the question.

You say that delay is caused owing to congestion at Mokameh Ghât. How long has this congestion existed?—It has happened at different times. At certain times there may be congestion. At other times it is all right. It all depends on the river. The river throws up sand banks.

Which is the time of the year when congestion mostly occurs?—I have not noticed any particular time.

You must have had a series of incidents when you say that the local industries are handicapped and cannot take advantage of a good market?—Very often you cannot get the waggons when you want to send goods. The time I am sending my rice is from November up till June.

I suppose the Bihar Planters' Association would represent the views of the people generally in the matter of improved road communication. Have they represented the difficulties to the authorities?—I do not think the Association has. I have done so myself. I have brought the District Engineer and shown him. I had my chief difficulty last year since this mill was started.

Who is responsible for the roads?—The District Board.

Is the District Board fairly flourishing?—They do not seem to have very much to spare.

Do you know what the annual income is?—I do not know. There seems to be a chance of its being increased.

Are there in existence any additional cesses to cover the cost of road making?—I think that every industry ought to help towards this end.

There are particular industries which derive special benefit?—I do not want that any one industry would pay an extra cess. Such industries as use the roads to a tremendous extent so as to cause more than the usual damage to the roads might be asked to pay something more.

Mr. A. Chatterton.—You refer to the difficulties in connection with the many weights and measures in use. Does it apply very much to rice?—Yes, when you have to buy it from outside you have to take it according to the measures in local use.

Do you buy paddy in the local bazar? I understood you had zamindari concerns?—I have, but I do not grow enough paddy to supply my own mill.

When do you run the mill?—In the day time.

Have you had any difficulty with repairs?—No difficulty up till now.

Have you found any difficulty in getting out spares during the war?—I got a lot of spare parts only a month ago from Calcutta. They came in promptly. There was no difficulty.

What were the raiyats who are growing paddy doing before the establishment of this mill?—They were selling it to grain dealers.

Have you found any particular difficulty in changing the trade, for example, from paddy to rice?—I have only started my rice market in Calcutta. I have not very large experience.

Hon'ble Sir F. H. Stewart.—What do you do in the absence of banking facilities locally?—I make my own arrangements for money privately. If there is no demand for rice I simply have to stop buying the paddy. I did make some local arrangement with a Marwari but that was not very satisfactory.

Hon'ble Pandit M. M. Malaviya.—You say that capital can be drawn from European investors if Government will give aid in the beginning to new enterprises. Do you know of any case where European capital has not been drawn to business because Government did not help it?—I know of a scheme we had where, if Government aid had been forthcoming, the enterprise might have been started.

Do you not think that Indian capital would also be drawn if Government will give aid in the beginning to new enterprises?—I have no experience.

You say that any one selling with weights other than the standard weights should be severely punished. Do you not think that the buyer has sense enough to calculate what he is entitled to get for the money he gives?—I do not mean to say that there is actual cheating. If one standard weight were used it would be very much easier for all concerned.

Are not business men likely to know the various weights that obtain in the different parts?—Of course we find that out. It would very much facilitate business if we had a standard weight.

But will it be right that any man who sells by weights other than the standard weights should be severely punished?—That is the only way of getting him to do it.

Mr. C. E Low.—How far is your rice mill from the railway station?—It is about 12 miles from the railway.

How long do you think there has been a demand for better banking facilities?—I have not been sufficiently long in the district to be able to give an opinion on the matter.

What wages do the labourers get?—Four rupees a month.

They also steal a certain amount of rice?—A very considerable amount.

President.—I understand that you have been authorized to make inquiries of the other mill owners in the Champaran district regarding certain needs of the industry of the district?—I drew up my ideas on the subject and I consulted Mr. Gordon. Mr. Gordon is consulting other people and getting their opinions.

You have not actually consulted other people?—I have not personally done so. I chiefly respresented the difficulties I had myself experienced.

WITNESS No. 55.

MR. C. H. GORDON, *Moorla Concern, Champaran.*

Mr. C. H. Gordon

WRITTEN EVIDENCE.

I will mostly confine myself with question 110.

Rice milling.

Rice milling—is an industry of which, I believe, I was the pioneer in Bihar, and as such I have had experience of a few difficulties which I consider bars to development.

Capital.—Though rice milling plant is not costly, the profits to be made and the success of the enterprise are in proportion to the outlay at one's command, for the purchase of the raw material (the unhusked grain for milling). A mill costing Rs. 22,000 or Rs. 25,000 to put up would require a capital of at least a lakh for purchase of grain in order to make an appreciable profit. The supply of this capital would assist development. If Government is unable to give advances, the establishment of a bank in North Bihar, prepared to do business against stock, would be a boon to rice mills as well as to other industries. It should be possible for Government to induce a reliable bank to open up as suggested.

Waggon shortage.—Government might do much to assist industries, but if waggon shortage continues, assistance in other directions might just as well not be given. I cannot too strongly express myself as regards this hindrance to development, not only of rice mills, but of industries in general, and general trade.

There is but one railway in North Bihar, and trade is at its mercy. The trader or manufacturer brings his goods to a station from any distance, to find that no waggons are available; it is days, and may be weeks, before he is able to get his goods to the market to find prices have fallen, and in desperation, he sells at a loss. Will the efforts of

Government to assist in other directions be of any avail if products cannot get to the market? Besides loss as above stated there is loss from unfavourable weather conditions while goods are lying at stations. The producer or trader is put to expense and inconvenience by having to guard his goods until such time as the railway chooses to take delivery, for the railway grant no receipts until goods are loaded on waggons. Any relaxation on the part of the owner as to the guarding of his goods results in theft. Waggons are so few and far between, the demand is so urgent and great, that there exists a system of payments to the station staff for the privilege of being supplied with accommodation. Each station has its fixed rate, and when there is a very great demand, carriage room goes to the highest bidder. Thieving in transit causes loss and failure, and railways should be made entirely responsible. Many a small trader owes his insolvency to the above objectionable state of affairs.

Roads and river crossings.—A mere mention of these, and it will be acknowledged they are a necessity, but how great a necessity only those who suffer year in, year out, from the want of them really know. These are essential to the development of the country, and the wonder is that there are parts of our districts almost void of roads. The raw material is unable to get to the mills, or gets there at much cost to the factory, or the producer. The remedy lies in interest being taken in the matter by District Boards and District Officers. Ways and means would, I have no doubt, present themselves, if the question were earnestly considered. Roads and river crossings are the very existence of the cultivator, as well as of industrial enterprise.

Income-tax.—This is truly a tax on a new industry, and might well be allowed to stand over for a time. Rice mills in Champaran are mostly run in connection with zemindaries (landed estates), the estates producing a portion of the raw material; these estates as agricultural concerns, are exempt from income-tax. It seems reasonable to suggest that such rice mills should also be exempted.

Weights.—There would seem to be as many different weights in this province as there are bazars. The buyers and sellers of grain in market places produce and use stone or pieces of iron as weights, one has to take for granted that these are correct. It is obvious that so long as this variety in weights exists, and weights used do not bear Government mark, trade conditions will be difficult. There seems to be no reason why the standard weight should not be used by all.

Adulteration.—I have found the mixing of paddy husk with the grain a serious hindrance to the successful working of a rice mill. When paddy is winnowed, the husk in which grain has not formed being light gets separated from the grain. Cultivators and small dealers mix this husk with mud and water, dry it; having made it heavy, they put it in with the grain, and sell it as such. If it is possible this form of cheating should be made punishable.

Information Bureau.—I have felt the need of information. If each province had an Information Bureau that could give up-to-date information on any industry, this fact combined with the knowledge that capital was available (I am assuming that Government would give advances or banks would do business) would induce, and encourage enterprise. I think too often ventures have failed through incomplete information, and ignorance of difficulties and pitfalls.

ORAL EVIDENCE, 21ST NOVEMBER 1916.

President.—In dealing with the question of roads and river crossings you say that the remedy lies in interest being taken in the matter by District Boards and District Officers. Are you or any of your associates represented on District Boards?—No, I do not think any of them is on the District Board.

Rice milling in itself is not yet sufficient to constitute what one might call a community so that that community might be represented?—No. There are about six rice mills in the district. But the roads and river crossings affect all industries. This is my point really.

How is this matter to be brought to the notice of the District Board. There are general complaints. We want now to know how exactly the problem is to be tackled?—I think that greater interest in the matter ought to be taken by the District Boards. If the better class of raiyat is approached I think he will be glad to help.

How are we as a Commission to deal with this matter more effectively than you?—You can squeeze the District Board and you can bring the matter to their notice?—That is what we have been doing. The reason is that they have not enough funds.

They do not have any spare funds?—No, some parts of the district are absolutely devoid of roads.

Can you suggest any way in which a cess could be levied voluntarily or otherwise in order to provide funds necessary to improve the roads?—I do not think the industries could stand it considering the number of roads to be attended to.

Do you think that by providing a greater capital outlay on roads the wealth of the district would increase and the people in general would be benefited by it?—I certainly think so.

You would like money raised for that purpose?—Yes.

Can you suggest any means by which this could be done?—I think the better class of raiyats will be glad to come forward.

Have you laid this matter before the Collector?—No.

Don't you think that if you place facts and figures at the disposal of the Collector it would help him to place the matter before the higher authorities with his comments thereon? —I might do that.

Mr. C. E. Low.—What is the market for your milled rice?—I have been sending it out to the United Provinces hitherto but now I am sending it down to Calcutta.

Do you supply it to large firms?—I have an agent in Calcutta and he sends up orders for so many waggons at a time.

Is it consumed in Calcutta?—I imagine it is for consumption in Calcutta. It is not what is called the red rice. It is rather different from the white rice in Bengal.

What do you do with the powdery stuff which remains?—That is sold as cattle food.

Do you get a very large sale for it?—It all depends on whether there is fodder or not. If the people are short of fodder they come and buy it in large quantities.

You allude to the difficulty arising from shortage of waggons. Have you considered the possibility of private waggons?—I have just made inquiries about it. It seems to me that a large capital would be required.

You are prepared to say that you personally find shortage of waggons a serious business difficulty?—A very serious difficulty.

It affects your business?—Very much indeed.

Have you any reason to believe that the railways are not doing the best they can with the stock they have?—I do not know that I can say that. I have said in my statement that there is a regular system of payments to the staff and that waggons go to the highest bidder.

Do you think that this practice is known to the officers of the railway?—I think every body knows.

Is there any injudicious preference shown to any one kind of traffic?—I cannot say that.

You never had occasion to think so?—No.

You suggest the releasing of mills run by zamindars from income-tax? Do you consider it would be fair if the zamindari mills were free from income-tax and non-zamindari mills were to pay income-tax?—I grow a great portion of the raw material I require and as an agricultural concern the product is not chargeable to income-tax.

Do you know whether the District Boards receive grant from provincial funds to improve communications?—I do not know.

In the last portion of your evidence you say that you have felt the need of commercial information. Could you mention any specific points in which information will help you?—When I was starting this rice mill I wanted information as to the best sort of mill to put up.

But that is industrial information?—Industrial information is what I am referring to.

You had no means of obtaining information as to the most suitable type of mill for your conditions here?—No.

How did you obtain the information eventually?—I went down to Calcutta and Burma and visited some of the mills there. I sent a lot of paddy to be milled in two different kinds of mills to see which was more suitable. When I found that one kind of mill was more suitable than the other I put it up.

Do you think that you have got the right type of machine?—Yes.

Hon'ble Pandit M. M. Malaviya.—In connection with your remarks about the difficulties of transport, do you allude only to rice milling or to other kinds of industries also?—I have had experience of rice milling really.

Has there been much theft in the railway?—I do not say much. I have lost a little. I am really speaking generally as to what might happen and what does happen and not only what has happened to me.

You think that the railway company should be made responsible for the delivery of the goods which it undertakes to carry?—I think so.

You suggest that rice mills should be exempted from income-tax. Have you considered the fact that the zamindars pay a great deal of land revenue?—I have not thought about it.

Do you think that on the same principle oil-mills should also be exempted?—I think the raw material of rice is grown in a much larger quantity by the zamindar than in the case of oil-seeds.

Hon'ble Sir F. H. Stewart.—Your concern is primarily a zamindari?—Yes.

This rice milling is a new development?—Yes.

Is it spreading all over the province?—Since I began three years ago, there have been six new concerns and two are in the making.

So far the financial results have been satisfactory?—Yes, except last year.

Cannot you develop a local market here for your products?—There is not much demand. The raiyats make their own rice for their consumption. They have objection to eating the boiled rice.

If you can develop a local market that will solve the question of shortage of waggons?—They do not buy the locally made rice.

Have you made representations to the railway authorities?—I have complained continually. The difficulty apparently with the railway is that all the waggons are required at a particular time of the year.

Is there any definite evidence forthcoming regarding the system of payments to the railway staff?—Any amount of evidence.

Mr. A. Chatterton.—I understand that practically all your rice is grown on your estates?—I buy a great deal also.

Is there no possibility of developing a market for hulling rice for other people?—There does not seem to be much scope for that.

What machines are you using?—They are Engleberg hullers.

If you had a cone system you might possibly develop a business in raw rice?—Yes, we might do that. There is the objection to eating boiled rice.

Has not your attention been drawn to any of the British machines?—I have been into the question of Douglas and Grant machines, they have been tried and I believe have not been found suitable.

This seems to be the reverse of our experience?—I think it simply depends upon the kind of paddy.

Witness No. 56.

Mr. C. M. Hutchinson, *Imperial Agricultural Bacteriologist, Pusa.*

Mr. C. M. Hutchinson.

Written Evidence.

The industries of which I have had personal experience in India are, tea, distilling, silk, saltpetre and the manure trade. My knowledge of all of these has been derived from research work carried out in connection with the various problems incidental to such industries and my experience has been that in every one of them not only has it been possible to make very great advances in the direction of greater economic efficiency, but that such advance depended almost entirely upon the substitution of scientific enquiry for the empiricism which is such an outstanding feature of Indian industrial methods.

Tea industry.

My knowledge of this industry is derived from five years' experience as scientific officer to the Indian Tea Association. As the scientific department of the association is now firmly established and recognized as vital to the welfare of the industry it is unnecessary for me to point out the value of research work in connection with tea culture or manufacture; I should like, however, to record my opinion based on my own experience and confirmed by subsequent observation, that the work of the scientific department of the Tea Association is not carried out under the best conditions for advance in knowledge, owing to the necessity imposed upon the scientific staff of devoting a large proportion of their time and energies to demonstration work in the form of touring in the tea districts. I have stated later in this memorandum, my conviction that whereas in the present condition of Indian industries research work might with advantage be undertaken by Government institutions, demonstration work such as the above should be carried out by the trade benefitting thereby. In the case of the tea industry, the trade is sufficiently prosperous to bear the cost of this demonstration work which would involve the employment of a separate staff of trained men, the individual members being allocated to districts in which they would carry out experimental and demonstration work based on the general principles determined by the research staff of the Association. In this way local knowledge of district requirements would be obtained with a fullness at present impossible. I understand that a move in this direction has already been made by the action of certain tea companies who have appointed their own scientific officers to carry out investigations as to the local requirements of their estates; no doubt these officers will work in conjunction with those of the scientific department of the Association to their mutual benefit. I should suggest that Government when making or renewing grants for such scientific departments should stipulate for their allocation to research work and not to demonstrations in the sense I have indicated above.

Government assistance and control.

Distilling industry.

My experience of this industry has been limited to enquiries made at the instance of the officers of the Excise Department, and as a later consequence to further work done at the request of commercial firms. All this work has been carried out at Pusa in such time as could be spared from the ordinary routine work of my section, and the results fully substantiate the proposition which I wish to put forward, namely, the vital necessity for research work in connection with Indian industries, carried out in India by men capable of appreciating the great differences existing between European and Indian conditions. Such men must have knowledge of what has been done in Europe, because Europe is many years ahead of India in scientific research, and must have knowledge of Indian conditions, and of what has been done in India, in order to save time by taking advantage of the work already carried out. It will take longer to acquire the European experience than the knowledge of India, whereas it would be easier to modify the former for Indian conditions when working in India than to carry Indian experience to Europe and compare it with western methods. Therefore the best results would probably be got from an expert trained in Europe, brought out to India for a time, sent back to Europe for say six months or a year and finally brought back to India.

Appointment of experts.

Research laboratories.

This industry affords many examples of the value of research work carried out in India and of the necessity of further work to enable it to be carried on successfully. It provides especially instances not only of the futility of wholesale adoption of Western methods without sufficient knowledge to adapt them to Indian conditions, but of the uselessness of elaborately designed apparatus and technique in the hands of unqualified operators I have encountered for example, several instances of the total failure of imported European yeasts, whereas I have been able to select and culture indigenous varieties of Cerevisieæ which in the hands of the Indian distillers have given conside ably increased yields. So many points requiring investigation have arisen in connection with the enquiries I have made on this subject, that I cannot too strongly emphasize my opinion that a research laboratory for dealing with the problems connected with this industry is urgently wanted in India.

Silk.

My knowledge of this industry is confined to that acquired incidentally as a result of carrying out researches on the nature and incidence of diseases of silk worms (Flacherie and Pebrine) at the instance of Mr. Maxwell Lefroy. It is perhaps unnecessary for me to say anything as to the economic importance of these diseases, especially of the latter, beyond quoting the expressed opinion of Mr. Lefroy that the future welfare of the industry in India depends upon obtaining a much more complete understanding of the causes underlying the incidence of Pebrine in India than we at present possess. As a result of six months' work on this disease, however, I am prepared to state that this subject affords another well marked instance of the importance, or rather of the absolute necessity of research in India as an alternative to the method in vogue at present of adopting, without scientific enquiry, European methods of dealing with a subject. In this case the Pasteur method of obtaining disease-free seed by selection has been adopted wholesale in India without enquiry, with the result that the supplies of seed issued from Government nurseries in Bengal after selection by this method are not necessarily disease-free, so that the disease is not being eliminated by this means. I have been able to devise a modified method which should obtain the desired result, but much remains to be done to determine how Indian conditions affect the spread of the disease, and the whole subject still requires the competent scientific investigation which it should have had many years ago. This is a case in which a cottage industry can be materially aided by scientific research carried out by a Government institution.

Saltpetre.

I undertook a series of investigations into the conditions of this industry in Bihar as a consequence of the interesting problems it presents from the point of view of soil bacteriology specially in connection with the nitrification of organic matter in Indian soils. The results of my enquiry have been published in a Bulletin of the Agricultural Research Institute, No. 68, now in the Press. My conclusions generally stated are that this industry might be considerably expanded by proper encouragement, owing to the fact that the reduction in output which has been going on for some years is probably not due to exhaustion of the raw material, but to the diversion of labour into more attractive channels. The causes responsible for this diversion are fully stated in the note dealing with this subject by the Hon'ble Mr. Morshead, Commissioner of the Tirhut Division, but the point I should wish to make is the inclusion of this industry in the list of those which I have cited as demanding Government aid in the form of research work aimed at improving the methods employed. I have given reasons in my report for supposing that such research would have fruitful results, and work already done at Pusa by the chemical section has shown the advantages of an improved method of refining devised in the laboratory of the Imperial Agricultural Chemist and tested in a neighbouring refinery. As I have pointed out there is good reason for supposing that the actual technique of the industry can be improved as a result of further research, both in the operations of the *nuniah* and of the refiner, and, apart from any alteration in the present relations of the Salt Department to the industry, the restrictive influence of which I have referred to in my report, a case for Government assistance in providing the necessary research seems to exist. I should like incidentally to draw attention to the commercial possibilities of Indian saltpetre as a source of nitric acid as compared with the use of nitrate of soda, on account of the superior value of the by-product, Sulphate of Potash, resulting from the use of the former.

Government assistance.

Manure industry.

My knowledge of this industry in India is chiefly derived from my five years' experience in connection with tea culture. One very definite conclusion is unavoidable i. e. that the whole

subject requires elucidation by a competent body, including an economist aided by experts possessing commercial and scientific knowledge of the subject. The chief points requiring attention are:—

(1) the relative economic value to the country of nitrogen as a constituent of exports such as oilseeds, bones, and hides, as compared with its value as a manurial constituent if retained in the country for this purpose; and

(2) the value of phosphates to Indian agriculture and the relative cost of indigenous production of superphosphate, either from Indian phosphates or bones, and of importing from outside sources. This of course involves the question of the local manufacture or importation of sulphuric acid. It also involves the clearing up of the question of how much any particular crop can afford to pay for manuring with phosphate, and the determination of a vital point, namely whether sufficient reliable experimental work has been carried out in India to allow of an authoritative pronouncement which would settle this question to the satisfaction of the trade.

The same remarks would apply to potash but my personal experience inclines me to the view that this manurial constituent is of relatively small importance in most Indian soils.

In dealing with this subject it must be remembered that what the trade wants is reliable information as to agricultural requirements and what the agriculturist wants is the same information (generally conveyed through the medium of demonstration) together with knowledge of what the trade is prepared to do for him, i. e., the cost of the manure. Obviously an intermediary is required and here Government has already provided the Agricultural Department to supply this want. Unfortunately, however, the requirements of the case demand a very much larger number of men than the Agricultural Department can supply, so that at present it is impossible in the majority of instances for the local department to give sound advice on the subject of manuring to the agriculturist or to report to the trade that as a consequence of actual trial and demonstration a demand for manures of a certain kind exists in certain localities. The need for more men in the department to carry out this kind of work arises not only from the enormous areas to be covered but from the variation in soil and crops to be dealt with. My own experience in the tea districts included the constant difficulty of advising on the subject of manuring (which as any agricultural chemist of experience will admit cannot be overcome by chemical analysis as was formerly supposed) owing to the variation in soils which made local experiments necessary. The dangers of the present position are that commercial enterprise leads to unwarranted statements as to the value of various manures or mixtures, such statements being made possibly on the strength of insufficient experiment or even of European experience, with the consequence that the agriculturist is probably greatly disappointed with the results obtained and not only condemns this particular manure and all others, but produces a similar attitude in the minds of other cultivators in his district, to the great detriment not only of the manure trade but possibly of the prospect of agricultural improvement in that part of the country. I should be inclined to suggest that, so far as the native cultivator is concerned at any rate, Government should exercise control over the sale of artificial manures by requiring adequate proof of the probable truth of any statements made by commercial firms as to the value of the manures they are offering for sale to Indian agriculturists. This is, of course, a very drastic remedy for the condition of affairs I have described, but I am firmly of opinion that unless some such remedy is applied the short sighted policy I refer to will do incalculable harm. On the other hand I am aware of the fact that the trade as a whole is only too anxious to take advantage of and be guided by the experience of the Agricultural Department and it should be the function of Government to provide the information required to bring the trade into satisfactory relationship with the agricultural interest. The guiding principle which should be insisted on as essential to the natural development of this industry in India is that profit on capital invested should depend upon small profits upon a large turnover. This, in the present condition of Indian agriculture appears to be the only policy likely to lead to the use of artificial manures to any considerable extent, and its recognition by the trade should form the foundation of satisfactory relations between the commercial and agricultural interests.

Government control and assistance.

The Hon'ble Mr. Morshead has referred at some length in his note to the subject of oil-cakes as manures; I have had a considerable amount of experience of the use of cakes, especially as manure for tea, and am able to say definitely and with some confidence that as a source of nitrogen they are unequalled in value in India both on account of the low cost per unit of this element and of the crop increase resulting from their use, as compared with other sources such as Nitrate of Soda or Sulphate of Ammonia. In Assam in several places oil mills to deal with local requirements have been erected at various times, but my experience of these has been that they have been generally run at a loss, owing to business difficulties mainly connected with disposal of the oil and frequently resulting from the hostile action of local Indian traders. To put this very important source of manure at the service of Indian agriculture the conditions of the trade and the requirements of the agricultural community require careful investigation by a competent body such as the one I have already suggested, and this enquiry would naturally engage their attention as being necessary for the proper use of a material of proved value, obtainable in large quantities but fluctuating in price owing to uncertain

Oil cakes.

demand and supply. I have no hesitation in saying that in my opinion Nitrate of Soda is not required in India as long as the indigenous sources of nitrogen, such as oil-cake, remain incompletely utilized for this purpose. Sulphate of Ammonia, however, is not in the same case so long as the commercial possibilities of Indian made superphosphate and with it the use of sulphuric acid for local production of the former manure remain to be determined.

Government enquiry.

In my opinion, then, the first requirement of the manure trade in India is an enquiry by Government as to its economic position so far as the whole country is concerned, and this enquiry, I think, can only be successfully carried out under the direction of a trained economist

Research Institutions.

In England, until recently all scientific research work has been carried out by private enterprise. In India, although there are notable exceptions, this would mean restriction of such work not only to already established industries, but to those proved profitable without its aid. My own experience detailed above has shown the importance of scientific research as a necessary antecedent to successful pioneer work either in introducing and establishing new industries in India or in adapting or modifying European scientific methods of proved utility to Indian conditions. Not only does it seem clear that failing Government aid in this respect such research work will not be carried out, but one advantage of Government institutions over private laboratories lies in the comparative ease of obtaining for the former more popular recognition of their existence and utility. The commercial man in England is notoriously ignorant not only of the possibilities of science but of the way in which to obtain scientific help and this condition of affairs is still more prevalent in India. In this country, however, recognition of the existence of Government institutions is more readily obtained, although the education of the commercial community up to the point of belief in efficiency is still in an embryonic stage. A further advantage attached to the Government scientific research institution would be the comparative ease of obtaining properly qualified workers provided that Government decided that such work was necessary and valuable and consequently put the terms of recruitment upon a solid and permanent basis.

The most difficult point in determining the functions of a Government research institute would be the exact point of division between research and demonstration. It appears to me that in a majority of instances an already established industry should bear the cost of the latter especially when experiment carried out by Government has shown the practical value of some improvement.

Examples of this may be quoted :—

(1) *The tea industry.*—A large proportion of the cost of the scientific department of this industry in India is borne by Government, partly out of imperial and partly from provincial funds. In my experience the full advantages of the scientific equipment are not at present obtained owing to the large proportion of the time of the scientific officers occupied by demonstration work ; this might well be carried out by a separate local staff in the various districts, the expenses of this staff being borne by the industry.

(2) *The manure industry.*—The development of this industry is most important for India and is at present in a very backward condition. This is due to a variety of causes, the principal one, ignorance on the part of the agriculturist, is being dealt with by the Agricultural Department, a subsidiary but still important factor being want of information on the part of the commercial community as to the requirements of the consumers. This is due partly to the lack of co-operation between the Agricultural Department and the trade, and partly to the fact that owing to the great disproportion between the staff of the former and the areas of land to be covered, sufficient knowledge of the manurial requirements of the country is at present in many instances not available. Nevertheless a very large industry could be carried on merely by dealing with manures the economic value of which has been proved for certain crops in certain areas by officers of the Agricultural Department ; the popularization of their use by demonstration of their value to cultivators, should in my opinion properly be carried out by the trade, but this cannot be done except when the latter are prepared to employ properly qualified men trained in the use of manures and experienced in Indian conditions. Such men are naturally difficult to obtain at present but their training might well be carried out in Government institutions and the necessity for their employment once recognized, a supply would be forthcoming. In my opinion the employment of properly qualified men for this work is absolutely essential for the establishment of the manure trade, especially artificials, in India, as much harm has been done in the past by indiscriminate commercial methods of advocating the use of manures by Indian cultivators, without any knowledge of their applicability.

The establishment and popularization of Government research institutions would also in the case of the manure trade help to eliminate from the latter the employment of unscrupulous methods of imposing upon the credulity of the agriculturist, whether European or otherwise, cases of which have come within my personal experience. This method naturally recoils upon the trade as a whole, to the great detriment of both agricultural and commercial interests, whereas the agricultural community once accustomed to turn for advice in such matters to a disinterested Government institution would be safeguarded against such imposition.

A further advantage to be gained by bringing Government departments in closer touch with the commercial community would be the possibility of influencing the policy of the latter with regard to the marketing of manures, more especially artificials such as superphosphate ; it would be easy to demonstrate in the light of the experience of the Agricultural

Department that the only hope for the expansion of the manure trade as a whole in India lies in a large turnover at small profits ; this fact has not, I think, been adequately recognized in the past.

The general principle I should advocate would therefore be that research work in connection with industries should be undertaken by Government whilst demonstration of the utility of improved methods resulting from such work should be carried out by the trade interested therein. Modification of this principle would be required in the case of new industries, or in certain others in which commodities are produced over widely distributed areas (*e. g.*, saltpetre) or in the case of cottage industries such as silk ; here the general principle of research work by the Government would be modified by having this carried out by an Imperial Department whilst demonstration would be undertaken by Provincial or Local Governments.

ORAL EVIDENCE, 22ND NOVEMBER 1916.

President.—For how many years have you been the Imperial Agricultural Bacteriologist at Pusa ?—Since 1910.

Is that your first introduction to the Agricultural Department ?—Yes.

And before that you had a great deal of experience as scientific officer of the Indian Tea Association ?—Yes.

How many years were you working there ?—From 1904 to 1909.

Your work as scientific officer brought you in contact with chemical as well as bacteriological problems ?—Yes.

What staff had the scientific department of the Indian Tea Association ?—The present chief scientific officer, Dr. Hope, was my assistant as a chemist. There was an entomologist, and an Indian assistant analyst.

So, you really consisted of three specialists, you as bacteriologist, one as a chemist and one entomologist ?—Yes.

You say that there is a difficulty in the translation of your scientific results into actual practice. I suppose you know that the tea planter as a rule is not a scientist before he comes to India ?—Yes.

And consequently your scientific results could not be translated direct into practice without some demonstration ?—No.

At Pusa have you got anyone associated with you doing bacteriological work ?—I have a supernumerary who is in Mesopotamia on military duty.

And you two are working together ordinarily ?—Yes.

What is the ordinary routine work of your section ?—That is bacteriology pure and simple.

In what way is that routine work brought ?—Are sample sent to you from the provincial departments ?—The method I adopt is to get samples of soils from the various parts of India which are characteristic for their fertility or otherwise, and endeavour to make biological analyses of them in order to ascertain what biological factors there are bearing on their fertility or the opposite.

Are these sent to you from the provincial departments or do you use any other way to get them collected ?—Both.

Can any provincial department refer to you a problem of that kind ?—Yes.

And it is done regularly ?—Yes.

Frequently ?—Not so frequently as I should like but much more frequently than it was three years ago.

But there are agricultural bacteriologists in the provinces under the provincial departments ?—There are none except the assistants sent from the provinces to Pusa to be trained for that special work. That has only been done during the last three years and I am training assistants from Punjab, Assam, Bengal and United Provinces.

You are the only senior agricultural bacteriologist in India ?—Yes.

And there is no one to check your conclusions from the point of view of agricultural bacteriology ?—In so far as it relates to chemical work the agricultural chemists are in a position to criticise them and I am glad to say they do.

You have also a certain amount of experience in connection with alcohol distilling ?—Yes.

Can you, from the purely chemical point of view, tell us what difficulties are in the way of the introduction of industrial alcohol in this country ?—I am afraid I cannot. I have not gone into that. I do not know if it be of interest to the Commission, if I let you know what points have been referred to me by the excise department and by the trade requiring special research work for determination.

That is to say, from the point of view of getting the most out of the raw materials ?—Yes.

That has nothing to do with industrial alcohol itself?—No. This is the list of the points referred to me for investigation last year.

Alcohol production in India.

Points suggested (by Mr. Brady) as requiring investigation.

(1) *Mahua.*—Deterioration in store.

(Bacterial fermentation).

(Caramelization).

(2) *Concentration of wort.*—Most favourable concentration for various yeasts in use in India at present not determined.

(3) *Temperature.*

(4) *Aeration.*—Possible value of.

(5) *Yeasts.*—Most suitable for *mahua*. Not necessarily the one naturally associated with this material. (*Tari* yeasts as alternatives.)

(6) Artificial additions to fermenting wort. Yeast foods. Inorganic salts in *mahua* extract

(7) Information is required as to the relation between theoretical yield of alcohol, and possible yield under the best laboratory conditions.

(8) Reliable information as to relation between attenuation figures and yield of alcohol for each 100 gallons wash one proof gallon for each five degrees attenuation.

100 gallons of 1·05 sp. gr. after fermentation falls to 1·01 sp. gr.

attenuation then = ·040 = 40 degrees = $\frac{40}{5}$ = 8 proof gallons spirit should be obtained.

(9) Possible manurial value of *spent wash.*

(10) Preparation of yeast culture for use as inoculum.

When you were still the agricultural bacteriologist?—Yes. As a conse quence of my having done work for the Excise Commission in Bengal on the subject of rice beer.

Is there any other scientific officer in India to whom these problems would be properly referred?—Apparently not.

Then you have also had to do a good deal of work in connection with silk in dealing with the disease of the silk moth?—Yes.

That has been recently occupying a great deal of your time?—Yes.

If you begin to translate the results of your researches on the silk worm disease into practice what kind of staff would you want?—I think that the staff at present existing in Bengal would be adequate if it is properly supervised as far as Bengal is concerned. As regards Kashmir the staff is quite sufficient. But the principal point I came across was in connection with the absolute ignorance of the difference between the European conditions and Indian conditions with regard to the selection of the disease-free seed by the pasteur method.

You find that that same thing applies to practically every biological problem in India?—Yes.

That the conditions in Europe cannot be translated direct without modification to India?—Yes.

And consequently research work ought to be done on the spot?—Yes.

Have you had any opportunity of getting research work done at home?—No.

You were at one time the scientific officer of the Indian Tea Association and I understand that most of the members of this Tea Association had their London offices. Would not the London offices refer certain scientific problems to the scientific men at home?—Yes.

Have they done so?—Yes.

You found that work of that kind was beneficial to you in any way in India?—I consider it to be the reverse.

I should like you to describe a specific case if you think that is a fair example?—*Witness here described a specific case confidentially.*

Take another example with regard to the use of potash as a manure in India. Potash is looked upon in Europe as a manure that you can safely apply to any land, to such an extent that almost any elementary text-book on agriculture would advise any body to use potash in almost

all cases. What is your experience in India?—My experience in India has been confined to the use of potash on tea. Tea is a crop which it is extremely easy to experiment upon, because you do not have to wait till the end of the harvest, but you get your results as you go along, every ten days. As far as potash was concerned, I carried out a very careful experiment with potash manure, and I can say that no results which were decidedly of economic value were obtained with potash on any of the tea soils on which I used it. It is quite likely that some tea would benefit by the use of potash. As a special case I may refer to the work of the Kali syndicate.

I want to know whether there is any justification for pushing potash sale in India among the agriculturists?—My experience is rather painful in some ways. In one case I went on a tour in a district in Assam and in the course of my tour I learnt that orders for several—I do not know how many—hundreds of tons of potash manure had been placed with the Kali syndicate's Calcutta representative, simply because the agent of that firm who had been touring had represented that the experiments I had carried out at the experimental station had fully demonstrated the value of potash as a manure. The experiment that I carried out had not been completed at the time that agent made the tour. As far as the results had gone I was sure that potash had no effect and I had no hesitation in saying so.

With the results of an experiment of that kind, an attempt to push potash in that way would give rise to a false impression that not only potash but every artificial manure must be bad?—Yes.

And indirectly there would be a set-back to the progress of Indian agriculture?—Yes.

You have referred to the control by Government of the quality of artificial manures that may be supplied. Would you propose a system of Government issuing certificates of quality?—I would not like to propose any such suggestion.

Would it be practicable for the Government to grant a certificate of quality regarding an artificial manure?—I do not know. But I think that the nearest you can get to it is for the agricultural officers in the provinces to give their opinion that certain manures are of value and for the commercial firms who are connected with the trade to sell them.

Is it practicable to introduce any kind of system by which control can be exercised efficiently?—I think it should be. I think the Agricultural department, if they are properly staffed, would be entirely capable of doing that, but I have at present a particular case in mind of the sale of mineral manures in a certain part of India where the sale of these manures was pushed by a commercial firm through agents, neither of them being an agricultural chemist or having any knowledge of the requirements of the trade. Manures worth a good amount of money were ordered and tried on the land and were found not worth the money, and the consequence was that a great deal of trouble arose which trouble recoiled on the heads of the agricultural department officials in that district, although they had nothing to do with it in the first instance, because the commercial transaction took place without reference to them and without their knowledge.

Would it be practicable to have some form of Government sales agency?—I think that the first thing you want is demonstration in some form of the value of the manure and then to allow the sales to take place on the strength of the demonstration by the Government.

That having been done does not solve the difficulty, because the raiyat has no education?—You must limit him to getting his manures through Government.

Do you think that the dangers that exist now are sufficient to warrant the Government undertaking anything like an official sales agency for artificial fertilizers?—Yes. I think so.

One does not want to interfere with private enterprise unless in this way it becomes serious public danger and I am asking you to review this question again. Do you think it is really sufficiently dangerous to allow the raiyat to come into contact with an irresponsible salesman of artificial fetilizers?—I think it is.

And you have not thought out any scheme that may be practicable for a Government sales agency for fertilizers?—I am afraid I have not. But I think the Provincial Agricultural Departments are quite capable of doing that.

Do you think we should get suggestions on that point by consulting the provincial agricultural scientific officers?—I think you will find they are in agreement with my view.

You are speaking with a general knowledge of their views, unofficially, of course?—I think you will find that they have had experience of the same sort that I have had of the danger of commercial enterprise going too far in one direction.

Has the matter been discussed among you?—I have had a considerable amount of correspondence on the subject both with the Governments of the provinces and with the commercial firms connected with the trade.

The Agricultural Board meets at Pusa. Do you know that this subject has been discussed there?—I do not think it was discussed.

Referring to saltpetre you draw attention to Indian saltpetre as a source of nitric acid as compared with the use of nitrate of soda on account of the superior value of sulphate of potash. You further down refer to the fact that potash is only of doubtful value as a general fertilizer of Indian soils?—it is not contradictory. It is largely used in Ceylon for tea.

So that in any case there would be a big market for sulphate of potash ?—Yes.

In tea districts ?—In Ceylon they import saltpetre from India.

Is that used for tea ?—Yes.

You know, of course, that you do not get the same percentage of nitric acid out of saltpetre as out of nitrate of soda ?—But that is a local product.

You are also aware that in peace time nitrate of soda is cheaper than nitrate of potash ?—Yes.

You have heard of a case that on account of the recent rise in price of saltpetre India has been re-exporting nitrate of soda under the name of saltpetre ?—I do not know that.

In one consignment of saltpetre about 50 per cent. was nitrate of soda imported into India for the purpose of adulterating Indian saltpetre ?—Well, I suppose it came through Japan from Chili.

It gives an idea of what happens when there is a slight change in prices and there is imperfect scientific control ?—Yes.

You apparently think that the scientific work in India should be done by Government organization and I gather from your note that you prefer an Imperial organization ?—I think that in the present condition of Indian industries it would be very difficult for one province to support a research institute to deal with the several industries in that province—except perhaps in the case of tea.

I will just sketch roughly some of the points that exist now in a scientific organization. In connection with tea you had three officers under one Tea Association, and that is, I understand, similar to the organization of general agriculture in each province. I find one agricultural chemist, one economic botanist, one bacteriologist and generally one of something else according to the province. Is not that a rough estimate of the scientific staff ?—Yes.

This means, of course, that each man must be an independent authority within his own province. The agricultural chemist is the authority on agricultural chemistry in that province, and there may be nine or ten of these in India ?—Yes.

Do you think that decentralization in this way is an advantage to the efficiency of scientific work ?—I think that one ought to regard scientific work in agriculture at any rate, as being divided into two classes, pure research, and the method of applying the results of the research, and my ideal would be, a central research institute in which the fundamental problem is investigated, and provincial ones in which the application of the results to practical agriculture are worked out. I do not think that you can go straight from the fundamental problem to the field in many cases.

The present staff of the agricultural department in India consists of a conglomeration of scientific experts or specialists of different kinds, such as an economic botanist associated with an agricultural chemist and I suppose that an economic botanist has closer affinities with other kinds of botanists engaged in other parts of India than with, for instance, the agricultural chemist. Their interests are common only in the application of their science to agriculture, but in the matter of actual research the botanist requires similar reference meterials whether he is an agricultural botanist, or forest botanist. Similarly, an entomologist requires collections of insects for reference purposes whatever may be the application of his form of entomology, and the result is that in the country you have many collections of insects and many chemical laboratories, and also many libraries of different kinds. Would it not be more economical and would it not lead to efficiency if you classified your scientific officers in another way, so that you brought together all the different forms of botanists and had your botanical collections accessible to all with a central library, and brought together all your chemists, agricultural, mineral, dye, explosive and so on, and you had a common list for promotion, so that no chemist would always be subordinate to any botanist and no botanist would always be subordinate to the agriculturist. Then a botanist entering the service would hope to become some day the head botanist of India, and a chemist to become the chief chemist of the Government of India ?—It does not quite fit in with my idea altogether of the agricultural side.

We should like to know what the difficulties in the way of such a classification are ?—When I was in Assam as scientific officer I suffered very much from the want of other scientific workers in my own immediate neighbourhood for consultation. Not being a botanist I had a lot of botanical problems to deal with and I had to refer to people at a distance who were under difficulties in dealing with them not being on the spot. Not being an entomologist I had to rely on my entomologist whose accuracy I sometimes had reason to doubt. My ideal is to get a research institute where you could find one man specialized in each particular line whom I could consult when I wanted to.

They might still be in one place. A member of the chemical department of the Government of India, as an Agricultural Chemist, may be at Pusa, and similarly for other branches. The chief advantage which has been suggested for this system is its effect on recruitment and promotion ?— Yes.

A scientific specialist in the present circumstances always remains subordinate to somebody else, and it has been said that you cannot get the best officer or the best recruit unless as a chemist, he would have a chance of being the chief chemist to the Government of India, as a botanist a chance of being the head botanist of India and so forth ?—I see that.

This scheme has not been put before you at all ?—No.

Would you consider a proposal of that kind, as you have been working in an entirely different atmosphere, and consult your colleagues at Pusa with a view to giving us your opinion later on in a supplementary note ?—Yes.*

Mr. C. E. Low —What system pertains in Java in connection with research work ?—Java is a land of private enterprise. There is no universal Government Department of Science there. The editor of a Java newspaper who was touring in India told me that there are many scientific departments not even subsidized by the Government in Java, but supported entirely by the planters themselves. I believe that is the same in the case of tea also. In West Indies they have a scientific staff, an Agricultural Department and an Imperial Department. They publish agricultural news. There is a botanical garden at Java which does some first class work but it is a Government institution and is not run by private people. I understood that this was entirely a Government institution, but the editor told me that it was largely financed by commercial bodies. In Java they are much more scientific in their management than the Assam people, because the Java people never plant any area with any particular crop which is not suited to the soil and climate. Tea is sometimes planted in India in very unsuitable areas and so it dies out sometimes and sometimes survives.

What stage have you reached at Pusa regarding the training of Indians for research work in your particular branch ?—In my particular branch I have had assistants sent from the provincial agricultural colleges to be trained in my special line, agricultural bacteriology. I have had one from the Punjab, one from the United Provinces, one from the Central Provinces, one from Assam and one from Bengal.

They are trained in order to be returned to the provinces ?—To work in the provinces.

What stage have they reached in the way of responsibility ?—They work under the agricultural chemist under his direction and supervision. They refer to me on any technical detail.

Have any of these men reached provincial rank or are they in the subordinate service at present ?—They are all subordinates so far as I know. This system has been only going on during the last two or three years.

None of them are working independently at present ?—No.

Have you been doing any investigation on the diseases of the tusser silk moth ?—No. I did a slight amount some four years ago at the instance of Mr. Lefroy, but I gave it up on account of the difficulties connected with the wild jungle condition of the industries.

You do not think that it would be possible to apply in practice any system of control which you were able to devise ?—The particular disease was called flâcherie ; it is an intestinal complaint and if worms are kept on trees in all sorts of weather it is impossible to have any control over them.

With regard to the question of saltpetre, you have heard it stated that the salt which in practice and under local conditions results from the refining of saltpetre is not suited for human consumption ?—Yes.

A point was made that the control exercised by the Salt Department was unnecessary because the service of the salt, at any rate for human consumption, was very small. Are you in a position to say whether that is correct or not; whether it is suitable for human consumption ?—The analyses that I have made averaged something like 50 per cent. of sodium chloride. It was salt separated in a refinery.

Was there much magnesium chloride ?—Yes.

That is so deliquescent that you could not keep it in a solid form in any case ? Yes.—But I would not go so far as to say that the samples I noticed were representative of any large area.

* Not received at time of going to Press.

You were speaking of the disadvantages that attend the sale of manures by commercial agencies. Supposing you have got the Agricultural Department properly organized making its influence felt in the several provinces of India, don't you think that it would suffice to stop the sale of these things under false pretences?—If the Agricultural Department is sufficiently developed. It should be developed to that stage, especially in provinces where the sale of artificial fertilizers is in most cases entirely due to the initiation of the Agricultural Department itself.

You state in a portion of your note that the enquiry into the economic position of the manure trade in India should be conducted by economists. Do you mean political economists or men who have special business knowledge?—I mean a man who would be able to deal with the subject as a whole for the whole of India instead of dealing as I have said with specific cases. I do not think there is any agricultural chemist that I have ever met who would be capable of dealing with the subject as a whole for a country like India because he would not know enough about the economics of trade in India. I think that I have stated in my note that the economist would require the collaboration of experts, but experts certainly require the guidance of somebody with business knowledge and experience to look at the problem from a wide enough point of view.

The problems that come to you from the provinces, do you know whether they usually come from the agricultural chemists or from the Deputy Directors of Agriculture?—If they are chemical problems, from the chemist as a rule.

I have not sufficient knowledge of the subject to make myself clear. You mean the chemical aspect of the bacteriological problem?—They come from the chemist.

Do you know how they are initiated as a rule? Are they initiated by the Deputy Director or the chemist?—They are generally initiated by me having got into touch with the chemist, about the value of bacteriological research in the provinces.

Did you not do bacteriological research in Jubbulpore (embanked) black soil regarding its insufficient aeration?—Yes. That came from the Deputy Director, but is an isolated case.

President.—You have taken a certain amount of interest in the indigo development of this area?—Yes.

Am I correct in supposing that until recently the scientific work done with a view to improving indigo was done by chemists?—So far as the published results are concerned that is so.

Have you done any work in connection with the bacteriological aspect of indigo manufacture?—I have done some work during the last six months on the bacteriological aspects of fermentation.

Does that work lead you to suppose that the continuance of it and the extension of it would lead to results of practical value?—I found that the presence or absence of specific bacteria made a difference of 100 per cent. on the yield.

Then the problem must be attacked from the bacteriological point of view as one of the principal factors?—Yes.

Does that give you hope that if the indigo problem is attacked from the bacteriological point of view, with the right kind of scientific specialists, natural indigo will hold its own against any synthetic indigo that you know of?—I am afraid it does not.

It is bringing you no nearer?—The best yielding indigo factories are naturally provided with the requisite specific bacteria; by artificially providing the low yielding factories with cultures of these bacteria I hope to be able to bring their yield up to the level of the more fortunate ones; until further enquiry has determined the ratio between the number of high yielding and low yielding factories it is not possible to say what effect this method would have upon the total yield of the indigo producing districts.

Looking at the problem from a purely commercial point of view, would you say that it would be justifiable to spend money on a far larger scale on scientific research for the development of indigo in this area?—I think so.

With the hope of shutting out the synthetic product from the market?—Not from my own knowledge, but from people whom I know. There is a great possibility of improving the industry in the direction of increasing the yield by paying attention to biological phenomena.

Hon'ble Pandit M. M. Malaviya.—Will you kindly tell me what is the extent of help given by the Government to the tea industry so far as scientific work is concerned?—When I was scientific officer the Government of India subscribed Rs. 15,000 and the Government of Bengal Rs. 5,000 or 7,000 and the Government of Assam Rs. 2,000 or 3,000. That was nearly ten years ago. Now I understand that the Government of India gives the same amount, but the Government of Bengal and that of Assam give considerably larger amounts, and that the scientific staff has been extended, and that there are about double the number of men in the scientific department now.

Who selects the staff, the Government of India, or the provincial Governments or the Tea Association?—The Tea Association.

Do they make any reference to the Government before they appoint the men?—I think not.

About the control of sale of manure, don't you think there is a danger of patriotic bias and prejudice coming into play in the case of manures imported into India from foreign countries, if you ask for certificates to be issued before manures are used?—I should not recommend manure made in Germany.

Putting aside enemy countries, is there not a danger of patriotic bias or prejudice coming into play even in the case of neutral countries?—I should not think so.

Don't you think that the object you have in your mind would be served if the results of the examination of these manures by the agricultural chemist or the Agricultural department were published in the trade journal?—It is not so much a question of the adulteration of the manure as of the value of the specific manure.

But suppose you examined a manure, and you published the result of your examination in some recognized Trade Journal either subsidized by Government or independently published, don't you think that you would thus give the public sufficient help to avoid using improper manure?—I do not think the public who use manures read trade journals.

How would the Government bring the result of your examination or the prohibition that you recommend to the notice of the general public? What other means have you in mind?—The Agricultural Department officers.

But they cannot publish it to the entire agriculturist world throughout the country. What means do you think they should take to make it known to the agriculturists?—I think the Agricultural Department should have a sufficient number of men to do that. The staff of the Agricultural Department engaged in demonstration and experiment in the provinces should be sufficient to convey that information to the cultivator as regards the value of the manure or the valuelessness of it. The Agricultural Department can do it if it is sufficiently staffed.

Do you mean that artificial manures should reach the cultivators only through Government agency?—I think in the absence of any other efficient means of controlling them. This is an example. (Witness reads from his notes.) The firm sold a manure in this form, mixture no. 1, no. 2, etc. Mixture no. 4 contains sulphate of ammonia, nitrate of soda, potash and superphosphate and oil cake. Anybody who has had experience of manure in India knows that when you use such a mixture you are trying it as you might a quack medicine hoping to get a good result but not knowing which of the ingredients will produce it or how much you are paying for the unnecessary ones. The price per unit of nitrogen in that manure was Rs. 22-8-0.

President.—Are there cases in which a mixture of this kind of two fertilizers might easily neutralize one another's effect?—It has been proved to the hilt by experiment in Assam on tea soil, that nitrogen in oil cake is not only about half as much in price as in nitrate of soda but has twice the efficiency, but people are trying to sell nitrate of soda deliberately ignoring the work that has been done and taking advantage of the ignorance of the people.

Hon'ble Pandit M. M. Malaviya.—In order to attain the object, do you think that demonstration farms and bulletins such as those issued by the Agricultural Boards in England and America would be helpful in communicating information to the people?—Demonstration farms are essential but bulletins only reach a comparatively restricted public at present.

But when they are supplemented with demonstration farms and demonstrations such as you have for instance in America, railway trains running through the country and agricultural officers holding demonstration, giving information, could you not reach the cultivators by these means?—I think you can. In my own case I had an experimental area in a tea estate in Assam, where I grew not only tea but certain other crops for the benefit of my servants, and that served as a demonstration farm for most of the cultivators in the neighbourhood, and they used to come and see what the effect of superphosphate was on rice and they tried it on their own crop, and in that way this method spread very rapidly in the district.

If you have agricultural schools in every tahsil, you can hold your demonstrations in the tahsils and gather the people of the surrounding villages there without great difficulty?—I have had no experience of agricultural schools, but I should imagine that they might, if the man in charge of the school knew what he was talking about otherwise he might do harm.

Of course, the man being selected by the department?—Yes.

You think the agricultural department needs the services of many more men to carry on the kind of work you have described namely to make experiments on the various soils and various crops?—Yes.

You think you are likely to get these men from England in sufficient numbers to take up the work on the scale you think it is necessary in this country ?—If the Government considered the scheme to be good, they should be prepared to pay for it.

In view of the great hovoc which the war has unfortunately made do you think that for some years to come you would be able to get a sufficient supply of men from England even if Government were willing to offer fair terms ?—I think so. I do not think there would be any more difficulty, because living at home has become more dear in consequence of the war.

You have got a number of Indians receiving training under you and under the Agricultural Chemist at Pusa ?—Yes.

If the necessary training is given to a large number of Indians, the advance you have in mind would be made ?—It would depend on the individuals.

You may get the superior staff who will train these young men in research, from England or America. Do you think that could be done with advantage ?—The training would be done in the provincial agricultural colleges where local conditions would be known.

You have spoken of the need for a larger number of scientific experts being concentrated at one centre because of the atmosphere it creates and the greater helpfulness of one to the other.

Would you advocate the establishment of such a centre in each province or would you be content with one for the whole of India ?—I think the ideal would be to decentralize to some extent, but in the absence of sufficient funds for that, there has to be a little more centralization.

As soon as the funds permit, in view of the enormous work to be done in each province you will have a fully equipped technological institute having a number of scientists working in each province ?—With correlation between them.

Each co-operating with the other, but each having a sufficient staff to tackle with the problems that arise in the province or the problems in which the province is interested ?—It is not necessary for all the problems, but there might be some that could be tackled by the central research institute with more advantage.

That can be always possible by arrangement ?—The staff can consider the matter and adopt the lines that will be most helpful ?—Yes.

I understood you to say that in certain countries, for instance in Java, they have no Scientific Board to advise industries ?—I do not remember having made that statement.

The Scientific Department was not under the control of the Government in Java ?—So I was informed, in some cases.

So far as your personal experience goes in view of the possibilities of industrial development is not there greater room at present in India for imparting a knowledge of the known results of scientific research in relation to industries than for promoting research ?—Yes.

In that view would you have any objection to the combination in one place of the two functions, that is, sufficient provision for the application of known results of research and for the pursuing of research wherever necessary in certain branches or in certain directions ?—It would depend on the accommodation of the institution.

Would it not be an advantage to the two sides to be in the vicinity of each other in one building but in different wings ?—I doubt it.

Two wings, one in which research work will go on and the other in which the application of the results will be taught to pupils ?—I think you will find it very difficult to find pupils in sufficient numbers to appreciate the scientific results obtained.

Suppose you have pupils of the standard you fix—of course you cannot expect them to come in large numbers—would it not be an advantage that those who are engaged in imparting the results of the research already done and those who are engaged in pure research should be close to each other ?—As long as the research work is not interfered with. You have to duplicate the staff. You must have a teaching staff and a research staff.

That you will have to find even in the event of your having the two in separate places ?—Yes.

But apart from the question of funds do you think that will be an advantage to combine the two in the way I have suggested ?—I do not know. I have had no experience of that. I have seen the disadvantages connected with this kind of system in Cambridge. A great many men had to do so much teaching work in the University that they became absolutely useless for research work.

On the other hand you are aware that there is a widespread opinion that every teacher engaged in the teaching of science should continue to do some research work ?—Yes, but in his spare time.

He should be allowed so much spare time that he should be able to do research work ?—Yes. It has an educational effect in itself.

Hon'ble Sir F. H. Stewart,—The problems that come to you for investigation are provincial. Do they vary very much according to the provinces ?—Not very much. The thing that varies in most of the provinces is the class of soil.

You are able to deal with them all yourself or do you think there will have to be separate acteriologists for each province ?—Emphatically there should be one for each province.

Your real arguement for decentralization is that a bacteriologist would require to be closely in touch with the chemist, the entomologist and so on ?—Yes.

Does your correspondence come to you departmentally through the Agricultural Department or direct to you personally ?—Direct.

Do you find that business and office correspondence interferes with your research work ?—Yes, very much indeed.

Most of your colleagues have the same experience ?—I know of one section writing something like 3,000 letters in the course of a year.

If you had a central research department could you have all the correspondence dealt with by a correspondence department ? No You must have an expert to deal with the correspondence.

That could not be done by ordinary correspondence clerks ?—No. It is too specialized.

You consider the Agricultural Department is undermanned from top to bottom ? —Yes.

The demonstration work which you think so very necessary would necessitate the employment of a very large number of officers ?—Yes.

Have you any specific recommendation with regard to demonstration beyond demonstration farms ?—I think that a demonstration farm can do everything.

Your experience in Assam was that the local ryots were glad to come and see what you succeeded in doing and then buy manures ?—Yes.

You stated to the President that Government might undertake an official sales agency for scientific fertilizers ?—Yes.

That would be multiplying the work of the Agricultural Department very greatly again. It could be done on co-operative principles.

I thought you meant to introduce a sort of business side into the Agricultural Department under trained economists ?—I withdraw that expression.

Supposing that Government prohibited the sale of any scientific fertilizers except such as they had approved and left the selling to commercial firms with the condition that they should not sell a fertilizer unless the Government were satisfied as to its quality, do you think that would work ?—Yes. Government will have to say this manure is all right on this soil and not good on that one. It would have to be done with the advice of the Deputy Director of Agriculture of the particular district.

President.—Do you think that any firms would be quite capable of carrying it out ?—Generally they are willing to do so, but I have had complaints made to me by commercial firms that they have been unable to obtain information which they require for the importation of certain manures.

Hon'ble Sir F. H. Stewart.—And ryots would be able to see their results on the different demonstration farms and would then probably take them up at once for their next crops ?—Yes. I think they would.

Hon'ble Sir R. N. Mookerjee.—You said that the Government subscribed Rs. 15,000. How much did the Tea Association subscribe ?—I think they subscribed rather more than an equal amount.

Unless the Association subscribed the Government would not contribute ?—I do not think there is anything fixed like that.

It is in the option of the Government as to how much they subscribed ?—They make a grant for so many years and then it is renewed at the instance of, or on the recommendation of, the agricultural officers of the Government of India.

So that the Government acts on the advice of the Agricultural Department ?—Yes.

Dr. E. Hopkinson.—You said with regard to your experiment on tea that nitrate of potash is not the best form of nitrogen for manurial purposes and you make a wide deduction from that, that generally speaking, in India nitrate of potash is not the best form of nitrogen for manurial purposes. Is that a perfectly sound deduction to make to apply to the whole of India?—I think it is on the whole, where there is a large amount of rainfall. The difference arising between the values of different sources of nitrogen in tea estate is largely due to the average temperature of the soil. In Europe it is seldom more than 15 degrees but in India for six months it is far more.

Has there been importation of potassium nitrate from Germany?—No. Potassium sulphate and chloride has been largely imported and they endeavour to force them on tea market. It is absolutely unjustifiable so far as the experiments carried out for the determination of the value of potash manures are concerned.

From what you say, India would be well advised to sell all its nitrate of potash, as far as agriculture is concerned?—Yes.

In answer to a question put by the Hon'ble Pandit, you mentioned Cambridge as being an instance where teaching and research in close proximity is rather disastrous. Could you not mention some instance nearer home in India, in a neighbouring province?—Yes. I know a man whose research work would have been of value who has been unable to carry out that research work to the extent to which he might have done because of his duties as the principal of a college.

With that view would you not go rather further and say that the advantages to the educational side of being in touch with research work are more than nullified by the disadvantages to those who are engaged in research?—I should say that I have had a lot of teaching myself and I know it interfered with my own research work.

President.—Are you distinguishing between teaching young men to do research work and the research officers doing simply elementary class work? They are quite different cases?—Yes.

Would you be in favour of having some part of your research institution devoted to the training of young men to do research work and give them also opportunities of assisting in the research work done by the research officers?—That is practicable to some extent.

That does not necessarily mean that research officers would do elementary class work?—No. What I should deprecate is any suggestion that men doing research work should have to train somebody to pass an examination.

Hon'ble Pandit M. M. Malaviya.—My question related to post graduate research work. You are now quite clear that it would be not only compatible with the work of the research institution, but that it would be an advantage?—Intention to train men for specific posts.

For specific work, for instance as agricultural chemist or as botanist?—Yes.

Dr. E. Hopkinson.—In spite of your answer to Sir Francis Stewart, I do not feel clear as to the machinery through which particular problems come to you. Suppose a group of cotton planters in the United Provinces wanted to submit some subject for research which came within the purview of your department, could they write to you direct?—Yes. Certainly.

Not through the Local Government or the local agricultural college? They write to you direct?—Yes, they could do so.

Supposing the particular subject that was brought to your notice was one in which you thought that research ought to be undertaken and that you could yourself undertake it, could you engage upon it without reference to any authority?—My ordinary procedure would be to refer to the provincial agricultural department of the district the problem came from as to whether they were capable of undertaking this line of inquiry.

Suppose they professed themselves capable, you would refer it back to them?—Yes.

And they would undertake it. Would you hear anything more of it in any way?—Not necessarily. When referred to me it would be a special job, on account of the peculiar and unfortunate fact of my being the only agricultural bacteriologist in India. It comes to me, because there is nobody in the province capable of dealing with it.

I want you for the moment to avoid that special fact of your being the sole bacteriologist. Supposing it was a subject of research which you decided to take up, you would be able to take it up without reference to any authority?—Yes. It would be entirely a matter for my own decision.

Supposing you obtained useful results, would you simply communicate those results to the original inquirer?—The ordinary thing is to publish a memoir of the agricultural department. It would be accessible to anybody.

And it would also be communicated to the people immediately interested?—Yes.

Have you had at Pusa any sort of connection with the provincial agricultural colleges?—The principal source of intercourse is the meeting of the Board of Agriculture in which all or most of the experts come to Pusa and discuss the problems there and we generally manage to get into touch with them in the interval by correspondence or by touring.

You tour?—Yes.

You rather deprecate touring while carrying on research?—In the case of the scientific officers of the Tea Association, they have had to spend at least nine months of the year away from their laboratory merely because it has become necessary for them to go practically to every district in order to keep up the interest of the local planters.

That applies particularly to tea?—Yes. It was hampering the work of the scientific officers.

Do you consider that the demonstration farms should be under the agricultural department?—Yes, in the absence of any other organisation.

I am not quite clear what you mean by demonstration farm. Is it a farm for the purpose of demonstrating the results on a proper scale of some research work, or is it meant to demonstrate the commercial advantages of that particular research work?—I think the ultimate aim is commercial advantage.

An agent of a Commercial firm went to a certain part of India and told them that if they bought superphosphate and put it on their fields it could give an increase of 100 per cent. yield which would very much more than repay the outlay on the manure. And in that district the people bought the stuff at what I understand was rather above the average fair market rate and put it on their lands, though particularly unsuited to the soil and to the crop. They got a smaller crop, and the result of that was that the officers of the agricultural department of that province were unable to enter the district because the ryots chased them.

You spoke of a particular manure having about 22 rupees worth of nitrogen?—In the case of oil cake in India it works out at Rs. 9-7-0 per unit when oil cake is selling at Rs. 1-12-0 a maund.

President.—When a problem is referred to you by, say, any local association of indigo planters or cotton growers, you say that it would be referred to the provincial Agricultural Department to know whether the research was being worked out there, and whether it could be undertaken locally or not?—Yes.

When you refer this problem back to the provincial Agricultural Department consisting only of the Agricultural Chemist you might be told by them that you might as well leave the subject to themselves?—I can imagine it, but I have not come across it.

Then who is to decide?—Have you any superior officer who is capable of appreciating the value of both soil bacteriology and Agricultural Chemistry and thus over-ruling the local Agricultural Chemist's opinion?—There is the Director of Agriculture.

Is he a scientific man?—He is a member of the Indian Civil Service.

We have heard very good things of the Indian Civil Service. Do you think that in all cases they would be in a position to decide this problem?—They might refuse to make a decision.

And therefore the subject is either neglected or confusion would result?—I do not think that confusion would necessarily result. If the local people had refused to allow me to deal with a problem for reasons which I considered insufficient, I could take it up myself without reference to them.

In that case, friction would arise?—Not necessarily.

Would you have to get the permission, in a case of that kind, of the Agricultural Adviser to the Government of India to undertake that problem?—I assume it is necessary to get it. I would certainly apply for it.

And he would over-rule the objections of the provincial department?—I do not know that he would.

Why?—I have not had a specific case to enable him to decide whether he would.

Is the Agricultural Adviser to the Government of India necessarily a scientific man?—Not invariably.

Mr. A. Chatterton.—There is one point I should like to know with regard to the functions of these scientific experts. That is how their work is initiated, how problems are first of all started and brought into the laboratory for investigation?—Certain problems obviously requiring solution are taken up at Pusa.

Take the problem of soil bacteriology. Did this arise from work in the laboratory or was it started in consequence of field observations?—A considerable amount of both. May I

give you a specific case? I have been doing work for some time now on the subject of green manuring. That, of course, is of interest to every part of India, but the specific application to particular districts would be a question to be worked out with reference to the conditions in those districts. I have just recently published a paper on the subject of green manuring where I attempted to deal with it in a new way, and before sending it to the press I circularised all the provincial officers, including the Agricultural Chemists, Botanists, Director and Deputy Director of Agriculture, asking for their criticism and advice as to the way in which this method could be modified for use in the different provinces I found that method of obtaining criticism extremely useful and I had a very large amount of helpful criticism and advice. With regard to getting problems or suggesting problems, the official method is to circularize to the provincial departments through the Director of Agriculture in each province and ask him whether there is any problem arising in his province and in his department which I can deal with from a bacteriological point of view.

From these returns you make a selection of what you consider to be suitable?—Yes.

And you will have to get those sanctioned by the Agricultural Adviser?—They are included in the programme of the year and discussed at the Board of Agriculture.

On the question of manures, the bacteriological contents of two soils of the same character in two different places are different. Would that materially affect the quality of manure?—Yes.

Is there any likelihood of there being a certain amount of error in the advice which is given by the Agricultural Chemist resulting from soil analysis?—If the Agricultural Chemist relies on entirely chemical analysis of soil there is likely to be a great deal of error but he does not.

How is the local Agricultural Department to specify for a particular district the type of manure that should be employed?—By experiment.

In each individual case?—Yes.

It is rather a big thing?—Yes. That is why I want men to carry it out. You cannot merely take the soil from the field and analyse it at the laboratory, and base a scheme on manuring on the analytical results.

Has that been done in some cases?—Yes.

With erroneous results?—Yes. The sale of manure is based on that. The manure merchant takes a sample of soil which contains 0·1 per cent. of potash and phosphate, and therefore he thinks so many cwts. of potash are necessary per acre You try the potash on the soil, but it has no effect. That is the thing that I wanted to get at, that the commercial aspect of the thing cannot be regulated on these lines. It has got to be regulated by field experiment.

WITNESS NO. 57.

Major T. R. Filgate.

MAJOR T. R. FILGATE, *Adjutant Bihar Light Horse, Muzaffarpur.*

WRITTEN EVIDENCE.

I have been resident in North Bihar since 1876, Indigo Assistant and Manager for 25 years in the districts of Monghyr, Darbhanga, Muzaffarpur and Saran, contractor for 4 years, General Secretary, Bihar Planters Association for 10 years, Major I. A. R. O. and Adjutant of the Bihar Light Horse for one year. I have served on Road Cess Committees. District and Local Boards, represented Tirhut District Boards on the Bengal Legislative Council, 1909-1912, represented the Bihar Planters on the Legislative Council of Bihar and Orissa, 1913-1916. I am Director of the Bihar and Provincial Co-operative Bank and Deputy Chairman of the Muzaffarpur Central Co-operative Bank and Member of the Muzaffarpur District Board and Municipality. After 40 years' experience of North Bihar, I would respectfully draw the attention of the Commission to and am fully in accord with the following *extract from "India under Curzon and after" by Levatt Fraser, Chapter IX.

Indigo.

I am of opinion that the most important industries in the Tirhut Division are:—(1) indigo' (2) sugar, and (3) saltpetre and after many years work and considerable experience in North Bihar I see no reason why these industries should not be placed in a position to give a very handsome return to the investor on his capital. No. 1 is the oldest rural industry in the division and undoubtedly several generation of planters have considerably assisted in opening out these districts especially in regard to communications, ferries, bridges, etc. There was a considerable slump in indigo in 1845-1848. The planter of those days turned his attention to sugar but for want of quick communications, expert advice, etc., the attempt was a failure. Indigo recovered and flourished until the introduction of the synthetic article in 1897. I will not recapitulate the steps that were taken and the very considerable research work that has been done. The reports and results

* Not printed.

are filed with the Bengal and Bihar and Orissa Governments. The question is, can the natural indigo industry hold its own in the future? I am firmly convinced it can after the war—

(*a*) if the average price of indigo does not fall lower than Rs. 225—Rs. 250;

(*b*) if the planter puts his produce on the market in the form that the consumer requires either cake, paste or powder;

(*c*) if the planter can guarantee a steady supply every season (say, by holding a certain quantity in bumper seasons to meet the supply in lean years) so that the consumer would know he can depend on a certain average supply every year. A large portion of the lost trade would then be recovered. But should Mr. Howard succeed in showing the Bihar planter how to obtain the yield per acre that he stated he hoped he could do at the Conference in Delhi in February 1914, the industry can hold its own, even with synthetic at pre-war prices. A good pure seed supply is of course absolutely necessary, but this is simply a matter of selection, locality and supervision. One of the four districts of this division, has practically abandoned the old established system of cultivation and I have heard it asked can this district ever secure the old area of cultivation. If the *khoosky* system or payment for green plant to the raiyat were introduced I feel sure the old cultivation could be reached if not exceeded. I have had considerable experience of this system in the Saran district. To make it a sound business arrangement, the price paid for the green plant should rise and fall with the price of the manufactured article, but in this co-operation between the planter and raiyat there is the great difficulty in getting the raiyat to recognise the fairness of the arrangement. He is only too ready to come forward and accept the higher rate but fails to see if there is a drop in prices he should also accept a lower rate for the raw material even though at the lower rate it may pay him quite as well if not better than any other crop. The planter therefore with his heavy block, etc., might be left without a crop to manufacture if he reduced the price of the green plant.

Shortly before I left the Secretaryship of the Bihar Planters' Association the Secretary of State was pressing on the planters the establishment of a central factory or factories. There are very many practical and almost insurmountable difficulties, and paste or powder can be prepared in any individual factory, perhaps in course of time such a factory or factories will be established but at present I do not consider it a practical suggestion.

Practically every concern in North Bihar has more or less land in which it has occupancy rights and when a concern is sold the lands are passed with it. But under the Bengal Tenancy Act 1885 (VIII of 1885), it is left to local custom, which no one knows, or to the caprice of the landlord, as to whether a transferee for value acquires any rights in the same. Again in the Champaran district a very important Raj estate is the principal landlord for more than a century the late Rajas and ever since it has been under the Court of Wards. The estate has been in the habit of leasing out many of its villages to the planters, any radical change in this policy would have a disastrous effect on both the indigo and sugar industry in this district

Sugar.

In 1845 cake indigo had dropped to Rs. 110 per maund and the planter turned his attention to sugar. Some 32 mills were opened. In 1848-49 indigo prices rose considerably and by 1851 the last of the 32 mills were closed down.

The first attempt with "otaheetee" cane planted in extra good lands gave 60 or 80 maunds of sugar per bigha. Expensive machinery was brought out from England but due to no manure being used until too late all class of land put under cane the yield per bigha fell to 2½ maunds per bigha. The sugar after it had been bagged became a sticky mass and the consequence was it sold in Calcutta for a mere nothing. The sugar would not show a dry clean grain. *Guano* or *fumier jaffroy*, well known in Mauritius, benefitted the cane greatly where it was applied.

About 1902 several planters again turned their attention to sugar and since that date several installations have been erected with up-to-date machinery, expert advice and chemists, and there is every hope that the industry will be an important one and successful in the future.

With regard to Government aid in 1904, the Bengal Government on the recommendation of Mr. D. M. Hamilton of Messrs. Mackinnon, Mackenzie & Co., Calcutta, approached the Association and Mr. Percy Jones of Benipur Factory (Darbhanga District) was advanced the money for the purchase of a mill to turn out a ton of sugar per diem, and to deal with a cultivation of 100 acres of cane. The money was repaid less Rs 10 per cent. depreciation at the end of two years and has been working successfully ever since.

Government could give considerable help to those concerns which are short of capital, or can only procure the same at a high rate of interest, by advancing money to the sugar concern under the Agricultural Loans' Act, at 6 per cent., such advances to be made to their raiyats only as cane advances. As the co-operative bank movement extends central banks would have good security in the cane crop for their advances to societies. By this arrangement the raiyat gets his money, the planter his cane and the bank the security of a valuable crop.

The Director of Agriculture, Bengal, in a note to the Revenue Secretary, dated December 28th, 1912, foresaw a possible and serious danger to the industry, *viz.*, the undue forcing up of the price of cane by competition, if "dehats" or "spheres" are not strictly recognised. Ever since indigo has been grown in *Bihar certain tracts* have been recognised as the particular sphere of a particular factory and where interloping took place lakhs of rupees have been spent in the courts and as a rule the interloper has been ruined eventually and the original concern considerably crippled. I believe I am correct in stating that in Java and Formosa, Japan, where a large sugar mill is erected it has a certain recognised zone, and no other person is permitted to erect a mill within this zone, or purchase the cane grown within the zone. I am strongly of opinion that some such system should apply to North Bihar. The pioneer factories have sunk large sums of capital and have had to face low prices. Prices are now very high. A mill may be run up within the zone and ruinous competition takes place for cane or a mill outside the zone may enter into competition in their sphere for cane. In the interests of the sugar industry in India, I hope after the war that German and Austrian beet sugar will not be admitted to India There is no reason why India should not produce not only all the sugar she requires but have an excess for export.

Saltpetre.

The planter of Bihar in the forties and fifties, in addition to indigo and sugar, manufactured large quantities of saltpetre but why and when they ceased to do so, I have no knowledge or information I myself, when manager of Shahpur Mircha Factory, started and worked a saltpetre refinery from 1891-1894, I manufactured the saltpetre for use in indigo manufacture. Many of the rules and regulations of the department in those days were vexatious but if this industry can be revived it will be of very great assistance to the Nunia class and of benefit to the division generally.

Railway facilities.

Not only for the development of this Tirhut division but for the development of the tract of country north of the Ganges from Cawnpur to Katihar on the B & N.-W. Railway, the metre-guage should run into the docks in Calcutta, and the Ganges should be bridged at Mokamah. In 1904 the volume of the B. & N.-W. traffic with Calcutta was 507,000 tons. I have not got the latest figures but in 12 years they must have increased very considerably. At the same date the Eastern Bengal traffic was 520,000 and I presume all of this passes over the Sara Bridge but how much of this has to be transhipped from metre to broad guage?

By running metre-guage waggons through between stations up-country and Calcutta with full waggon loads the question of economical haulage and the cheap freights should come into operation. It is a question whether the B. & N.-W. Railway and Tirhut system will not have soon to double a considerable portion of this line to deal with the increasing traffic. The cost of yard transhipment from one guage to another is 5½ *d.*, equal to a haulage of 20 miles and in cases of large rivers and no waggon ferry 9 *d.* to 1 *s* 3*d.* a ton, a heavy tax especially on agricultural produce.

It is unfortunate that India has not one standard guage. However as there is very nearly the same mileage of broad and metre there can be no change made now, but with the exception of hill lines and light feeders to main lines, no other guage should be allowed in the plains. In 1911 the Bengal Government approved of a 2 feet guage line from Silliguri to Kishunganj and the Railway Board sanctioned it. This can hardly be called a feeder line The Eastern Bengal State metre guage runs to Kishunganj. The distance from Kishunganj to Silligur is some 50 miles and on the direct route from Bihar to Darjeeling which if metre would shorten the journey to Silliguri by some 70 or 80 miles less than the present route *via* Parbatipur. Furthermore I believe I am correct in stating that passenger fares and goods rates are higher for the 2 feet line from Kishunganj to Silliguri than they are on the Bengal & North-Western Railway. Break of guage means 24 hours detention for waggons.

New industries.

Rice mills.—The planters have established several of these in the last few years and there is room for extension.

Flax—can be successfully grown and of good quality in Bihar. The Imperial and Local Governments spent Rs. 35,000 on experimental work and Mr. Vandikerkhove, a Belgian practical flax grower and manufacturer worked for 5 years. The results have been published in his reports and Pusa bulletins. In these he gives cost of erection of a mill, growing crop, etc., and the probable return on the capital which worked out about 7·80 per cent.

Jute.—This has also been grown successfully in North Bihar but the long lead to Calcutta and consequent freight is against it being cultivated on large scale. A mill or mills to supply bags for local requirements, in my opinion, would pay. A considerable number of bags for the various local cereal crops are required annually.

Rhea.—This has been tried on a fairly large scale and was not a success.

Alæ fibre.—This also several planters have tried. Sisal plants were imported but this also was not successful.

Paper mills.—Some years ago the firm I was connected with contracting had an important contract with the Bally Paper Mills for the supply of sabai grass. There was a large

quantity of this near Kharakpur in the Monghyr District and if in addition to this bamboo pulp can be utilised for paper making, a mill might be started in the North Bihar and successfully worked.

Eri silk.—Some few years ago some planters took this up on a large scale, but after a year or two the work was abandoned.

Cottage industries.

It is to be hoped that one result of this Commission will be that a very large number of articles of all kinds found for sale in any bazar made in any country but England, will be replaced by the same made in India itself or some other part of our Empire.

General.

We hear a great deal of the drain on India from politicians but a really most serious drain is the export of oil seeds and bones and the burning of the cow-dung for fuel. Every ounce of cow-dung, every ounce of oil cake, every single bone should be returned to the soil. At present the oil cake of India and the bones of its animals go to enrich the fields of foreigners and amongst them our present enemies. If this Commission can suggest how this drain can be stayed and the suggestion is accepted and the Indian soil receive back what it should, it will do more for the welfare and well-being of the millions of India in the way of real practical benefit than can be imagined. The industrial development of India should rest principally with the Indian capitalists I can only speak for a very minute portion of this vast country but from my experience in the past I very much doubt if the Indian Biharee capitalists would be content with a return of 4 per cent. or 6 per cent. on his capital in addition to a certain amount of risk in new undertakings. How many of our well-to-do Biharees hold shares in the Bengal & North-Western Railways which has developed our districts and pays some 6 per cent. In most other countries local people would hold a considerable number of shares in their local line. Finally, if new industries are developed in Bihar by Biharee investors they must have and loyally give that confidence to their Indian directors and Indian managers that prevails in some other parts of India where industrial development is advancing rapidly.

I am giving my own personal views and not as representative of any of the industries I have mentioned.

ORAL EVIDENCE, 22ND NOVEMBER 1916.

Mr. C. E. Low.—You have had experience of indigo but not of sugar cane ?—Only of a very small quantity of sugar cane which was grown for fodder before the sugar factories were established.

Have you had experience of saltpetre ?—Yes.

Not recently ?—No, about 20 years ago.

Did you have any technical or scientific training ?—No.

I understand that you produced some of the standardized type of paste ?—Yes. The Behar Planters' Association produced two tons of paste some six years ago made by their scientific adviser, Mr. Bergtheil. That was sent home and now experiments are going on again and a certain amount is being sent this year.

There was some difficulty about fermentation ?—I heard rumours about it. I have had nothing to do with the present experiments. I had something to do with the first experiment as Secretary of the Association.

In the first stage did you get opinions and reports from dyers of dying associations in England ?—A report came to me from the brokers at home that the dyers approved of the paste and wanted more of it. It appeared that they were very pleased with it.

You were not in a position to get any opinion from an unprejudiced authority ?—So far as I know I do not think we have had that opinion from the dyeing trade generally.

You did not address the Dyers' Association ?—No.

You did not ask for the help of any of the various Government organisations, say, the Director-General of Commercial Intelligence or the Imperial Institute or the Board of Trade ?—No.

Had you any reason for not asking them ?—We were going straight to the middleman who was at home. He was in intimate touch with many of the dyers.

Have you had any experience of the improved method of cultivation recommended by Mr. Howard ?—No actual experience of it.

Have you seen anything of it ?—As Secretary of the Association I have seen the work which has been done up to last year.

Have you seen the result of it as applied by your brother planters ?—I saw the result of it as carried out on a practical scale at Dholi Factory near Pusa. We had a demonstration there the year before last when Mr. Howard met the members of the Association and the Director of Agriculture of this province was also present. Mr. Howard showed us the work that was being done, seed growing, drainage, etc.

Did you hear of the results on a commercial scale?—As far as I know the proprietors were satisfied with the results that they got.

Have you heard of it anywhere else?—I have. A few concerns are trying Mr. Howard's recommendations.

Have you heard any unfavourable criticisms on it by men who have tried it?—I have. From my long experience of Bihar especially in agriculture with reference to indigo who will apply to one portion of the district is not always applicable to another and you even get in the same concern with two or three outworks a marked difference.

Did your Association or you ever ask for the assistance of Government?—Since 1898 a considerable amount of research has been done by Messrs. Rawson and Bergtheil. They were our first men. Mr. Rawson carried on the work in fermentation and this was confirmed afterwards by Bergtheil. But unfortunately Professor Bloxam was working independently at home and his results were entirely different and to-day the unfortunate planter cannot say who is right. We asked that the question should be settled by the Board of Scientific Advice in India. Nothing was done. Eventually I wrote to St. Johns University in America to get some independent person to do the work. They said that the experiment was most interesting but that they had no time to take it up. The whole question is whether a great deal of dye is left behind in the plant or not. Messrs. Rawson and Bergtheil say that an efficient manufacturer gets 87 per cent. Professor Bloxam said that he did not get more than 30 per cent. The planter is in that difficulty and he is inclined to put more faith in the experiments made by Messrs. Rawson and Bergtheil who have been working here for years day in and day out and in all seasons than Professor Bloxam who was only working with the dried leaf in the laboratory at Leeds.

Were these gentlemen employed by the Association?—Mr. Rawson came out originally and after he had been out here we approached Government to give a grant and the work was financed by a joint contribution from the Association and the Government.

These gentlemen were chemists and not bacteriologists?—Mr. Rawson is a chemist and Mr. Bergtheil is a bacteriologist and was sent out to Pusa. He was lent to us.

Did the Association ever employ any experts independently?—Mr. Rawson and Mr. Bergtheil were the men in charge of our research work, and had several men under them. The present Economic Botanist in Madras Mr. Parnell was connected with Mr. Bergtheil.

You allude in your evidence to the importance of getting good seed; how is seed obtained at present?—The present seed supply is the seed we have always got, viz. the Sumatrana or *desi* indigo which has always been coming from the United Provinces round Cawnpore, but I think deterioration goes back to the last famine in 1896 and 1897. This seed is grown by raiyats all over the province.

Do you know if the Agricultural Department of the United Provinces, or any other body has investigated the question of the best conditions of seed growing?—I think Mr. Leake. of Cawnpore did some very valuable work at Dalsingserai and Cawnpore.

Have you had any positive results in the improvement of seeds as the result of those efforts?—I don't think we have had, but some years ago our own men here selected some Sumatrana seed and were very successful. That was grown in a factory called Dasna, Meerut District, United Provinces, and the seed supplied there was fine, healthy seed and gave good plants. The difficulty was the price it cost. Many of the men could get their seed cheaper, a fair class of seed, from Cawnpore.

Generally speaking is there much use made of seed grown in the district or do you prefer seed from outside as a rule?—Seed which comes from outside, but we were advised that Java seed could be grown locally.

When you get seed, do you make any attempt to test it for germination?—Yes, that is done generally.

Is the percentage usually very high?—Oh yes, the percentage is quite a high percentage in the case of the imported seed, the best seed from Java is not a good germinant. It is impossible to get really good seed from Java, and my samples cost Rs. 40 or 50 per maund. Whether it was the climate or sea-voyage I don't know. It is impossible to get good seed from Java, but there is no reason why good Java seed cannot be produced in this country.

When you test for germination, do you also take note as to whether any of the seeds are very slow in germinating?—The Java seed is particularly slow; in fact it is very hard to get any germination owing to its hard coat. It has to go through a regular treatment that has been worked out by our men. They have tried broken bottles and other things and eventually treated the seed with sulphuric acid.

In the old prosperous days of indigo, were you troubled very much with deterioration of this kind; where was the seed obtained from then?—No. The United Provinces, Cawnpore and Delhi. A little used to be brought up from Bhagalpore and Purnea.

You express the opinion that the introduction of the *khoosky* system would bring cultivation up to its old level, if not increase it. How far is the *khoosky* system practised?—Very little; as far as I know, few factories do it, and very few in this district. In the Saran district many used to, but most of those factories are closed, including one I owned myself.

Is there any particular reason why they are closed?—In my own case I would say that I passed my word to my raiyats that I would pay them 3 annas a maund. I was paying 3 annas for my raw material, and my indigo was costing Rs. 180 or 190 to make, and it was selling for Rs. 150. I paid up my raiyats and had to close my concern. I offered them a less rate which would have paid me and paid them, but they would not do it; they simply dropped it.

What other systems are in force besides the *khoosky* system?—They have the *zerat* system or grown on lands belong entirely to the factory, and the old *tincoltia* system.

In the *zerat* system does the planter use his own cattle?—He largely uses his own cattle but also hires labour.

Is the price paid under the *khoosky* system higher than under the *tincottia* system?—I don't know that it would be higher than the last amended rate that was raised about four or five years ago, but I had no experience myself of the *tincottia* system, and I don't know how it works out.

Do you think that under present conditions cultivation could be extended by taking up the *khoosky* system?—Yes, but chiefly it applies to the Champaran district where planters have largely relinquished the *tinco'tia*. The system has practically gone, and the difficulty is can the cultivation be increased by *khoosky*. Concern after concern has abandoned indigo and don't do it now at all.

Have those firms who have given up the *tincottia* system abandoned the cultivation of indigo?—Several of them have.

Have they gone into sugar?—No, they are doing zamindary.

Are there any cases in which concerns have dropped the *tincottia* system and still kept up indigo cultivation?—Some concerns have. I understand one or two concerns have started *khoosky* in Champaran, and with success.

Do you think you could afford now-a-days to pay rents under the *khoosky* system which would enable you to make a profit?—Certainly.

And which would tempt the raiyat?—Certainly.

In hiring a piece of land on lease from a Zamindar or from a Raj, are the planters in competition with other people?—Not as a rule, due to the fact of the recognised indigo *dihats*.

No indigo planter comes in?—No indigo planter, and the Indian *ticcadar* takes here and there, but I don't think there is any competition.

The *ticcador* who takes it up for ordinary cultivation, does he take up the same class of area?—Not on such a scale. The Indian *ticcadars* are very much smaller compared with the factory *ticcadar*.

How large an area would a factory owner take up?—I really cannot say, but some of the Champaran concerns have as much as fifty, sixty or seventy villages, paying a rental to Bettiah of a lakh or a lakh and twenty-five thousand rupees.

In such cases they would not find an Indian *ticcadar* competing?—I have never heard of it.

I suppose the estates find it to some extent advantageous?—It saves trouble to lease out big areas to substantial people?—I think it saves a very great deal of money to the Bettiah Raj to have these villages leased and worked by responsible and trustworthy people. They have no establishment to keep up. All the zamindary has to be worked by the factory; the factory takes over the zamindary and the various duties pertaining thereto, and pays an annual sum.

Do you know anything about Nunias, saltpetre workers?—I simply know them as labourers, and in the factories where I have been, my Nunias have taken up crude saltpetre work.

The previous witness informed us that Nunias had to do *begar*, *i.e.*, forced labour, either for nothing, or at comparatively low rates, and this was a village custom which both Indian and European landlords enforced, and that the lower castes had to do this labour. Have you any knowledge of this?—As far as I know, within my own personal knowledge, among the factories there was not a single cooly taken for *begar* labour in these four districts. That is one of the rules of our Association, and if the factory manager was found to use a practice like that he would be called upon by the Association under rule 17, to account for it. For the last thirty years I know of no *begar* labour in the districts I have been in, viz., Saran, Champaran, Darbhanga and Monghyr.

Do Indian zamindars take this kind of labour, so far as you know?—As far as I know, they do not. The zamindar gets from the man who makes earthenware vessels some little things, but as to taking *begar* from Nunia, it cannot be done. The Nunia is a very valuable labourer. He makes his four and five and six annas a day. They go out in large numbers to other places.

You say the Nunia migrates; for what work, earth work?—He emigrates in large numbers. There is a very big emigration, espacially in the Saran district. They come back in May and June.

Turning to the question of flax, have you seen anything of actual flax grown on a commercial scale in Bihar?—I have.

Was it successful?—I think so.

The grower got a price for it which was satisfactory to him?—I think so.

Has the growing of flax spread much among planters?—It has not spread at all. The Imperial Government and the Provincial Government of Bihar and Orissa spent a sum of 35 thousand rupees for the 5 years' work that was done. The flax sold very well at home, was highly reported on, was tried by Mr. Macdonald, but he evidently got a better return from other crops than flax, although Vandikerhove's Report shows that if a planter puts up an installation and grows his own flax, he can make about Rs. 90, or £ 6 per acre. If there were a central mill and the planter grew the flax, he would make only Rs. 29 per acre, because he has to take into account the upkeep and all other expenses. If the raiyat grew the flax he would make Rs. 41, because all his family works on the land. If a central mill were put up and purchased its flax, it should give a return of between 7 and 8 per cent. This is on the testimony of our expert.

President.—Where are the results reported?—In the Pusa bulletin, No. 35.

Mr. C. E. Low.—Then presumably this practice of growing crops was not taken up, either because something else was more profitable, or because they could not get the results estimated by Vandikerhove?—If a planter wanted to start a flax mill, he would want a great deal of capital, and before the war the indigo planter was not in a position to find any fresh capital to start anything else; but after the war I dare say they may start. I think it ought to pay. I think you can make your crop a certainty if you irrigate.

You say that aloe fibre was not successful?—It was tried very largely in many concerns when the slump came in indigo, and sisal-hemp plants were imported.

What size decorticator had they got?—I don't know. They tried the latest. There was great difficulty at first but eventually they thought they had got the machine to deal with it, but I don't know any concern which is making it. On account of the price which fell very low, it has not been carried on.

I believe it is the case that there is nothing so good as the best and biggest decorticator?—I don't know whether they tried the biggest here. I don't think the machines were at all large ones.

I mean by a large machine one costing Rs. 50,000?—No, there was nothing like that up here.

You contracted to supply sabai grass to the Bally Mills?—That was before I joined the firm I refer to. They had a large contract with the Bally Mills for this grass.

That is now discontinued?—Yes, the firm has closed up now that the proprietor is dead.

Is there not the same demand for the grass on the part of the mills?—There may be, and somebody else may have taken it up.

You say that local people with money to invest have not put it into shares of the local Bengal and North-Western Railway; to what do you ascribe that?—I attribute it to the fact that these four districts are an entirely agricultural country, and even a man with a good deal of money or a little money, who has got it to lend, lends it out to zamindars and well-to-do raiyats. It is simple business, he knows his man, he is living near his debtor, and the rate of interest is either 12 per cent., 18 per cent., or 24 per cent.

You also find that the same class of capitalist will buy Government paper which pays him much less interest than the Bengal and North-Western Railway?—That may be so, but in my experience certain men who have money prefer to lend it on security such as I have mentioned above.

Hon'ble Pandit M. M. Malaviya.—You say that if the *khooshy* system of payment was introduced, you feel sure that the old cultivation would be increased?—Yes, in that particular district, the Champaran district.

You have always been in favour of the *khooshy* system?—I have been in favour of the *khooshy* system because I have had personal experience and worked it myself.

You worked under that system in Saran also?—In the Saran district only.

But under the *khooshy* system there is better payment and greater latitude to the raiyat?—I don't know that there is better pay that I cannot say but certainly greater latitude to the raiyats.

I am taking this from Mr Stevenson-Moore's Reports:—"In the *khooshy* system three conditions are wanting, while the rate of remuneration it much higher than under the *sutta* system." Is that correct? This was written in 1907?—That might have been correct in 1907; but there has been a rise in rates of about 30 per cent. At that time I daresay it would be correct. The *khooshy* rate was then higher than the *tinkottia*.

At present you don't think that the *khooshy* rate is higher than the *tinkottia*. At present I am not sure how the rise in rates works out.

But without going into actual figures, is it not a fact that under the *khooshy* system there is on the whole a little better payment and greater latitude to the raiyat than under the *tinkottia*. There is very great latitude in that; in the *tinkottia* system the ryot enters into agreement and takes an advance. If he does not carry out his contract, he is liable for severe damages. With the *khooshy* system it is perfectly voluntary. He is given seed; he may not sow my seed or grow my crop. I have to trust him and he has to trust me. I have worked it for years over 3,000 acres. I had not a single document. The men who were paid every week, and it was a case of mutual trust. It is very curious; one or two planters have told me that some of these raiyats have actually told them they would sooner have the *tinkottia* system than the *khooshy*. You were so informed by one or two gentlemen, but you cannot say that that was the general view? This I have heard lately. It is not my personal knowledge.

It is not the general opinion?—That I cannot say. I have not actually cultivated indigo for 12 or 14 years.

Under the *khooshy* system you say he is liable to pay severe damages; what is the amount fixed?—The amount is fixed in the *sutta* Rs. 40 or 30.

Is the period of agreement 20 years under the *tinkottia*?—Some of the old *suttas* that had been handed down for past generations were for 18 or 20 years, but the whole question of the *tinkottia* was thoroughly thrashed out. We had some agrarian disturbances in the Bettiah district, which were, I am positively certain, in no way due to either system of indigo or sugar cultivation, but to local agitation; in the same way a man in trade at home starts a strike; it is a very paying game for the agitator. The result was that it took us about 1½ years in conference with the Lieutenant-Governor of Bengal before a satisfactory arrangement was come to.

When was that?—In 1909 or 1910.

When were these riots?—In 1908, I think. The result of that conference was that under the system no *sutta* can now be taken for more than 7 years.

You were a Member of the Bihar Legislative Council since 1909?—I was.

Am I correct in saying that this question was taken up by the Hon'ble Mr. Brij Kishore, after the period you mention?—Yes. After this matter was settled, there was perfect peace. We then had a revision of the survey, and there has naturally been a good deal of trouble. The raiyats have been unsettled. In no survey report will you find any mention of the bad management of the estates or the system. The Hon'ble Mr. Brij Kishore actually asked for an Indigo Commission. There was a very interesting debate; the whole question was thoroughly ventilated in our Council last April. That Council consisted of Indian gentlemen from this side of the river who were thoroughly conversant with the particulars, and when it was put to a division that division was 26 against 4 in favour, one being the proposer.

How many of these 26 were officials?—Without looking up the official proceedings I cannot say but practically there were only four Indians for it. Whatever the number was I don't think every Indian gentleman was there. I cannot say the actual number of them.

But the majority were officials?—There may have been a majority of officials, but looking at it from the point of view of this side, out of whatever number it was, 16 or 12, the Indian majority was only 4 in favour including the proposer.

Will you be surprised to hear that Mr. Rainy Macdonald yesterday said that the Champaran riots were due to the *tinkottia* system; you know that gentleman?—Very much surprised. I know him very well.

President.—I don't think he said that they were due; I think he said that he did not know what the specific origin of the riots was.

Hon'ble Pandit M. M. Malaviya.—Is it not a fact that cultivators in this part of the country are very adverse to cultivating indigo; it is not popular; or is it popular?—In speaking for the district in which I have served, honestly they don't like it, because under the *tincottia* system though he is making money over it, on account of the trouble in cultivating the land since the factories relinquished cultivation the raiyats have been coming and asking to return to the system in accordance with the terms of the contract.

How long has this industry been in existence in this province?—Since 1793.

How many factories are there at present roughly?—In Bihar there are about 72 concerns belonging to the Association, and about ten or twelve outsiders.

Do you think that indigo cultivation would suffer if the *tincottia* system was done away with; would any harm result to the indigo interest, planting or manufacturing?—I dare say, if *tincottia* is to go out entirely how is it to be replaced.

My question is, in your opinion will the indigo interest suffer if the *tincottia* system were discarded; suppose the *khoosky* system was substituted for it?—Not if you can replace the cultivator. It is very hard to say without figures. The difference in Champaran was 75 thousand as compared with 25 thousand so that there are 50 thousand acres that have been given up.

After a century of this system, has the time now come when planters should wholly rely upon voluntary purchase and sale by cultivators, or has it not yet come?—I don't think the time has come. I don't know when it would for a voluntary arrangement. If a planter advances money for a crop, he must have some sort of agreement?

In your opinion the time has not yet come when the indigo industry can rely upon voluntary cultivation?—If the ryot accepts the fairness of the *khoosky* agreement. It certainly ought; the difficulty is that if indigo remains at a certain price, say, Rs. 250 per maund, indigo is now up very high; therefore the planter can afford to pay more for his raw material than when it drops; but if indigo drops to pre-war prices, he will have to give the raiyat at high price. The ryot does not see the fairness in that; the price of the plant should rise or fall in accordance with the price of the manufactured article. I had to close my factory because the raiyat would not accept the lower price for the indigo, and I lost my cultivation.

Then in your opinion you require some sort of compulsion?—No, not compulsion.

But what is the *tincottia* system if not that?—It is a contract. The man receives an advance; it certainly is an old established system in which a raiyat agrees to grow a certain proportion of his land for a certain crop, and if he does not grow that crop it results in enhancement of rent.

To pay a certain damage?—That is for growing the indigo, but if the planter relinquishes his *tincottia*, the landlord has the right of enhancing the rent, because in these districts the raiyat is benefitted in so far that he has held his land at exceptionally low rent for growing a special crop.

Has it been entered in the agreement that he holds his land at an especially low rent?—It does not mention his rent at all. His rent comes forward at the same rate for the last 70 or 80 years. One of the rules of our Association is that no planter whose raiyat does *tincottia* can enhance his raiyat's rental; that was inserted in 1877 and that rule is in existence to this day. Now when *tincottia* has been given up, and there has been an enhancement, the planter has applied for his enhancement, and there is a big case pending and it will be very interesting to see how it goes. Those questions come into *tincottia*, and the raiyat has undoubted advantages.

That suit has been filed by the tenants?—The enhancement was made by survey, and the suit has been filed in the Lower Court by the tenant.

Do I understand you to say then that the time has not yet come when the indigo planter and manufacturer can rely upon a voluntary system to obtain his supply of indigo? Or has the time come?—It is a very hard thing to answer; there is very little of the *tincottia* left.

I understood you to say that the *khoosky* system is very little practised?—Yes.

Is the *tincottia* system largely practised or is it as little practised as the *khoosky*?—No, a good deal more cultivation under the *tincottia*, but a great deal of the *tincottia* has been relinquished and can never come back. Those factories who have lands under *tincottia* are still doing indigo, but under agreement. It is called *tincottia*, but the planter agreed to give up one cottah. It is really two cottahs that go into indigo, not three.

Since when?—Since the agreement under the Government of Bengal in 1910.

You have told us that since 1877 you have ruled in your Association that you would not raise the rent of the cultivators?—Any raiyat of a factory who did *tincottia* cannot have his rent enhanced; that has been ruled since 1877.

The price to be paid for indigo is also fixed in agreement?—Yes.

For instance, if a man takes a lease for 20 years, the price to be paid would be fixed as ranging between Rs. 6 to Rs. 16 per bigha, according to the outturn in the agreement that you have now substituted since 1908. Do you retain that rule that the price will be the same for 7 years?—The price will be the same for 7 years, but although the rate for *tincottia* indigo was fixed in consultation with the Bengal Government in 1877, in 1887 there has been a considerable rise in the price of food grains. The planter considered that the rate that was fixed in 1877 for indigo was not sufficient, and that year although the rate was altered voluntarily to 16 per cent., it was raised in 1887 and again raised in 1911.

President.—That is the rate paid to the raiyat?—Yes, though there was existing the *sutta* for 20 years, the planter saw the fairness of it. They used to buy a maund of rice for 12 annas and the rate was raised to 16 per cent., although there were existing contracts.

Has there been any rise in rates fixed, in the *suttas*; the new rates that were fixed in 1908?—There has been no rise since. There has been a rise on the 1887 rates in 1908 of 25 per cent., if not 30.

Since then there has been no rise?—No.

So that whatever the market rate would be, the raiyat would get the rate fixed in the *sutta*?—Yes, but he should receive a corresponding rates for his raw materials. The raiyat should get some of the benefits due to high war prices; but then the difficulty is if he gets high rate now, you have very large cultivation over Bihar. Prices fall low and the raiyat would not accept a lower price, if there was no contract, and the crop would not be there; that is the only difficulty.

For that reason you want this rule in the *sutta*, that he must be compelled to sell at the rate fixed in the *sutta* for the period of the lease?—The two systems are quite separate, but I see the difficulty of introducing the *khoosky* system. I am speaking from personal experience

Do I understand that in this *tincottia* system, the selection of the particular plot in which the indigo is to be sown rests with the manager of the factory or his agent. He can select any plot which, he thinks, is best suited for indigo?—He can select suitable land; that is the custom.

The cultivator has no opinion in this respect; he must plant it on the field which the manager of the factory directs?—Certainly, because the man receives a big advance for his land, and would try and palm off the very worst part of his land.

I ask you this because I read in this Report that when a tenant has prepared the field for wheat, the manager of the factory would come ..... (question interrupted by witness)?—I do not think you will find that in a well-managed factory.

I find in this Report that "wheat is ⅛ per acre, more profitable than indigo to the cultivator. This explains the unwillingness of the raiyat to raise indigo. Mr. Stevenson-Moore wrote this. Barley is 7 annas per acre less profitable than indigo. From your knowledge do you think the same proportion holds good now?—No, it is not the same proportion now.

Since 1907 indigo has fetched a much less price, except since the war?—That was when the planter was paying that rate for the *tincottia*. In 1883 and 1884 indigo was selling at Rs. 300 or Rs. 280. When indigo was down to Rs. 100 the planter did not reduce his *tincuttia* rate. He paid the ryot his full *tincottia* rate, so there was considerable benefit; whereas if you have your *kosky* system it goes up and down.

In the suit that you mentioned, was it not a point raised by the tenants, that since indigo went down in price, the indigo planter compelled them to execute agreements, to pay an enhanced rent, on the ground that they were no longer planting indigo?—It was so alleged.

You were the Secretary of the Planters' Association for a long time?—I was, for ten years.

What are the conditions of membership; are all planters members of the Association, or any of the zamindars also?—The Planters' Association in Bihar consists of indigo and sugar planters of these four districts. We have no tea planters.

Is it a registered body?—It is a registered company.

Has Government in any way assisted it with aid for research work?—Yes.

On many occasions?—Government research work took place from 1908 to 1914. The total amount received from the Provincial Government of Bihar and Orissa was Rs. 4,72,661-10-9. The Bihar Planters' Association's share of that was Rs. 3,31,457, altogether Rs. 8,04,118. Government aid for the sugar industry was Rs. 16,165 for an installation which I mentioned. That was repaid to Government by the planter, less 10 per cent. for depreciation. Between the Imperial Government and the Bihar and Orissa Government they spent Rs. 35,000 on flax work.

Do you take all planters as members, Indians and Europeans; is the Maharaja of Darbhanga member of your Association?—The Maharaja of Darbhanga as proprietor of a factory

the result that a competition takes place and perhaps ruins the first concern. This suggestion aims at preventing existing concerns being attacked by new ones.

You cannot say for certain that there is a rule there that no other person shall purchase the cane grown within the zone?—I have only been told about it; I do not know it from personal knowledge.

In speaking of "pioneer factories" you mean indigo and sugar factories?—I am speaking of pioneer sugar factories.

Did not these factories start work with sugar in 1848?—They started with indigo in 1793. Indigo was flourishing till 1845. In 1845 there was a big slump in indigo, which went down to Rs. 110 per maund, and then the planter turned to sugar.

So long as indigo was profitable he cultivated indigo, until 1902?—Up to that date but the slump came in 1908.

When the slump came he again took to sugar?—Yes.

Can you then speak of these sugar factories as pioneer factories?—Yes, pioneer in these districts. Large capital was sunk; one English company spent half a million, and the concern was sold to Mr. Pierpont Morgan.

You speak of them as such in the sense that they started work before other?—They put up a very big substantial concern and had considerable difficulties to contend against practical difficulties.

This was about sixty or seventy years ago?—The old sugar factory was a very small toy thing compared with the modern factory now put up. They dealt with a very small quantity of cane.

You do not speak of these factories as "pioneer" factories in the sense that they would be starting new industries?—Not, as "pioneer" of this industry in this province, because the first people spent a lot of money, and the people who followed put in less.

President.—I understand you want some kind of regulation to prevent one factory competing with another, but you don't want a regulation which will prevent growers selling to whomever they please. If for instance a grower wanted to make *gur*, you would not force him to sell to the factory?—If *gur* pays him better I have no objection to his making *gur* instead of sugar.

WITNESS No. 58.

BABU BASANTI CHARAN SINHA, *Pleader and Proprietor, Bengal Preserving Company, Muzaffarpur.* Babu B. C. Sinha.

WRITTEN EVIDENCE.

I have some experience of raising capital for my own business of canning fruits. When I started my business of canning fruits in 1910, I had not much money left of my own, having invested what little I had in swadeshi concerns, nearly all of which, I am sorry to say, failed. It became necessary for me to raise funds for my own business. I applied to banks, I mean the swadeshi banks, and they invariably refused to finance my enterprise. Two of my friends, however, who seem to have had some confidence in me, lent me a certain amount of money at 12 per cent. and a relation of mine at 6 per cent. These loans I secured with great difficulty, and many other moneyed friends, whom I approached, refused to finance the business. I must however add that for three years I was suffering considerable losses owing to the Californian process of canning fruits not suiting the mango, a more delicate fruit than peaches, pears, apples, etc., and every year during the season the experiments cost me a good deal. My friends who had already advanced me moneys became alarmed and my other friends became very cautious. I required more money to go on, and my difficulties can better be imagined than described. I am glad to say that now my enterprise is a success so far as the manufacturing side is concerned and it promises to be a success financially in the near future. Capital.

Q. 28.—Commercial museums such as the one in Calcutta are very useful as they would disseminate the knowledge of different industries existing in the country and help in making a market for the articles. Besides, one industrially inclined will have no difficulty in collecting all the informations and learn any particular industry which is carried on in the country. The Calcutta museum has been useful to me. Commercial Museums.

Q. 31.—Industrial exhibitions are very useful in encouraging the industries of the district or province, and they bring together the producers and buyers, although much sale may not take place at the exhibition itself. In the exhibitions held in Calcutta and different districts of Bengal and Bihar my tinned fruits found buyers at the exhibitions and put me in touch with dealers. Besides, the exhibitions helped to make my fruits widely known. Exhibitions.

is a member. We however have not had the pleasure of seeing him at any of our meetings.

Have you any other Indian members?—I don't think there are Indian gentlemen as proprietors of factories.

There are nine or ten, I find from this report?—The factories are shut up I think.

Is the Hon'ble Babu Maheshwar Prasad a member?—Babu Maheshwar Prasad is proprietor of a factory, but the factory has only just been re-opened. If he applies for membership and selected as proprietor he is a member, and his manager comes to the meetings.

Is he entitled as proprietor to attend the meetings? I have been told that Mr. Levinge proposed one of these Indian gentlemen as a member and that your body refused to have him. The gentleman was Babu Vishvanath Prasad?—Babu Vishvanath Prasad was a very old friend of mine, and I have never heard anything of the sort. I don't know of it.

Hon'ble Sir R. N. Mookerjee.—The cost of cultivation does not go up and down, according to the market rate of the produce?—Of labour.

I mean the cost of cultivating, say, one acre of indigo, practically remains the same; it does not go with the rise and fall of the market?—No.

Therefore the raiyat does not benefit by the rise or fall, because you have a contract price?—Yes.

Now the jute mills depend upon the production of the jute, and there is no trouble. Why do the indigo planters want the special favour of fixing the price. In Calcutta we have 30 or 40 jute mills, but never any trouble; when we buy jute and the prices go up we pay the higher price, and so on?—The system is very different. There is a concern and that concern has its fixed *dikat*. It is the landlord..... ...(witness interrupted).

That system can be easily abolished and a common sense one introduced. You buy the indigo at the market price as you do jute?—That is a sound principle.

And all this irritation would disappear?—Then the raiyat says "I do not want to grow indigo."

Jute cultivators never say that, because it is to their interest to grow jute?—Quite so.

President.—Jute can be carried a long distance and you cannot do that with indigo. You have to have it within three miles of the factory, otherwise it would be useless.

Hon'ble Sir R. N. Mookerjee.—It is not desirable, for the indigo trade. Every Indian will tell of the irritation produced in this system of forced cultivation at a fixed price for years to come.

Do you think that these uneducated cultivators would be in a position to know the market, if indigo was sold at higher price would he be able to demand higher prices for his crop?—They certainly would not know the market, but take my own experience. I had no agreement, I had the *khooshy* system. The price of indigo fell, I could not pay but I kept my word. I told them I could not afford to pay the promised rate of three annas, but they would not agree and I had to close my concern.

The cultivator should only be expected to take the low price when the market comes down, but he is not in a position to know at what rate you are selling your indigo?—There must be mutual trust between the two.

President.—It is important to find out whether it is possible to introduce some voluntary system which would be fair to both parties and give the raiyat liberty. It does work in the case of jute, and Sir Rajendra wanted to know whether it is not possible in the case of indigo. We realise that conditions are different. But if you will think out the matter and we get an opportunity to talk to you about it again, we would like to hear your more mature views. You naturally look at it from your own experience, but there is another point of view which we would like you to consider.

Dr. E. Hopkinson.—In regard to the proposal to make experiments in growing flax was that suggested in the first instance by the Planters' Association?—No, I think it came from the proprietor of the Dooriah Factory. It is mentioned in one of the reports no. 35, the whole history of it is given there.

Hon'ble Pandit M. M. Malaviya.—You say "I believe I am correct in stating that in Java and Formosa, Japan, where a large sugar mill is erected it has a certain recognised zone, and no other person is permitted to erect a mill within this zone, or purchase the cane grown within this zone." Have you got sufficient information about these two places to support your statement?—No, I have no information about it, but the Director of Agriculture pointed out the possible danger to the industry if *dehats* were not recognised. The idea of a zone is that pioneer men have sunk their capital and have had to face low prices. Prices become high, and a man with a small capital may come in and take up cane cultivation, with

Government onage.

Q. 38.—I am not acquainted with the rules themselves, but I have a little experience of my own which shows what the rules must be. I submitted a sample bottle of my typaree jam to the Assistant Director of Supply and Transport, Poona, and he, being satisfied with the sample, gave me a trial order for a ton of the jam. Regarding this one ton of jam he wrote on the 15th July 1916 : "I have to inform you that the jam was sent to our troops in Mesopotamia and issued to hospitals. I have much pleasure in saying that the jam was found to be of excellent quality and was much appreciated." After this I thought I should have no difficulty in inducing the officer in charge of Supply and Transport, Presidency Brigade, Calcutta, who is a large buyer of Military stores, to take my jam, but when I approached him for the purpose, he simply said he could not take country jam. The rule seems to be against taking country products, however excellent they may be, and there cannot be any question about its unfairness. I must add that the Assistant Director of Supply and Transport, Bombay (an office recently created for Mesopotamia), has given me orders for jams. My answer to the previous question gives the change I would propose in the rules.

Training of labour and supervision.

Q. 44.—I had some difficulty in the beginning to get men to work the few machines employed in my industry. They were particularly afraid of the presses cutting their fingers. Following the instructions received along with the machines, I first examined and studied their different parts dissembling and assembling them, showed their working by working them myself. Then the men, principally carpenters, worked the machines and I have no difficulty since. I always took care to explain the working of the different parts of the machine, and I believe that has improved their efficiency.

Reference libraries.

Q. 78.—I could not get in this country any good works on canning with bacteriological technique dairy farming for making condensed milk, die making for sheet metal working, for enamelling on iron, etc., which I wanted for my own industry or for study, and I had to get books on those subjects from England and America.

Registration of partnerships.

Roads, railways and waterways.

Q. 97.—There is not much lack of transport facilities on this side of the Ganges in this province, but the very facilities have become a curse. Owing to railway communication, one is induced to transport goods from one part of the country to another, for trade or manufacture, but the extent of pilferage is appalling, and in the case of perishable go ds, such as fruits when they cannot steal, they seem to take good care to detain the consignment in transit so that the goods may perish and cause loss to the trader in any case. On two occasions I had mangoes brought from Bhagalpur in *sealed* wagons and although my man took care to see that the wagons were ferried over the very day they were loaded, they were detained in the way and they arrived here, a distance of about 100 miles, on the fifth day and a large number of the fruits were entirely rotten. I complained to the railway authorities, but nothing came out of the enquiry that was made, the rains having been held responsible for having washed away the labels "Perishable" outside the wagons. Of course in all cases of perishable goods the railways take care to take risk notes to exonerate them from all blame even for culpable negligence. As for pilferage the instances are innumerable.

Q. 98.—The railway freights are very excessive, and stand a good deal in the way of trade. A case of tinned fruits is charged the same freight from here to Calcutta, a distance of about 350 miles, as from Calcutta to London. For an oil-engine I paid Rs. 13-2-0 from Liverpool to Calcutta, and I had to pay Rs. 34-9-0 for its journey from Calcutta to here. As if these are not high enough, the Railway Board have since October last enhanced the freight rates on sugar, iron and steel, corrugated sheets, tin sheets, kerosine oil, etc., 30 to 40 per cent. which were carried at special low rates, for how long I cannot say, but for more than 20 years certain. Then the rate for vegetables, fruits, and other bazar articles is half the parcel rate and it is very high. I would propose that the freight on vegetables, fruits, etc., should be a quarter of the parcel rate, that sugar, oil, iron, tin sheets should enjoy the concession rates as before, that grains should be carried at a low rate, that unpolished wood should also be carried at a low rate and that in all cases when the consignment is a full waggon-load or a large quantity the freight should be substantially reduced.

Jail competition.

Q. 109.—I have no complaints to make regarding competition by jail industries, and I think the competition is healthy.

Q. 110.—More capital and better railway facilities, such as low freight rates on fruits, sugar, tin sheets, coal, tinned fruits, packing wood, and, above all, steps to prevent pilferage and delay in transit of fruits, will make for the development of my industry.

ORAL EVIDENCE, 22ND NOVEMBER 1916.

President.—You have been interested in developing the canning industry and have spent a little money over it. Any satisfactory results so far ?—Yes, within the last two years. For the first four years the result was not satisfactory.

Have you seen the commercial museum in Calcutta ?—Yes.

Has it been of any real help to you ?—I think so. I have been getting orders through the Director-General of Commercial Intelligence.

Mr. C. E. Low.—You require a number of tins for your industry. Where do you get your tin sheets from ?—From Calcutta.

You presumably try to get them as cheaply as possible ?—Once I tried to get some tin sheets from England but I found that they were not cheaper.

Did you make any enquiries from the Commercial Intelligence Department regarding the purchase of tin sheets ?—I never made any enquiries.

Where did you get the machinery ?—From a student whom I helped in America. He brought them out.

Did you advertise your goods ?—Yes, very largely in the "Stateman" and "Times of India" and "Indian Daily News" and also the "Pioneer" for sometime.

Did you get enquiries from dealers or was the business mostly retail ?—In the beginning it was mostly retail. Now it is both wholesale and retail.

You sell a certain amount of stuff through the Commercial Museum ?—Recently.

You have your exhibit there ?—I have.

Is there any way in which the Commercial Intelligence Department could help you further in making your goods known ? Supposing there was another branch of the Commercial Intelligence Department in Bombay do you think it would help you ?—Yes, certainly.

If there were a branch agency of the Commercial Intelligence Department in Bankipur or Patna would it increase your sales ?—Not, if it were so near.

Do you get sales in Patna and Bankipur ?—Yes.

The officer in charge of Supply and Transport in Calcutta would not take country jams ?—Yes, that is Colonel Swan.

Do you know that if the country jams are of good quality, that is entirely against the provisions of the rules ?—I presume so but that is what he told me. I went to see him at his office.

Do you know if the Supply and Transport specify imported jam or specify country jam or do they simply ask for tenders for jam ?—I do not know that.

I believe that at present a great deal of country jam and preserves are being supplied through the Supply and Transport ?—At present it is the case.

Did they find it satisfactory ?—Very satisfactory.

You are supplying on a commercial scale ?—Yes.

Did you find out whether after the war they would continue the orders for country jam ?—I have not yet sounded them in that way.

It is rather important to know that, whether they will take the things after the war ?—If they go on taking for some time I shall be able to urge that it should be taken after the war also.

You have to secure that your fruits and tins are cleaned bacteriologically ?—Yes.

Do you consult the bacteriologist at Pusa ?—I went to Pusa but there was no bacteriologist then.

Have you consulted the Pusa people since ?—Mr. Hutchinson came to see my factory in June or July last and then I had a talk with him. He was satisfied.

Mr. A. Chatterton.—What jams do you make ?—I am now making guava jam.

What other fruits do you use ?—Typaree.

WITNESS No. 59.

BABU BHULAWAN LAL, *Tirhut Moon Button Factory, Mehsi, Champaran.* *Babu Bhulawan Lal.*

WRITTEN EVIDENCE.

Capital.

The Tirhut Moon Button Factory of Mehsi in the district of Champaran was started by me in the year 1906. Being myself not a capitalist nor an expert in the line I sought the help of few of my personal friends and they contributed in very small amounts. But although the factory has been in existence for the last 10 years the total capital subscribed up to date has been only Rs. 2,960, including the only donation of Rs. 100, from Radhaswami Central Satsang at Agra. The small capital at my disposal has not been sufficient to enable me to expand the works and no more money can be subscribed by the people, as those who had subscribed before got nothing in return. The very small profits if any are used in expanding the work and improving its quality. The works would have been stopped had not the factory borrowed a sum of Rs. 2,000 at 12 per cent. interest.

The main difficulty of running the factory lies in the want of capital. A button factory with up-to-date machinery worked by hand and foot would require a capital of Rs. 10,000 at least and if assistance in the shape of loan of Rs. 5,000 or so without interest for a period of ten years were forthcoming the factory would be placed on a sound financial basis.

The appeal of the Hon'ble Rai Bahadur Purnendu Narain Sinha published in his Exhibition report of 1912:—"I shall ask all lovers of Bihar, all genuine patriots of the land and all who want to build up Bihar by sacrifice of money, time and intelligence to read the pitious appeal of Mehsi Factory" did not elicit even sympathy from our magnates and the appeal for funds from the Tirhut Exhibition Committee was returned to us to be referred to the District Industrial Committee now in course of formation. The Hon'ble Mr. Morshead was kind enough to visit our factory recently and he is doing his best to negotiate for a loan and if he succeeds he will be doing really a great service to the button industry in Bihar. But so far the banker has not been able to concede to our fair terms.

Government assistance.

The button industry in this province is an important institution and well deserves the patronage and help of Government. It is unfortunate that our benign Government could not come forward to support an application for a grant of Rs. 200 per mensem for an expert although it was recommended by the Inspector of Technical Schools, the District Officer and the Commissioner of the Division.

As we got no help from outside we had to fall back on our own petty resources and we have been able to secure the services of a practical button expert who has been trained in Japan for 4 years His allowances are very low not befitting his position, and it is likely that he will leave us as soon as he gets a better remuneration elsewhere. If a sum of Rs. 100 at least per month were contributed from outside for 2 to 3 years his services may be insured and the industry put on a sound commercial scale and paying basis.

The supplementary assistance in the shape of capital may be given by Government, local bodies and by industrial banks, and Government should also give the free loan of experts and help of technical and scientific advice for which research institutes with competent experts may be provided.

Both private factories and factories securing any sort of help ffom Government ought to be asked to furnish annually a full report on their workings dealing in detail with the difficulties they had to undergo during the year and also the remedy they suggest as likely to mitigate them.

Government may from time to time also depute experts to report on the working of such concerns and if it is discovered that any such industry is working at a loss it should do all in its power to help it on the recommendation of the expert inspectors.

Pioneer factories.

Government would do well to subsidise and improve existing industries which are capable of development and in case of new industries it should start poineer factories and if successful, make them over to local bodies if no other capable hands are forthcoming.

The experts now available should learn to be practical experts, and students who may hereafter proceed to foreign countries to study any technical subject should not content themselves with the theoretical knowledge of the subject but should ascertain carefully how that knowledge can be applied in Indian soil where the conditions of labour, material and trade are quite different.

The difficulties of disposing of goods is also another important factor in the development of the industry. At present all buttons are imported from foreign countries and from the reports published we find that our imports from April 1915 to September 1915 come up to the figure of 759,000 of which Japan heads the list, contributing more than half and the following countries come in order—Italy, United Kingdom, France, Straits, Germany and other countries.

Whenever we put our manufactures in the market we find the difficulty of disposing of them not because they are inferior to or more costly than those of other countries but because the market is over-flooded with foreign goods. Our goods though manufactured from mother-of-pearls do not find a ready market before the Japanese goods which are made from couries (trocas shell), a very inferior material. The remarks of Mr. James Hornell, Superintendent of Pearl and Chank fisheries, Tuticorin, reproduced below will support our proposition.

'The one marked "India" is a better made and stronger button than the one marked "Japan" but the shell from which it is made, though stronger than the other is not so good in colour being smoky in tint. The Japan one is of good colour but in this the thread holes are weak and such buttons would break from their attachment very readily Except in colour the "India" one is considerably superior in value.'

The wholesale dealers get large supplies from Japan and other countries and are not prepared to undertake the sale of our goods as we can supply them only in small quantity and that for cash only. Our market is therefore at present confined to petty shopkeepers and tailors who are approached by our travelling agents and it is in this way that we dispose

of the goods, involving considerable commission to them and also cost of transit in each case of transmission.

We might well stand the market if (*a*) our outturn could materially be increased, (*b*) the labour secured, and (*c*) quick disposal of goods by wholesale dealers not on credit but cash system ensured.

Subsidise and adequate protection are also essentially necessary to stand competition in the market.

The impetus given by Government to the indigenous industries is bound to bring into the market different varieties of Indian manufactures and it will be a great disappointment and a cause of discontent if the articles are not easily disposed of in their own native land. The foreign competition is sure to stand in the way of progress and Government should be prepared to find among other means increased protection for the quick disposal of the manufactured articles.

Industrial schools.

The divisional population is purely agricultural and agriculture is considered to be an honourable profession by all the higher castes. Of late students who fail to matriculate and those receiving education below that standard do not take to agriculture and always prefer service either under Government or private bodies, and being unsuccessful are becoming a source of constant trouble and burden to their parents and guardians. It is from among these people that an artisan population may be easily built by opening an efficient industrial school in each district where they may be trained for their future work.

Government itself will find difficulty in obtaining suitable and cheap artisan population to start pioneer and demonstration factories, and private enterprises also are suffering for want of this class of people. Ordinary blacksmiths and carpenters are scarcely now available and they cannot be got for Rs. 20 per mensem. This difficulty should find prominence and efforts may be made to remove this want by opening industrial schools.

At present night schools do not serve their real purpose. If the labour class for whom these schools are meant are paid some thing daily they may be punctual in attendance and may do some thing. The industrial schools should be under the control of the Department of Industries.

Director of Industries.

There does not exist any provincial organization for the development of industries. A Board of Industries and a Director of Industries should be appointed for the province. The Board should have executive powers and budgetted funds. The Director of Industries should both be an expert and a man of business. A reference library is also necessary.

Imperial Institute.

There is an Imperial Institute at Pusa but it is more for agriculture than for industrial work. It has not been able to give us any assistance in our industry and I conclude this is due to its having no organization for industrial pursuits which may be added. We have not had any help from different Government institutes in bleaching of shells although we referred to them. Similarly we could not get any help in dyeing of bone buttons which is yet a most pressing question to us.

Trade marks.

The Indian law does not give sufficient protection to trade marks and proprietary rights and the law may be amended to secure this end.

Railway freight.

The railway freight for mother-of-pearls and chunam shells is too high. They should be despatched under cheap special rates and the shells classed as class I. The Local Government may be empowered to classify goods which are specially meant for trades and revise tariff lists.

General.

The button industry in Tirhut Division has a very great future before it and can well be expanded with advantage. There is ample scope for starting many more factories here as we have got raw materials in abundance in almost all the local rivers. The only thing essential is that the raw materials (mother-of-pearls) should be carefully surveyed and secured by Government and let out on reasonable terms to working factories so that they may not be burnt for lime and if left in the river for some time they will improve both in quality and thickness which will give us also ample material for bigger buttons for coats which are scarcely found in these days owing to the over drain of the material on local rivers for burning lime. Government may also through the department of fisheries import the best varieties of oyster and other shells and preserve them in rivers and channel beds to propagate and secure a better quality of material. These are the points on which the attention of Government should be invited at once so that in course of a few years we may have a very flourishing industry in Bihar for making buttons. The District Officer may be requested to arrange for a lease of the river beds where these shells are most abundant and this may be done at once. If this is not done even the only existing factory will not be able to continue for a long time unless it takes to the manufacture of other sorts of buttons.

Mother-of-pearls possess also pearls which are extensively sold by the people. These pearls are of small dimensions and are used in nose ring and burnt for medicinal purposes. The trade for these pearls may also be organized.

The mother-of-pearl in Bengal rivers near Dacca is of superior quality and very thick. It gives us good button for coats and ought to be protected.

Divisional association may be formed to survey and secure raw materials and results should be published by Government.

ORAL EVIDENCE, 22ND NOVEMBER 1916.

President.—You have had a little experience in organizing a button factory at Mehsi, what made you select that place?—I have got my house there and the members of my family there are able to look after the affairs. There are also raw materials about the village. We have also a railway station near to us, with other facilities.

Would it not have been an advantage for you to be in personal touch with some good market where you can get your goods pushed and where you can get into touch with the sellers readily; in this way you would be able to bring your goods to the notice of the buyers and find out what they wanted?—Yes. That we have been doing. We are selling our goods in Calcutta, Madras and other places.

Have you any regular agents?—Yes. I have travelling agents.

To what extent are you selling your buttons now and what is your annual output?—Last year we sold Rs. 5,000 worth buttons. This year our output will be Rs. 12,000 up to March.

You are getting a ready sale?—Yes, We have got 30 per cent. of our stock in hand.

Are your buttons exhibited in the Calcutta museum?—Yes.

Have you had any orders through the museum?—We have some orders from some Europeans.

Through the Director-General of Commercial Intelligence?—Direct. They wrote to me direct.

Have you sent the buttons to the Swadesi Stores in Bombay?—No, we have our own agents in Bombay selling separately.

Mr. C. E. Low.—I do not quite understand from the first sentence of your evidence whether you founded a limited company or not?—We did not form a limited company.

This money was simply paid in as representing the capital of a limited partnership. On what terms did you receive the money?—Was it paid in simply as a subsidy?—These people wanted to share in the profits if there were any.

Did they get any dividends?—Not yet.

You do not get enough capital?—I do not get enough money to extend the works.

Is it a registered company?—It is not.

Supposing you receive assistance towards the salary of your Manager from the Government or any public body, what terms would you offer in consideration of that? Would you undertake to teach apprentices or make your results known to the public?—We are prepared to make it public. Although it is a private concern still we are ready to teach apprentices. If the people will come and learn we have no objection.

Have any people come to see the factory and afterwards started private business?—Some people from Calcutta and the Punjab came and inspected our factories. They asked us for certain information and we supplied them and we do not know thereafter whether they started private factories. They told us that they wanted to start factories.

Do you use machinery?—We use machinery.

Where did you get the machinery from?—Japan.

That is simply because your employé told you?—Yes. We have an expert who was trained in Japan.

These shells which you use are they commonly found in all the rivers?—They are found commonly in all the local rivers.

Who collects them?—People belonging to the fishing class.

Whose property are these shells?—They do not at present belong to the Government. They belong to the zamindar. The zamindars do not care for them.

Supposing you work up a good business in these shells and you begin to create a big demand, are you apprehensive that the Zamindars would begin to squeeze you and ask more rates?—The Zamindars have no concern with the shells. They settle them with the fishes.

Then they may charge fishermen higher rates?—The price depends on the fishing. The shells are not taken into accounts.

The shells you say are also used for burning lime?—Yes.

Do you pay the same rates as the lime burners?—We have to purchase at the same rate as the lime burners. We have sometimes to pay higher rates when we want better quality.

Mr. A. Chatterton.—Since you started this factory have you felt the need of technical assistance in developing it?—Certainly, I still want the assistance of a technical expert.

If there were a Department of Industries in this province do you think you would be able to get assistance?—Certainly.

In what way do you think they could be of use to you?—We want technical assistance for bleaching and dyeing bone buttons and for bleaching shells.

You make both shell and bone buttons?—We are making shell buttons but we are also experimenting on bone buttons. On account of want of technical knowledge we have not been able to colour them.

Have you had any difficulty in getting material for mounting your buttons?—Of late there has been a difficulty in getting card-boards and escutcheon pins which we use in coat buttons.

Have you got samples of your buttons?—I have got some (witness showed the members some samples of his buttons).

How many workmen do you employ?—There are sixty workmen at present.

How many lathes do you employ?—We have got about thirty-two.

You got these from Japan?—We got the sample from Japan. We get these machines made locally.

Are they made of wood?—Cast iron.

Are they made in Muzaffarpur?—We can get them made here from Messrs. Arthur Butler and Company upon furnishing samples.

Hon'ble Pandit M. M. Malaviya.—Have you made any representation to the Railway Board in regard to the railway freight?—No. We have not made.

Did you approach the Government with a request for help?—Yes, but we got no help.

You asked for help in the shape of Rs. 200 a month for an expert and nothing in the shape of a loan?—We asked for one thousand rupees as a loan. We neither got the two hundred rupees nor the money on loan.

WITNESS No. 60.

BABU MANMATHANATH BOSE, *Managing Agent, Bose Brothers, Limited, Muzaffarpur.*

Babu M. N. Bose.

WRITTEN EVIDENCE.

Q. 1.—I started my cutlery business in 1905 with only Rs. 8-8-0 in my pocket. Finding people unwilling to invest money in industries and business, I wanted to learn the reason thereof and so began working on my own account. I had this belief that when I succeeded in mastering the ins and outs of my business, when I learnt the technical and commercial side of the business I had taken in hand people would readily respond to my call. Moreover, I wanted to remove the stigma that attaches to the educated community that they are unwilling to take to business and that they are incapable of appreciating and understanding the value of "dignity of labour." I further wanted to carve out a path by following which a considerable number of the educated middle-class community would be able to earn their livelihood without serving another's will. So, to begin with I wanted to bear the burden of the work myself. Capital.

I had great difficulties in learning the methods of doing things. There being no institution in Bengal and Bihar where I could learn the making of the articles I wanted to deal in, I went on making experiments and reading books. Books on the subject I could not secure, so I went to this man and that and visited all the places in Bengal and Bihar where I could learn even by instalments and so in about three years I learnt what should not have taken more than six months. I now wanted men and money, specially the latter. Tools, plants and so forth. I had nothing. I could secure nothing. I bought 2 Ekka wheels and cut open my bedstead the tapes of which I turned into beltings and went on working as best as I could. The bedstead is gone. The frames still remain. Since then I have been sleeping on the floor. I still sleep on the floor of my room.

I made such tools and plants as I could make myself and bought some with what little I had and with some borrowed money I have not yet been able to pay. I was able to make very good articles and cheap as well. There was a good demand and a large market but I was unable to meet the demand and make an adequate supply. Some 7 or 8 years back, Dr. Denning, Superintendent of Industries, Government of Bengal, paid a visit to my factory. He said some of my articles would find a ready market in London and Paris. He told me, if I could make an adequate supply of those things he would like to be my London and Paris agent. No one even in his dreams can hope for a success better than this.

To meet the demand and increase the outturn money was wanted. My hopes of securing money, after I had learnt my work, were shattered. I found people quite unwilling to invest money in industries. My friends then advised me to turn my concern into a joint stock company with a nominal share capital of Rs. 20,000 at Rs. 10 a share. Many promised to purchase considerable number of shares. For my part I thought nobody would grudge purchasing one share for which he would have to pay only Rs. 10. Considering how successful the concern was, how nice the articles made by the factory considering this was the only factory of its kind in the whole province of Bihar and Orissa, coupled with the fact that I was the only B.A. in the whole province of Bihar and Orissa, as also in Bengal who had taken to industries as his profession, all these made me believe, that to whomever I might apply, he would buy at least one share. That I had only to apply and the shares would be in my pocket in less than a month. I was anxiously waiting for the registration of the company. I was sure of giving a dividend of Rs. 12 to Rs. 15 per cent. There was further the hope that I would be able to give the shareholders. I never expected they would purchase more than one share each—articles worth Rs. 10 the amount paid by each and every shareholder in 3 years or so. So that they would get back their money in that period. The articles I make, are a necessity to all from a prince to a peasant So nobody would have to take a thing he needed not.

Could I have secured the money, then, by this time, there would have been at least 1,000 men in my factory. I would have established no less than 3 different varieties of small industries on a firm footing and would have secured money and wages to hundreds of persons for generations to come. Vain hope. Vain delusion. I have been able to collect another in all about Rs. 4,000. As I received this sum in instalments, I have lost more than I have gained and it is with the greatest difficulty and by making great personal sacrifices that I have been keeping the money in tact. For this sum does not enable me even to pay the establishment charges. Disappointment has been my experience in my efforts to collect funds for industrial enterprises. As a last resource I have applied to the Commissioner of the Tirhut Division who is taking a keen interest in me and my business.

A most promising business managed with the greatest economy, tact and judgment, by an educated person of high moral character with technical and commercial skill of no mean order, has failed to secure the modest sum of Rs. 20,000. Unless the Government renders help, there is no hope of success.

Q. 2.—Whatever money I have secured I have received from educated persons.

Government assistance.

Q. 5(1)—Unconditional money grants I consider to be injurious in their effects. Whenever Government makes a grant a return, either in cash or kind, should be made.

(2) Bounties and subsidies are certainly a necessity within restricted areas. An example will clear my point. I met a gentleman who had bought a knife in America for Rs. 4 or so. The same thing sells here at about Rs. 1-8-0. This shows that the United States Government renders some such help to the industry in question as enables it to undersell in India the articles made here. In such cases bounties by Government should be given or taxes imposed on foreign bounty-fed articles to protect industries in India.

(3) Guarantied dividends would certainly make capital flow in industrial concerns and would be most appreciated by all who would like to be under the wing of the Government.

(4) Loans with or without interest to industrial concerns I do advocate. Advances should certainly be given, in cases where Government itself is the purchaser so that money paid in advance may be repaid in kind.

(5) The supply of machinery and plant on the hire purchase system, in case of small industries, is a necessity and would be highly appreciated. The help so rendered would be real and most beneficial if Government could see its way to take manufactured articles in return. Repayment in money by industrial concerns, specially such as are in their infancy is, in my opinion, a most difficult and inconvenient thing. It assumes quite a different aspect when money or machinery received one has to give articles it makes. Such a system would be very healthy in its effects. Government is a great and valuable customer. Moreover there are many semi-government bodies who also purchase every variety of articles that a country can make or produce. It should not be found difficult to come to an arrangement by which the Government by itself, as also through other bodies that are semi-government may purchase articles from industrial concerns.

(6) This is the only way in which I can and would ask the Government to pay money to an industrial concern. In fact considering the temper, habits and attitude of the people, the suspicion with which investments in industries are looked upon, the ignorance of the public in these matters, and the utter want of knowledge and experience of the technical and, commercial aspects of the industries in existence or proposed to be started, I think, that the provision by Government of part of the share capital of companies is necessary to restore public confidence and make capital flow into industrial concerns. I am further of opinion that help in this form would not only make capital flow rapidly into industrial concerns but the very fact of the Government being a shareholder would act as a deterrent on the would-be mischief maker and would have a very healthy effect on the whole nervous system as it were of the industry. I am sure in such cases failures would be few and far-between. The absolute dependence of the people on Government, their hopeless condition brought about by the peculiar circumstances of the country and the surroundings in which they live, their belief that they can do nothing unless and until helped by Government, their loss of self-confidence due to ignorance in general and ungodly education in particular all these causes have brought about a condition of things, in which unless Government lends a helping hand, in every case, like a friend in need, there is no hope.

Pioneer factories.

I have no experience of Government pioneer factories. In my opinion Government should not start pioneer factories. Government methods are certainly the best but they are too expensive. In the case of a small industries Government is sure to fail. Even in the case of large industries, I have doubts if Government would succeed. I do not think it is the proper function of Government to start factories. Government should help, encourage, foster, and nourish industries but to start industries is the concern of the people themselves. Where the spirit of enterprise is lacking as in Bihar, where people have not got the natural aptitude to do such things, the best way to inculcate that spirit and bring about a change is by helping the pioneers who have taken to industries and by making their concerns a real success If they are left to struggle by themselves, if they do not get the help they need and deserve, if they do not receive the guidance and support without which they cannot proceed, of what use will be the training, commercial and technical it is proposed to impart to the young men in the country? Pioneers run in advance of the times and deserve well of their country and Government. All the Government should do is to show the way to do a thing and suggest what to do. That can be done by demonstration factories. Not much harm is done if a private individual or company fails to do a thing. Another firm or individual may take up the thing. The failure in such cases is ascribed to incapacity. The failure of the Government would, however, prevent others from trying the thing as it would at once be taken for granted that the thing is impossible. The Government of Bengal did start such a business, I mean the fishery business. I do not know the details, but I know and I think rightly that large sums were spent for nothing. Such experiments should be left with private individual or firms. Government can and should render help, but should not try to do the thing itself. It will spend vast sums of money for nothing. In such enterprises Government cannot succeed. The expenses are bound to be very great in the case of Government and failure would, in my opinion, be the result. But experiments have to be made and in such cases Government should have to supply the funds but the work will be better done by private individuals or firms.

Co-operative societies.

Q. 12.—The handloom industry of the Bihar Sub-division of Patna District, the banian, lac, candle, comforter, money purse, and such like industries as are done with manual labour would be greatly benefitted by co-operative societies. In Bihar labour is cheaper than in other parts of India, climate naturally good, land fertile. Under the circumstances, co-operative societies, if started with the object of helping the abovenamed cottage industries, would, in my opinion, be of great use. These societies would greatly help in the formation and growth of the abovenamed industries and ultimately there would be a body of men with a full knowledge of the technical and commercial aspect of the abovenamed industries who would be of great use to capitalists willing to start large industries. The handloom industry of Bihar, as it now exists, is not capable of much expansion. The methods are crude and the articles they make not much in demand outside Bihar. But they may be made to learn better methods.

Government control.

Government should avoid exercising any control that may have the appearance of interference. Such action on the part of the Government would bring about stagnation and there would be no healthy growth.

I may here mention one fact which in my case has not had a very good effect. The law as regards auditing of accounts and keeping books, etc., of a joint stock company unless modified would bring about failures in the case of small concerns. The requirements of law are a great hardship to small concerns and will prevent their growth and development if not modified.

Training of labour.

Good and skilful artisans have become a necessity everywhere and their want is generally felt. To make articles of every day use, such as we generally import, we do not get a sufficient number of trained hands. Even for general all round work the carpenters and blacksmiths do not show much skill, e.g., Chinese carpenters have replaced the native workmen wherever they have made their appearance. The carpenters and blacksmiths learn their trade themselves and their methods are generally crude.

Apprenticeship system and industrial schools.

The carpenters and blacksmiths, I mean such as are by caste followers of the above professions, are certainly not what one wants. In order to have a better class of artisans, regular training schools should be started in every large town. Where industrial concern exists or are going to be started, such schools and factories should work hand in hand for mutual benefit. In such cases greater attention should be paid to such education as may enable the workmen and students to get employment in the industrial concerns with which the schools may happen to be attached.

The higher sections of those schools should give education in practical science and chemistry and herein the existing colleges, I mean such departments of those institutions as teach science and chemistry, and the technical institutions may work hand in hand, one section undertaking to teach the theoretical part and the other the practical and commercial part. Students who pass from those higher sections may serve as apprentices in such industrial concerns as will give them employment. After they acquire sufficient knowledge of their subjects, they may be engaged by research institutes. After they acquire a knowledge of the raw materials and their whereabouts, the local conditions of the industries they were apprenticed in, and the ways and methods of making those things which they have studied, it would then be wise to send them to foreign countries. The system at present in vogue is, in my opinion, useless. None of the gentlemen who have come from foreign lands after learning some of the arts and industries, have so far as I know, come out successful in the proper sense of the term.

Technological institutions.

In the higher departments of technical and technological institutions, arrangements should be made so that the scientists and chemists of the universities and the country may impart such education as the students may need of them. At present students and persons placed as I am, can derive no benefit from their learning. Very little help from them would go to show us easily and in no time what it would take us years of study and trouble to learn. There is no means at present, whereby the country may turn into pennies and pounds the knowledge and experience of the chemists and scientists of the universities.

These institutions should also serve the purpose of permanent industrial exhibitions where samples of foreign made things should be placed side by side with those made here. The prices at which they are bought, the expense incurred in bringing them and the quantities imported should also be stated.

Trade representatives.

Apprentices educated in this way should be appointed as trade representatives in different provinces of India. When they learn all that is to be learnt in this way, when they acquire a thorough knowledge of the commercial aspects of industries and trade and the technical side of some of the industries, it would then be time to appoint them and send them as trade representatives to foreign countries. The task of training belongs to Government.

Artisans, apprentices, managers, chemists, scientists, mechanics all should receive education and it is the Government who has to look to their education.

The technical and technological institutes, I have above spoken of, if properly conducted and managed would, in course of time, be a great source of income to the Government, *e.g.*, suppose there are 500 students in a school. Government will have to bear initial expenses of training this number. But once industrial schools are started, when students begin to come in numbers just as they are now doing in the present educational institutions, they would certainly have to pay their fees. Moreover, every student will do some work which would have a money value and so will be a source of income to the Government. If properly taken advantage of this income will assume large proportions and will greatly help the Government in general and industrialist in particular.

Exhibition,

The industrial exhibitions such as are now and then held in different parts of India are useless if by such exhibitions the promoters thereof think they would help the industrial regeneration of the country. They are "tamashas" and are looked upon as such. I consider them as sheer waste of money. I do not think Government should hold or encourage such exhibitions. Government may treat such exhibitions just as it treats a bioscope company.

Government patronage.

(1) Government should publish lists of articles it wants to purchase whether country-made or foreign; (2) exhibit them in commercial museums; (3 state the quantities required to be purchased; (4) the prices to be paid; and supply such other information as may be thought necessary.

The present rules are a hide and seek affair. I once went to nickelling factory situated close to Messrs. Whiteaway Laidlaw & Co.'s buildings. I saw large quantities of German-made scissors of which the marks were being ground off so that they might pass as country-made scissors. On enquiry I learned that the scissors belonged to a contractor who was supplying the same to the Government of India and in order to pass them off as country-made he had recourse to this grinding process. I could have given better scissors at a cheaper rate but who cares to purchase them. Certainly not the officers of the purchasing department. A rule should be made to purchase country-made things from the manufacturers themselves.

I understand Government is purchasing large quantities of table knives at Rs. 4-8-0 per dozen. I saw some at Alipore in the Army Clothing Stores. I can supply them at Re. 3 a dozen. But nobody would tell me to whom send the samples. I sent a sample to Shajahanpur, but the Director has returned the sample saying it is not his department that makes the purchase. He does not say to which department I have to apply. Government stores instead of being purchased by one department of the Government of India should be purchased by provincial Governments and if possible from their respective provinces, and direct from the manufactures. There is a rule to the effect that price and quality remaining the same preference should be given to country-made products. Semi-Government bodies never follow this rule. Instead, they purchase foreign-made articles even at a great cost. There is none to see if the Government circular is obeyed.

Training of labour and supervision.

I have been engaged in cutlery business, comb-making, brush-making and so forth for the last 12 years or so. I have taught my men myself. Government has done nothing to improve the labourers' efficiency and skill. Government has never purchased any article from me, nor helped me in any way. I have had to do every thing myself, bear the expenses and all the troubles. Mine is rather a technical school than an industrial concern. It cannot be a success in the proper sense of the term without Government help. I know of only one industrial school the Guer Technical School of Muzaffarpur. The school was placed under the control of the Education Department and of those who were innocent of all knowledge of industries and technical subjects. At least they never evinced the least interest in the concern, I mean the firm who took the charge of instructing the students. The result has been an utter failure. I had written to the supervising officer, indicating the lines of action I wanted to follow if it were placed under my control. I received no answer. Had it been placed under my control, I would have, by this time, trained at least 200 hands whom I would have given employment in my own factory. I doubt if the firm above mentioned has been able to train even half a dozen men. Industrial schools should never be placed under the control of the Education Department.

Railway freights.

The freights charged by Railway companies are felt a bit hard by small concerns like mine. In my case I have found the rates excessive and on many occasions they have acted as a deterrent in selling my articles.

Provincial organization.

The establishment of a Board of Industries with funds and executive powers as well as a Director of Industries are recommended for the development of industries. The Director of Industries must be a man with a full knowledge of business and trade in general. He should have further a knowledge of at least one technical subject, e.g., match-making, glass making or allied subjects. Whether he is a non-official or official, it does not matter much provided he is an able man. The Director of Industries should be the President of the Board.

College of commerce.

If a college of commerce is badly needed anywhere it is in Bihar. Libraries of technical, experimental and scientific books are most urgently needed. The college would supply all sorts of necessary information to the public. In fact such colleges would train the public mind and prepare them for taking to industries and business. In theory they would do everything that in practice the industrial concerns and tradesmen perform. They would show the path for the young men to follow.

General.

For the success of my concern I want a large number of trained hands some 4,000 hands immediately. Large orders are lying unexecuted for want of men and money. I know how to make them but I cannot increase the outturn for the reasons abovementioned. If the industrial school here is placed under my control and the money grant increased, I may get a sufficient number of skilled artisans in a short time. If the local boards contribute their mite towards the training of workmen and apprentices it would be a real help. But the chief difficulty is that of funds which must be supplied without delay either by the Government or local boards.

Horn, bone and animal hair can be found in large quantities in this part of the country which may be utilized in making articles like buttons, combs and brushes and so forth. I know many of the arts and if funds are forthcoming, I can undertake the training of persons for the above works and start manufacturing concerns as well.

Dairies have become a crying necessity and since the people do not show any inclination to start them, I would advise the Government to do it on a large scale.

Witness did not give oral evidence.

WITNESS No. 61.

MR. CHARLES STILL, C.I.E., *Sathi Indigo Concern Champaran, Bihar.*

Mr. Charles Still.

WRITTEN EVIDENCE.

The part of India with which I have been connected for many years, *i. e.*, Champaran may be said to be entirely agricultural, unless Indigo manufacture may be classed as industrial. Agriculture and many industries are, however, closely connected, and it has always seemed to me that Government might well assist agriculture in many ways. The condition of

the ryots does not seem to have been perfectly understood. There are two distinct classes of ryots in each village, (1) a small percentage, say 5 to 6 per cent. of well-to-do ryots and money-lenders, (2) 95 or 94 per cent. of poor ryots. The interests of these two classes are exactly opposed. No. 1 class feeds on and eventually swallows up no. 2 class, by lending money at very high interest to these poorer brethren on mortgages and usufructuary mortgages. The mere fact of ryots being allowed to mortgage these holdings accounts for the so-called poverty of ryots. I think that there should be banks established and supported by Government, through which ryots could be assisted at fair rates of interest. Co-operative banks have, I know, been started, but are they in a strong enough position assist to the agricultural community? Banks could also assist under expert advice, industries which might be started and which at present are not started for want perhaps of little assistance.

I was interested in an oil mill in 1904 to 1907 in Saran. It was a castor oil mill, and as planters, we had not much experience of course. We found difficulty in disposing of the oil, and at first even of disposing of the cake; however, we failed because we had no means of obtaining cash at fair interest, to enable us to purchase castor seed in season in sufficient quantity to allow us to work through the year. We had to go to native bankers, which only hastened the closing up of the works. This is a case of a really good industry failing for want of assistance in disposing of the oil and the serious loss of one of the very best manures (oil cake) for any crops. Now-a-days there would be no difficulty in disposing of any quantity of cake made, in fact it would be impossible to make enough. Oil mills, if established, must of course be situated in the seed-growing districts; whether castor, rape or linseed. I have always understood that a large percentage of oil seeds leaves India in the raw state; that castor seed, for instance, is taken in large quantities to Marseilles and there converted into oil and cake. This does not seem to be right.

When the Pusa Agricultural College was opened, many planters were there, and I remember our agreeing, that we could not see how an institution of that kind was going to help agriculture generally or how could it possibly help the ryots?

With lands worked perhaps, for a thousand years, the soil of which has never been cultivated or moved beyond say 5 inches deep in all those years, what could be done to make a lasting improvement in cultivation? (I am writing of the districts of which I have experience only.) Surely, the great need to improve outturn of crops must, in the first place, at any rate, be manure. The natives have no manure of any kind, the small quantity available being cattle manure. I say small quantity, because what should be used as manure is used for fuel; and as there is no other fuel available, it has to be so used. From experiments made by myself on my own lands, I have not succeeded in getting any good results from any kind of manure except oil cake and that is without doubt a most excellent manure.

Indigo planters have turned their attention in other directions, such as sugar manufacture, and some rice mills have been started, but so far I have not heard of oil mills being started. There must be a reason for this. The raw material is available, so I should say the difficulty is, the sale of the oil and need of capital to purchase seed in season in large enough quantities. It seems to me that a good deal might be done towards introducing oil mills where seed is grown.

Where industries are started, greater facilities for banking transactions are required. Take, for instance, a sugar mill in Champaran, the mill banking account is in Calcutta (there being no country branches), the Managers require cash in silver to give out advances or to pay for the cane and run the mill. He has to get up notes from Calcutta, and get them exchanged for silver as best he can or he writes to his neighbours to ask if they can cash a cheque for him or again, if one has silver and wishes to bank it in Calcutta, the only way at present that it can be remitted is through the Treasury, which will not issue a Treasury note for less than Rs. 10,000 at a charge of Rs. 2-8 per Rs. 1,000. The purchaser of the Treasury note has to take his chance of having perhaps 3 per cent. or 4 per cent. of the rupees cut as light or false coins. It is natural that these banking transactions are very serious questions and prejudicial to any profits that may be made in any industry.

There are many planters who have closed the manufacture of indigo, who, I should say, would be only too pleased to assist Government, the ryots and themselves at the same time, in opening out industries; and no better class of men could be found to demonstrate any improvement.

Planters are already domiciled, they know all the conditions of the country round, know what raw material is available, have in many cases machinery lying idle and buildings ready. If there seems to be a lack of initiatives the reason is, in the first place, want of the mercantile knowledge in disposing of their goods; secondly, want of financial assistance; and thirdly want of banking facilities.

(*Witness did not give oral evidence.*)

WITNESS No. 62.

MR. A. C. AMMON, *Belwa Factory, Anvolwa P. O., Champaran.*

WRITTEN EVIDENCE.

Development of bone mills in North Bihar.

The tract of country in North Champaran, about one thousand square miles in area, and extending from the Nepal frontier on the east and north to the boundary of the Gorakhpore District on the west abounds in pasture land and is annually visited for nine months in each year by large herds of cattle from South Champaran, Gorakhpore and other places for the purpose of grazing. This tract of country is strewn with the bones of cattle and must furnish presumably for all time to come as it has done from time immemorial an abundant and constant supply of bones suitable for manuring purposes. Bone mills.

Bone manure is generally used in one of two forms, namely, bone meal or bone superphosphate. The meal is made by grinding bone to a fine meal and the superphosphate by dissolving bones in sulphuric acid. Bone meal takes a long time to rot and be converted into the necessary plant food in the soil, while dissolved bones are readily available as superphosphates and are therefore more in demand than bone meal. But the cost of sulphuric acid is so high in India that bone manure in the superphosphate form is not likely to pay unless sulphuric acid can be bought at from ½ annas to ¾ anna per pound pure or unless some cheaper substitutes for dissolving bones can be found by chemical experiment. Bone meal.

Mr. Mollison has observed that the advantages of bone meal manure are the small cost of cartage and labour in collecting bones through the raiyats and of grinding them into powder, and that by the simple process of fermentation the bones might be made more soluble and therefore more quick in action than in their natural condition.

Bone meal has been found specially useful with sugarcane and to some extent is used with both tea and coffee. It is also used by the Khasi cultivators for their paddy crop and a bone crushing mill has been set up at Shillong which in spite of the elevation of 6,000 feet requiring much more power in an oil engine (owing to decreased atmospheric pressure) than would be needed in the plains, is yet able to supply bone meal at a lower price than it cost when imported from Calcutta at over Rs. 5 per maund.

It is hardly necessary to indicate that the largest consumers of bone meal in Champaran and throughout Bihar would be the indigo and sugarcane concerns, and that the cultivators would also utilise it for their paddy and other cereal crops though there might be some amount of Hindu scruples to be overcome at the outset through which tact and example on the part of the planters would win a way eventually.

A rough estimate for the plant of a bone mill in North Bihar would be as follows:—

	Rs.
Oil engine of any good make, 12 B. H. P. ... ... about	2,500
Christy and Norris Disintegrator, No. 1½	360
Counter shaft, belting, etc.	250
Fitting and fixing tools and accessories	400
Total ...	3,510

To this must be added the cost of a building which need not be elaborate and ought not to exceed Rs. 6,000. An output of 5 maunds per hour would amply suffice for the experimental stage of the industry and would amply justify the outlay.

While I have indicated that the cost of sulphuric acid in India is deterrent to the manufacture of superphosphates I would point out that the Ganges Bone Mill near Calcutta are able to buy up the bones in these districts, rail them down to Calcutta where they are treated with sulphuric acid and yet make a large profit. It therefore stands to reason that superphosphates can be made at a considerably lesser cost in Champaran where bones should be had merely for the cost of collection and cartage.

My suggestion is that Government should erect a large central bone mill on the railway line between Bagaha and Narkatiaganj, with the primary object of manufacturing bone meal with a bone crushing mill and also to experiment in the manufacture of superphosphates so as to reduce the cost of production to a figure which will place it within the reach of the cultivating classes, who would probably have less prejudice to it than they might have to bone meal.

The most potent factor in the elimination of the prejudice must undoubtedly be the utility to country crops of bone manure and I can say that bone meal used for mustard has in some instances doubled the crop and never failed to increase it.

The supply of bone is retarded by the fact that the bulk, if not the whole, of the bone bearing tract in North Champaran to which I have referred has its proprietary rights vested in the Maharani of Bettiah whose estate is administered by the Court of Wards, and the Ramnagar Raj, and therefore my suggestion that Government should start the first bone mill factory which would not be hindered by any opposition placed in the way. Retardation of bone supply.

(*Witness did not give oral evidence.*)

Witness No. 63.

Hon'ble Mr. D. J. Reid, *Belsand Concern, Bihar, representing the Bihar Planters' Indigo Association.*

Written Evidence.

Financial aid.

The rather exceptional financial conditions under which indigo is manufactured constitute a heavy handicap to the industry. The working year of an indigo factory commences from September or October when the lands are prepared for sowings. The dye is extracted from the plant from June to September, but is not fit for marketing before November or December, and may not be sold before the following February or March, or even later. Some of the heaviest expenditure is incurred during the early part of the season, which expenditure may not be refunded for a period that may extend to eighteen months or even longer. For these reasons it is important that money for financing the indigo industry should be obtained at the lowest interest possible. Calcutta banking houses usually refuse to advance money on an indigo crop until the dye is actually manufactured, without a substantial collateral security. Most indigo factories have valuable assets in landed property and also moneys lent on mortgage to local landlords. Calcutta houses, however, are adverse from accepting such assets as collateral security, as they have no means of ascertaining their values.

If an Agricultural Bank was instituted in Bihar for the purpose of financing indigo factories, it would be in a position to deal with such securities, and accept them as collateral when advancing money on an indigo crop.

Technical aid.

With the assistance of a grant from Government the Bihar Planters' Association carried on research in indigo from 1898 to 1912. Results, however, have not been up to expectations. With reference to the research into the methods of extracting the dye from the plant, it is probable that a mistake was made in trying to effect too quick results by inventing new processes for increasing the yield of the dye on the trial and error system; instead of pursuing a methodical research into the established methods of manufacture, so as to gain a complete knowledge of the chemical actions during the process, and afterwards building up new ideas on the knowledge acquired.

It is also a fact that the method employed by Mr. Rawson for determining the amount of indican contained in the plant gave different results from the method employed by Mr. Bloxam. It is to be regretted that this all-important point has never yet been decided, as with any uncertainty in the efficiency of the tests employed, it is impossible to carry out research into the methods of indigo extraction.

With reference to the botanical side of research this was not taken up until 1907. Messrs. Bergtheil and Parnell took up the line of increasing the indican content of the leaf by plant selection, and the results obtained were decidedly promising. In 1912, however, the work was made over to the Imperial Economic Botanist at Pusa who abandoned this line of research, and so far it cannot be said that any further advance has been made on the botanical side. It would be of great benefit to the industry if a demonstration factory with an efficient staff to carry on research work was instituted in Bihar, as the present methods of carrying on research under garden conditions are most unsatisfactory.

That there are great possibilities for the industry in the cultivation of the Java plant is proved by the very heavy yields which some factories have obtained from this plant. Unfortunately various difficulties have arisen in connection with its cultivation, and it is obvious that the methods most suitable to Bihar have yet to be discovered. There are also many problems connected with the extraction of the dye from the plant which yet remain unsolved. With regard to the botanical side the researches of Messrs. Bergtheil and Parnell gave every promise that in time a plant might have been produced containing 40 per cent. more Indican than the present variety.

Despite the fact that indigo prices have depreciated nearly 100 per cent. many factories in Bihar managed to still turn out a certain quantity of indigo at a profit. This has been made possible by a more economical method of working due to the rotation of other crops with indigo. It is possible therefore that if some of the present problems could be solved indigo in Bihar could compete with the synthetic article on equal terms.

Assistance in marketing. Pooling.

With reference to the marketing of indigo it would probably be of advantage if the entire outturn could be pooled and sold direct to the consumer. If a standardized paste can be introduced, pooling should present no difficulties. With cake indigo however, the position is different. The chief difficulty is the basis on which a pool could be formed, as it is a fact that indigo is not sold absolutely on the basis of its indigotin content. There is also the fact that a very large amount of cake indigo is made by small Indian producers who would be difficult to bring into the pool. It might however be possible to form a pool for Bihar indigo with several sub-pools for the varying qualities.

Cess.

If a pool for the selling of indigo was formed it would probably be advantageous for Government to institute a small cess on all indigo exported to be devoted to the pushing of the sale of indigo. The proceeds from the cess to be controlled by the directors of the Pool.

Government preference.

It would be of benefit to the industry if the Government would lay down that wherever possible preference should be given to articles produced within the British Empire by the different Government departments and also cause a list of imported articles used by these departments to be published.

Land policy.

The indigo industry in Bihar is at present greatly hampered by some of the sections of the Bengal Tenancy Act. Under this Act, if land is leased out to cultivators of the class known as "settled raiyats" they immediately acquire a right of occupancy to such land and cannot subsequently be ejected. Indigo factories hold large areas of land which they cultivate with indigo. It is an established fact that it is not profitable to sow indigo in the same fields for several years in succession, but that the most advantageous system is to rotate the indigo with other crops. Not only does the indigo benefit, but very heavy crops of cereals and tobacco can be obtained after indigo. Owing to shortage of labour and other circumstances, it is not always possible for an indigo factory to cultivate other crops as well as indigo to any very large extent and rotation can only be secured by leasing out the lands to cultivators. With the possibility before it of losing possession of the lands, an indigo factory is very adverse from leasing its lands to cultivators. This therefore results in a large amount of land which might be utilized in growing cereals, and other crops being left fallow. The Bengal Tenancy Act should certainly be amended on this point to enable indigo lands to be leased out to cultivators for short periods in rotation with indigo.

Oral evidence, 24th November 1916.

President.— I understand that you are the President of the Bihar Planters' Association this year?—Yes.

Is that office ordinarily held for a year?—It is held for a year, I really am Chairman of the Directors.

You have care of general planting industries in the district?—Yes.

You would like, I suppose, to concentrate your evidence on the question of indigo?—Absolutely; I know nothing about sugar.

I suppose that you appreciate the fact that on a two or three days' visit it is not likely that half a dozen amateurs will form a sufficiently comprehensive idea of the indigo industry to enable them to advise people who are already experienced. What we want to do is to get a sufficient view of the industry to enable us to formulate proposals for organizing in such a way that either the Government will help you, or you will be able to help yourselves. One of the things, above all, that we want to know is, what, in your view of the situation, is the prospect of the indigo industry. I am asking the question because some people here say that the industry has a two years' life at the outside, while others think that it is capable of being aided in such a way that it will be able to face synthetic indigo in due course. Our action will depend on the view we take of this matter. If there is any reasonable assurance that natural indigo will be able to face synthetic indigo in the open market, it is obviously desirable that we should sit down and consider means for preparing our defences; but if, whatever we do, the problem is a hopeless one, there is not much use in spending public money and encouraging you to spend your money also. Are you in any position to give a definite answer to a question of that sort?—Certainly I am in a position to give you a very definite answer.

What is your view of the situation?—My view of the situation, and I am talking from my own experience of growing Java indigo on a very large scale, is that the more I know of Java indigo the more I am impressed with its possibilities. As regards my own factories, we can make indigo at a price, with which I am certain, no synthetic product can compete, I dare say you will hardly believe it if I told you what it cost me to make indigo during the past twelve years. I have had a very large and varied experience of Java indigo. I have got here a list of the outturns per acre from Java indigo. They average 16 seers in one factory and 14 in another, and they include one very bad wilty year, and one in which there was a very bad hail storm. From these figures, which I have obtained for a very large cultivation, for a period of over 10 years in one factory and 12 in another, I can say with great confidence that I could put out Java indigo to compete with any other. Naturally we would have to take natural indigo at the same price as synthetic, unit per unit.

The following are my figures for the Belsand Concern:—

1905	...	...	18 seers per acre.
1906	...	...	12 seers „ „

(Witness here handed in the tabular statement from which he was reading.)

APPROXIMATE YIELDS PER ACRE FOR JAVA INDIGO.

BELSAND FACTORY, MUZAFFARPUR DISTRICT.

Year.	Acres.	Yields per Acre.		Remarks.
		Seers.	Chitaks.	
1	2	3	4	5
1905	29	18	10	
1906	253	12	7	Second cuttings flooded.
1907	586	24	5	
1908	1,170	21	0	
1909	1,369	5	9	Crop enormously damaged by hail very exceptional.
1910	626	14	8	
1911	978	10	4	Bad wilt year.
1912	690	12	8	*Ditto.*
1913	622	3	5	Very early and heavy floods.
1914	200	11	0	
1915	434	12	1	Second cuttings flooded.
1916	400	20	0	

BAGWANPUR FACTORY, MUZAFFARPUR DISTRICT.

1907	117	33	8	
1908	795	21	6	Want of water for manufacture interfered with second cuttings.
1909	825	6	8	Record hailstorm.
1910	719	11	6	
1911	837	17	1	
1912	620	10	14	Wilt very bad.
1913	670	6	10	Bad floods very early.
1914	493	21	9	
1915	452	11	8	Second cuttings flooded.
1916	470	20	3	

Belsand Factory average yield per acre for 12 years is seers 13, chitaks 13.

Bhagwanpur Factory average yield per acre, for 10 years is seers 16, chitak 1.

Average Behar yield for Sumatrana is about 8 seers per acre.

In 1914, 1915 and 1916 a much larger area was sown with Java than actually shown, but owing to the fact that Sumatrana was also sown, the figures given are for that area which was manufactured separately from the Sumatrana.

Continuing, witness said :—

The average is 13·3 for one factory and 16·1 for the other per acre, but as I say they include two very bad wilty years, in one of which the crop was absolutely wiped out by hail. The hail year might be excluded, as I have never known such a thing to happen before in my 25 years of planting. The nett result of the consideration of these figures is that there is no need to hesitate over this matter. You consider that the possibilites of natural indigo are such that we are justified in going ahead in consolidating the position and improving it. I have absolutely no hesitation on that point.

Will you tell us if these are the principal things that we ought to consider; first, improvement in the breed of the plant that is grown?—I hold a very strong opinion on that Messrs. Bergtheil and Parnell were put on to this work by the Association, as I have mentioned in my written evidence, and Mr. Parnell discovered that our present indigotin values vary to an enormous extent; some plants have practically no indican and others having very high indican. The experimenters were hampered by very adverse circumstances, floods, wilt, etc. They

lost a large number (of control plants) but they got good indications that a high indican content was hereditary in the varieties they separated. About 1912 the Behar Planters' Association was in a very bad financial way and, as we could not carry on research work, we approached the Imperial Government, asking them to take it over. As Chairman of the Directors I went to Mr. B. Coventry, pointed out the very promising results which Messrs. Bergtheil and Parnell had already got, and assured him that we considered that these results gave at any rate a very promising outlook. They showed that we could at least improve our yield per acre by 40 per cent. or even larger than that, and I hold that even with the figures given you I can put out indigo at a very low price. If you can put on 40 per cent. to those figures, the industry will be in a very sound condition indeed.

So that on the score of plant breeding alone, there is sufficient evidence?—There is also the point of the supply of seed.

That comes to the second point, organization of methods for producing seed?—I would not put it on that line. The importance of it is this at present and our seed rate per acre all along has been about 100 per cent. lower than it ought to be. On account of the scarcity of seed in every Java crop you will see that fully 25 per cent. of the land is empty, the crop is patchy. This alone would put another 10 per cent. on the yields.

It has been suggested that there should be some farm for the purpose of growing the seed. Have you got any proposal of that kind?—I have a proposal, but do not believe that seed will be successfully grown in Bihar.

The farm need not be in Bihar, but in some other suitable locality?—Outside Bihar it might be grown.

Someone has tried the Ranchi District?—I know nothing about Ranchi. It was at Cawnpore where I started a farm of about 50 acres. I sent up an assistant to show the man how to sow the seed and start the Farm. I have sent seed to the Kumaon Hills and to Jalpaiguri. I do not believe Cawnpore very suitable, however, on account of frosts.

You think there is room for the investigation of this question,—where this seed should be sown, and what organization is necessary for the production of a cheap supply. What would you suggest in addition to the efforts you have made on your own account? We want something done on a more systematic scale. Whose business would it be to tackle this problem?—I should think the Provincial Agricultural Department should be asked. We supplied them with seed to make experiments in certain localities. I suggest Messrs. McKenna and Parnell.

In this case you are getting beyond your own province, and I suppose you will have to deal with the Agricultural Advisor to the Government of India?—Yes.

Somebody must be responsible for organizing this work?—I think the Imperial Agricultural Advisor would be the man, as the quickest way of doing it.

What staff would you want to work out this problem?—I really never considered that point, and I could not answer it right off. I should call for opinions from the various provinces, and I am certain that we could get many factories in Bihar to contract to take Java seeds at very remunerative rates. We are very willing to make contracts. My own experience is that hundreds of men wanted to come in with me. With regard to my seed farm at Cawnpore, I took one man, but I had applications from every factory in Bihar to come in.

It is just possible that we shall be able to formulate some organization that will tackle the whole indigo trouble from a different point of view, if we are convinced that the industry is one worth taking up seriously. There is the question of improvements in cultivation with regard to the physical conditions of the soil and also to the question of the supply of fertilisers. Do you think these two problems are being tackled now efficiently?—I regret to say that I hold distinctly contrary views to Mr. Howard's work in this respect. I do not consider that Mr. Howard has made any progress whatever since he undertook research work in indigo. Mr. Davis has lately come out and he has suggested phosphates. I cannot give any opinion on them, not having yet had time to test them. We are testing them however. In one plot we have distinct indications that phosphates are doing good.

In remedying the wilt disease?—There is no wilt disease this year, except in spare plots. You never get wilt in the young plant until it reaches the woody stage. It is too early to express any opinion as to the effect of phosphates on wilt.

We have a series of results indicating as the cause of wilting, on the one hand the physical condition of the soil (what has been locally spoken of as water-logging), and on the other hand the deficiency of phosphates. Each of these has been given as, so far as I can make out, the only cause of the origin of this disease. It is just possible that both are

contributory causes. We want to know if the two parties can be brought together in such a way that we can discover the real truth, and therefore what to do in practice to tackle this problem. In respect of the water-logging theory, I may read you extracts of letters from my copy books regarding Java indigo and wilt.

I understand that you have fairly fixed ideas on this question... (question interrupted) ?—I regard water-logging as absolutely out of court.

There is no use in making researches in any line that we know to be futile. If you will give us your point of view I have no doubt we shall, during the course of the day, get other points of view presented to us, and possibly think of some plan by which these two opposite views can be brought together?—I want to read you extracts of letters written before this controversy arose. I started Java indigo in 1905 which was a year of extraordinarily heavy rainfall, the total being 70 inches against 40 of the previous year. In July there were 18 inches, and in August 25 inches. Practically there was rain every day which is more than double the actual normal. The following are my letters on the subject of Java indigo which we sowed that year. (The witness here read several letters addressed to Messrs. Begg, Dunlop & Co., describing how the plants after standing in water for some little time began to sprout afresh, and how the excessive rain had no bad effect on the produce; in fact the produce was found to be better.) Commenting on the above, witness stated:—In regard to this Mr. Howard positively lays down that water-logging immediately stops the manufacture of indican.

I understand that there is a difference between submersion and water-logging. When you have heavy rain, the rain for the time being carries down a good deal of oxygen, but if it remains for a long period in water, then decomposition sets in, with the growth of anærobic bacteria. The point is, was the land under water for a long period, say, longer than a fortnight or was it well drained?—There was no drainage; I go in for no drainage. However, I think I will be slightly more convincing in my next report. 1912 was the very worst year of wilt I have ever had.

Is it not true that some varieties of these indigo plants have deep roots and others have shallow roots?—Mr. Howard's theory is that shallow rooted plants (not liable to wilt) flower in September and for some reason or other fail to set seed and have been gradually eliminated from our crop on this account. Only the deep rooted plants liable to wilt here survived. Hence the increase of wilt. I can, however, show that all our plants this year at Belsand flowered in September. Therefore, Mr. Howard's statement that this variety of plants has been eliminated is not true.

I was referring to the fact that shallow-rooted plants will stand more water-logging than deep rooted plants? All my evidence goes to show that Java indigo is absolutely impervious to rainfall and waterlogging. It does not affect it in the slightest.

The varieties are different, I think?—I do not know what Mr. Howard is aiming at. It is a very difficult question to decide because one plant may be shallow rooted because it happens to strike on a harder bit of soil.

Will you give us the additional evidence?—I may remark that in 1911 we had a bad attack of wilt. I was rather wondering whether the wilt was due to water-logging, so in 1912 I caused a record of sunshine and rain to be kept. In 1912 we had a very bad attack of wilt and it was a year of absolute drought. In the first year our rainfall was 70 inches: in this particular year at the end of September it was 38 inches only; and the rainfall was so distributed that there was no possibility of water-logging. The rainfall in July was 11 inches, August 6 inches and September 8 inches. It was all well distributed. With reference to this year I should like to read you a few extracts from my press copy books. These letters were signed by my manager, Mr. Lydiard. (Witness here read extracts of several letters describing the alarming increase of wilt due to a poor rainfall.)

That is all very much to the point. What is your experience on the other hand in regard to phosphatic fertilisers?—I have tried them some years ago. If you get heavy fall of rain it is likely to wash them out. I tried them one year before the rains for wheat. I cannot give you my experience.

You have no positive evidence?—No, the only evidence I can give you is ocular demonstration.

I find that a knowledge of phosphates seems to have existed since 1901 when you had the Indigo Research Syndicate. Why has not anything been done since then to test the value of phosphates?—Java indigo was introduced into Bihar in 1905, and gave very good yields. Everybody thought "Now we have got a plant that we can go ahead with." Then this wilt appeared and the yield fell off 100 per cent Many got disgusted with the whole thing and went into sugar and decreased their cultivation of indigo very largely. I do not remember any reference to phophates at that time.

This matter has not been followed up by the planters?—No, it has not been followed up to any great extent by the planters.

Some time ago there was an Indigo Manure Supply Company. What were they supplying?—I think Mr. Coventry knows full details. I am afraid I do not know the details. I have no information on the subject of phosphates myself.

Have you put into practical use the discoveries made by Mr. Hutchinson regarding the bacteriological effect that is obtained during the manufacture of indigo?—That is too much in its infancy. When we start manufacture the first day's produce is always miserably poor and have found that by not washing the vat the first three days the produce goes up much quicker. It is a mistake to wash your vats.

That is obvious. Mr. Hutchinson explains that, and therefore he thinks that by inoculating your vats at once, you might be able not only to produce more indigo but to produce a uniform grade?—Yes.

You have not made any experiments?—It is too technical. I have no knowledge of chemistry.

The whole of this work by Messrs. Bergthiel and Bloxam, was it from the point of view only of chemistry?—I do not think they tackled it from the bacteriological side. They left the steeping vat entirely alone, although Bergthiel went into the proper hours of steeping.

They did not actually do any bacteriological research; if so the work was still empirical?—Not as far as I know. It was empirical.

The results obtained by Mr. Davis are too new to have any opinion about, but you have had something to do with the paste?—I made the paste with Mr. Davis.

And you agree with Mr. Davis in looking forward with hope to it being a success?—I think so; the only question of doubt in my mind is as regards freight. It would probably be cheaper to send indigo home as 65 per cent. cake and make it into paste in England. There is also the cost of packing and such expenses. But you might get a smoother paste by making it at the factory instead of grinding cake. All eastern markets preferably take cake.

Is there not an obvious advantage in having a market dealing in one kind of article?—There would be an enormous advantage in that.

You have not been able to form a mental estimate, sufficiently precise, to tell us whether the paste proposed would be commercially remunerative?—I think it would be commercially remunerative. From the information I have gathered, it would be very expensive to crush cake and make it into paste at home. Dyers would take cake if uniform, just as soon as they would take paste. The point is that they can not get uniform cake; they do not know what they are buying in cake.

Is there any hope of producing cake of uniform quality?—No, I think cake of uniform quality would be difficult to produce; it would be almost impossible without a chemist at the factory. The only question that is troubling me is the relative cost of freighte. There is no doubt you can make paste out here.

I suppose this question will never be settled until we have an estimate from home of the value of the paste sent home now?—Exactly. Find out what it costs to make paste at home and compare it with what it costs to make paste in a factory.

Have you any way by which you could estimate the quantity of superphosphates that would be taken in this area, supposing that a proposal was made to put up superphosphates factories or establish sulphuric acid factories, with a view to making superphosphates? Could your Planters' Association give us any idea as to the quantity that could be absorbed?—We could certainly give you an idea.

To what extent could you give a guarantee?—That would be a very difficult thing. It is not easy to say how many men would come in and give a guarantee.

There is no necessity for waiting for Government action in this matter if you can give a guarantee?—If the advantages of superphosphates were proved thoroughly I should think a factory might be established. I don't know what it would cost.

If you can give us an idea of the quantity that would be absorbed, we could give you those figures as to cost?—I am afraid I could not give you an answer to that question

Have you got any proposal to make regarding financing of industries?—There is a suggestion of a local bank?—In my written evidence I gave my suggestions and pointed out my reasons. No firm will advance on an indigo crop without collateral security, and most factories have substantial assets in landed property, and also moneys lent on mortgage to local landlords.

Do you want the Government to start an Agricultural Bank ?—I presume Government would have to assist in starting it.

Is not your Planters' Association sufficiently powerful to form a financial association of the kind itself, not only for indigo but for other crops?—Not at present, until they regain more confidence in indigo and in sugarcane. Once confidence is restored there will be some hope.

Is it fair to assume that they have had a bit of a shock and are rather distrustful of the future ?—They had a bad shock some years ago which they are gradually recovering from. That really is at the bottom of the whole thing.

Does the same difficulty arise not only with regard to finance, but with regard to other matters like organization for research work and the organizing of superphosphate manufacture ?—Technical research has done absolutely nothing for the industry, and therefore most planters have a great distrust of research of any kind, of Rawson, Bergtheil and all these men, although if Rawson and Parnell had a ghost of a chance, they would have done good work. Nobody however, has been of any material assistance.

Assuming that is a fair conclusion to draw, is it due to the fact that problems have been attacked in a sporadic and fitful manner, and not by a systematised and well-organized research on a proper scale ?—That is so with regard to research into manufacture. They did not systematically go into the established methods of manufacture, but were in too great a hurry to obtain results by inventing new processes, as I have said in my written evidence.

We want to form some idea not only with regard to the industry as a whole but of its dimensions. We want to know if this is a problem worth tackling with a proper staff of men. The industry was once wellworth technical research, but it suffered in those days from prosperity. Now that you have had a shock, we want to know whether the occasional work of one or two specialists at a time is of any use, or whether you think we are justified in asking Government to go into this matter more systematically ?—My own opinion is that the increase of indigo in Bihar has been strictly limited to the available supply of Java indigo seed. Nobody pretends that there is any profit in growing the Sumatrana plant. The Sumatrana plant can only be looked on as a stand-by in days of high prices, but if there had been a large supply of Java seeds available, I am positive that indigo cultivation in Bihar would have gone up by leaps and bounds. I don't say it would take the place of synthetic indigo, because of the fact that the wilt disease crept in. If the first results could have been maintained it certainly would have challenged synthetic, but this wilt disease came in and wiped off crop after crop, and they had to give up Java entirely in many factories.

What do you think indigo might expand to in production, assuming that the wilt disease was successfully tackled and a system organized for producing seed enough to cover your wants at reasonable prices. What do you think Bihar is capable of turning out ?—You want to put me down to figures just now. I am positive that the indigo industry, if the indican content was increased, and there was an ample supply of seed, would flourish; all Bengal and Bihar planters would take it up, and there would be an enormous increase.

You really think it worth considering as an industry on a probably large scale in the future ?—I think so. Indigo is such a magnificent crop to grow in rotation with other crops such as cereals.

It is inviting disaster to get one or two experts to make occasional enquiries of this sort without any organization. This matter must be organized from every point of view, and research work collated and put to commercial advantage in such a way as to give confidence to planters. Do you think there is justification for assistance of that sort ?—There is absolutely no doubt on the subject. My own results have shown that we have been making double of that which we made in the rosiest days, even with pre-war prices and wilt and everything else. We have been making profits which were out of all proportion to what my factories used to make under the old system, and that was because I introduced the system of showing Java for seed in August, and managed to maintain a fair seed supply.

Mr. C. E. Low.—You speak of the desirability of an agricultural bank for the purpose of financing indigo factories. Do you consider that indigo factories, as they are at present, will afford sufficient scope for a sufficiently strong bank by itself ?—Indigo factories combined with sugar factories, and with rice mills.

What other industries do you think would be financed by such a bank ?—I don't know, there are not so many just now, unless saltpetre came along.

President.—What about tobacco and wheat ?—I should think tobacco would. An indigo factory would want an advance on its wheat. An indigo factory always grows wheat largely along with indigo.

Mr. C. E. Low.—I suppose your country crops are handled by Marwari merchants. Would those men take finance from such a bank ?—I should think they would very largely. There is an enormous import of rice into these districts from Nepal, and the buying of that ought to benefit by finance.

You stated that "the work was made over to the Imperial Economic Botanist at Pusa who abandoned this line of research". What is your reason for believing he abandoned it ?—Because he makes no reference to it in his reports, except in his last report where he only mentions it to say he does not believe in it.

Have you exported your indigo direct or through Calcutta houses ?—For the last three years I have been exporting direct.

How did you arrange with the consumer ?—I cannot say, as it is sold by brokers in London.

Have you had any direct communication with any consumers as to how your products suit them and what results they get ?—No, never.

Have you asked the Association, which you represent, to communicate with any of the Dyers' Associations in the United Kingdom ? We sent a lot of paste home, and asked Messrs. Parsons and Keiths to distribute it among dyers, and asked them to send us a report. They refused to give us any information.

You did not communicate direct with any Dyers' Association ?—We have seen a letter which passed through the Government of India on the subject of making paste.

Have you tried to get the assistance of the Commercial Intelligence Branch of the Board of Trade ?—I do not think so.

Have you any particular reason for not trying to communicate direct with any Dyers' Trade Association or the Board of Trade ?—No. That matter was taken up before I got into the Association and was found not to be of much use and was dropped.

I do not mean sale; I mean advice as to what they thought of your stuff ?—I do not know what was done.

You speak of pooling. How would you send the stuff; through Calcutta or direct ?—I would have two markets. The poorer class seems to go to Europe, and indigo suitable for the western market would be shipped direct home.

Do you think there would be any opposition on the part of factories who were managed by houses in Calcutta to such a proposal ?—I did not find any encouragement in Calcutta in my efforts to get up co-operation among planters during the last two or three years.

Is your idea of pooling with reference to a central factory or a central analytical laboratory ?—My idea is pooling both cake indigo and 20 per cent. paste of one value.

I always thought it was the contention, of some indigo planters at any rate, that there were values over and above the indigo tin contents ?—That is as regards cake, I am talking about paste. The difference in cake is this; if you get Rs. 70 for 70 per cent. cake, it does not follow that you will get Rs. 60 for 60 per cent. The reason is that the dyer makes up a vat for 70 per cent. cake, in which there is a residue left which he has to throw away. The finer the indigo the less the residue, and if he gets the lower indigo, which has more impurities, the residue is larger and he has got to throw away those impurities holding a larger indigo tin content than if he had used finer indigo.

There is more difference also in respect to the marks of different factories in cake than there would be in paste ?—Yes, I do not see how there would be any difference in paste.

Do you contemplate joint selling in the English market ?—I contemplate pooling all the indigo and have each pool stand on its own base, *i. e.*, with reference to cake I would leave a certain amount for the eastern market and send the rest home. With regard to paste it might be sold out here. The dyer likes to look at his cake before buying, while there is nothing like that in regard to paste.

The dyer in buying cake would like to stick to his own mark year after year, and if the quantity of that particular mark was insufficient, as he would sooner deal with a description which he knew, he would not care for any particular mark unless he was sure that the supply would be large and fairly constant ?—It would be. That is an argument in favour of paste. As a matter of fact my own opinion is that all indigo tin tests are very faulty. When you get a test of a cake calling it 65 per cent., it does not follow all the other cakes in the chest are 65 per cent. All cakes would not test the same; there would be a difference of one or two per cent. They take one cake out of a chest and call it 65 per cent., while the bottom ones might be 60 per cent. for all they know.

Have you any information on sea-freights on indigo before the war and during the present period ?—Freight is charged per ton, regarded as 50 c.ft. In 1913 indigo cost £2, tea £1-15 and shell the same. (Witness reads figures for 1910 and 1911.) I notice indigo has been coming down since 1910.

Would you ascribe that to the fact that the Liners' Conference was charging in proportion to what the goods were valued at?—Probably.

You speak of Government preference in favour of natural indigo. Do you not think that the existence of the British Dyers Co., Ld., a company supported by the British Government would militate against such a preference being given ?—I include the produce of the British Dyers Co. in my evidence.

You speak of the indigo industry being hampered by occupancy rights. In the Central Provinces we had a large area of forest which we were making over on lease to a sugar syndicate. So long as those people kept to their own cultivation they retained their right upon it; if they let it out to anyone to cultivate, they would lose cultivation rights which would accrue to the tenant. That is what I understand you wish to avoid?—Yes.

Do you think that it is a desirable alteration to make generally, in respect to ordinary zamindars or in respect to industrialists ?—The present Act is very hard on a small zamindr who is practically a cultivator. Supposing he is temporarily unable to cultivate his land and leases it out to a "settled raiyat", he loses occupancy.

If you get a certain number of abandonments by tenants with accrual of occupancy rights on areas leased for short periods, would not the effect be that in a shorter or longer time the landlord would have the whole land in his possession?—That could be safeguarded by leasing in rotation from crop to crop for one crop only.

Would not the result of that be that the landlord would only let out the land for one crop only, and in the case of the less intelligent tenant would that not have the effect of deteriorating the cultivation very seriously?—Not at all, why should it? A landlord would not do anything to deteriorate cultivation because he knows he will not get his rent if he did.

Do you think a small Indian zamindar would?—No, I don't think he would. I don't think it would be a factor worthy of consideration.

Turning to one other matter; you will agree that there is a great deal of indigo in other provinces besides Bihar. You have, say, your research going on in Pusa. Have you any knowledge how Pusa results are made known to Madras or the United Provinces, if they are made known?—I have no knowledge at all. I see the Pusa journal.

You are aware that Pusa research arrangements do not include arrangements for demonstration on a wide scale?—No, they don't.

Demonstration is as a rule a function of provincial departments. Don't you think you would be better off if the provincial department was organized in such a way as to enable them to demonstrate to managers the results of research work at Pusa?—I have no doubt. We should have considerable benefit, I think.

The same remarks would apply to other crops, perhaps more forcibly?—Yes.

You would be in favour therefore of a more satisfactorily organized provincial departments? —There is enormous scope in provincial Agricultural departments for demonstrations.

Hon'ble Pandit M. M. Malaviya.—You say in the first paragraph of your written evidence that "the rather exceptional financial conditions under which indigo is manufactured constitute a heavy handicap to the industry." In making that statement have you taken into consideration the profits that have been reaped by the industry?—I am not referring to war profits.

Before the war?—Before the war I am simply pointing out how the working outlay is carrying interest for eighteen months in indigo.

In spite of its carrying interest for eighteen months, what were the profits it yielded on an average before war days?—I should think Rs. 14 per acre or under that, on an average. This refers to the days before synthetic indigo.

And at present the profits are very much higher?—Only with myself. I am not talking of other people. The price has gone up from Rs 250 to Rs. 600.

The profits that you mentioned on the pre-war basis were arrived at after making allowance for all expenses?—That should be reduced to Rs. 10 to provide for the cost of working.

Can you give me the cost of, say, one bigha of indigo before the war; I mean including everything sowing the seeds, carting, packing, etc?—During the war it was very much higher. Before the war I should think with interest and all Rs. 35, including agency charges and everything else.

How many seers of indigo would be produced for that?—About 8 seers.

And what would be the price before war days?—About Rs. 45 to Rs. 50 per acre. This is the gross return per acre; your cost would be Rs. 30 to Rs. 35.

Do you think that an industry that can earn Rs. 45 by investing Rs. 35 stands in any need of special assistance from Government?—I am talking of prices before synthetic came on the market.

I am speaking of profits before the war?—I was talking of prices before the synthetic. If you take indigo by itself there was no profit; if you work it with the country crops you can get a profit, because the more country crop grown the cheaper your indigo is, and the thing is to strike a happy medium between the crops and the indigo. That is a very difficult question to decide off-hand, and it would be impossible to make an average for all factories.

Can you give us a rough idea of profits after synthetic indigo began to come in?—Profits dwindled very very low; no profit was made for years until the factories got on their legs again and took up a different system of working, growing country crop with the indigo.

Leaving aside the badly-managed factories, will you tell me what the profits are in the case of the best managed factories like yours?—(Witness objected to answer this question and said) I know my returns are too good to be absolutely accepted by any other factory in Bihar; the difference of soil the difference of situation is so very large, that it would be impossible to strike an average.

You lay great stress on the Java and Natal seed supply being available?—Yes.

You think even without further research, if you had a sufficient supply of Java and Natal seed, and the concern was managed properly, it should yield good profits?—I think it ought to to a certain extent.

Could you tell us what on an average is the rate of interest which these concerns have to pay?—To Calcutta Houses? For short accommodation 8 per cent. with collateral and Government securities. Firms less fortunate than mine get no accommodation at all. They might, if they do get accommodation, have to pay 12 per cent.

You say that in 1912 the research which was done by Messrs. Bergtheil and Parnell was handed over to the Imperial Economic Botanist. By whose orders?—The Imperial Government took it over from the Bihar Planters' Association.

You say that "it would be of great benefit to the industry if a demonstration factory with an efficient staff to carry on research work was instituted in Bihar, as the present methods carrying on research under garden conditions are most unsatisfactory." Do you mean the conditions that prevail at Pusa?—Yes.

You think it is not a favourable comparison of what a particular experiment is likely to yield when it is carried on under the very favourable conditions that prevail at Pusa?—Garden experiments are useless when applied on an estate scale. They afford no criterion at all.

You have said there should be some modification in freights. Have you any definite suggestions to make?—No, I have none. I would just as soon have that taken out of my evidence.

You suggest that Government should institute a small cess on all indigo exported, to be devoted to the pushing of the sale of indigo? Don't you think that would be much better done by the trade?—No, because they could not collect it There are too many small producers, for instance, in Madras and the United Provinces. You can only do it on exported indigo and not on that used in the country.

You want Government merely to collect the tax and hand it over to the trade?—No, I said that Government should safeguard our interests.

Would you give Government a voice in the spending of it also?—Yes.

You suggest that the "Government should lay down that wherever possible preference should be given to articles produced within the British Empire by the different Government Departments." Do you refer to the Government of India here?—I am referring to the Government of India; I refer to the Home Government as well.

That raises a large question as to whether any preference for goods produced in every part of the Empire would be justified?—It is only a suggestion. I am not prepared to discuss it.

What is a "settled raiyat"; is it not a person who has acquired that status by cultivating the land for 12 years continuously, or by heredity?—Yes.

What is the objection of the planters to allow a tenant to acquire the status of a "settled raiyat"?—We do acquire it. On that line I would be arguing against our interests, but in the case of temporarily leasing land so as to cultivate in rotation with indigo, the planter takes the risk of losing possession of the land.

You say, "With the possibility before it of losing possession of the lands, an indigo factory is very averse from leasing its lands to cultivator's." What is the real objection to leasing land to cultivators; what does it mean; does it not only mean that in the case of a "settled raiyat" you cannot eject him except according to law, and you cannot enhance his rent except according to law?—I am not talking of land that the "settled raiyat" is already holding in occupancy. I am referring to zerat lands. When the planter does not want to grow indigo, if he lets them out to settled raiyats, those raiyats would obtain occupancy.

But is that not the whole difference that you cannot eject the settled raiyat or increase his rent, except according to conditions prescribed by the law? Is that not the whole difference between the settled raiyat and the non-settled raiyat?—Yes.

Is not the "settled raiyat" economically stronger and better than the raiyat who is not settled?—Yes, he would be.

Does he not attend to the land in his keeping and improve it better?—Yes, he would.

Don't you think that it would be a gain altogether to the agricultural industry that the number of settled raiyats should increase? But then you have got to take into consideration that the indigo planter has taken that land for the purpose of growing indigo on it. You are not increasing the "settled raiyat" but increasing the lands of the "settled raiyats"; you are not creating new "settled raiyats".

Does it not in practice come to the same thing; so long as the status of the raiyat is raised to that of a "settled raiyat?—No, you don't raise them to "settled raiyat", because he must have been previously a "settled raiyat", to acquire rights over temporarily leased land.

But the "settled raiyat" to whom you let a piece of land will have the rights of the settled raiyat in the land you have leased to him, therefore *qua* that period he becomes a "settled raiyat", and it does not matter if 'A' alone being a "settled raiyat", there were "A" & "B" two "settled raiyats"?—If you increase the "settled raiyat's" occupancy to an area larger than he can profitably cultivate, it is not a good thing. Raiyats with large holdings are most unsatisfactory.

Do you think there is any apprehension that their holdings will grow so large as to become really unwieldy? You very often see raiyats with holdings much too large. They sublet them out.

Are you familiar with the land legislation of recent years in Ireland?—No, I don't; I am a Scotchman myself.

Thus I suppose you are familiar with the present system of land tenure in Scotland?—I have some acquaintance with it.

From the point of view of the tenant it would certainly be an advantage that he should acquire the status of a settled raiyat, but from the point of view of the factory it is not an advantage?—Not from the point of view of growing indigo, or from the point of view of small zamindars who are more or less cultivators.

Do you think it is a wise policy to allow land to remain fallow rather than to allow a tenant to cultivate it and to acquire a status in relation to it?—It is a very bad policy, but what can you do?

Therefore the recommendation that you make about the Bengal Tenancy Act comes to this that the position of the landlord should be strengthened as against the raiyats. Do you think there is any justification for improving the position of the landlord in an industry which gives good profits?—I have been very careful to state that all the profits are my own.

Supposing that the industry did not yield good profits and became commercially a bad industry, don't you think it should be abandoned, rather than be bolstered up by legislation against the tenants?—While crops can be grown profitably there is no loss to the industry.

You mean to say that so long as further crops can be grown profitably on the land, there is no loss to the agricultural industry of the country?—There is great loss because wheat, barley, etc., would greatly profit by being rotated by indigo. You will find that the yield of rice fell considerably when indigo was abandoned in Lower Bengal thirty or forty years ago.

You think that the retention of indigo is necessary?—I think it is highly beneficial.

Supposing that consideration does not apply to every territory, to every part of the province, and suppose that you can get better yields of wheat and other crops by other methods than by rotating it by indigo, then the retention of indigo would not be necessary?—You ask me a hypothesis that does not exist.

Indigo is not cultivated in all parts of the country where wheat is, in the Punjab, for instance, only on a small scale. The Punjab gives very good yields of wheat, and in many parts of Bihar where indigo is not cultivated, you get very good yields of wheat; therefore you cannot say that the rotation by indigo is a *sine qua non* of improving the yields of wheat?—There may be other methods.

That being so, unless the manufacture of indigo continues to be commercially a success, there would be no justification for keeping it up, if it can only be kept up by laying down conditions that would operate harshly against the cultivator?—I quite agree with that.

Hon'ble Sir F. H. Stewart.—You indicate the possible institution of agricultural banks in Bihar and you told the President that a certain amount of Government assistance would be necessary. Have you formulated any ideas at all as to what shape that assistance might usefully take?—Government could place its treasury balances in the banks.

Do you think it would be right that Government should lock up public money in landed property, machinery, etc., in this manner?—My suggestion is that landed property should be accepted as collateral security when advancing money on an indigo crop.

Can you develop at all your idea of an indigo pool; who would be members of this pool?—They would be in Calcutta. The agents and brokers would be members. At home you have the same thing.

And its affairs would be managed by a Committee?—Yes.

And the Government connection would be simply in respect to the cess?—Yes; in no other way.

How would you bring in all the other parts of India which produce indigo?—They would not come in, or perhaps some might come. Madras would not come in.

Does that not knock the idea on the head altogether?—Yes, I think so. But, of course, with paste it is a different matter.

The functions of a pool would simply be regulations for sale; no interference with production?—No, the only idea of a pool would be to get away with the middleman. At present indigo is sold to the middleman. If you get away with him you would increase the profits of the producer.

You do not mean the Calcutta houses by middlemen?—No, I mean the buyers.

With reference to the manufacture of paste as against cake, would you not have much more difficulty and incur much more cost for packing, freight, both by rail and steamer, etc.?—The cost would be very much heavier, about four times: the cost of packing is very much higher.

And you would have much more difficulty in getting labour carry it out?—Yes; that is an argument in favour of cake, but also a very big argument in favour of making paste at home.

Dr. E. Hopkinson.—Can you say what proportion of the total crop of indigo in Bihar is grown by members of the Association?—All of it, or nearly all. I do not think there are any growers outside the Association.

You say that the Association, as an Association, has never been in official communication with any users in the United Kingdom?—No, never.

Do not you think there would be great advantage in such communication?—There would be.

Would you think that that communication would be better direct between one business association and another, or through the Government?—I think it would be better direct from one association to another, and not through Government at all.

You think the Government could not provide any good offices in that connection?—I do not see how it could.

How is that that there is no such communication in the case of such an important Association as the Bihar Planters' Association?—We have made several efforts, not through the Association but more or less privately. We made great efforts to provide them with paste, but the Dyers' Association went to the Germans, lock, stock and barrel.

You attribute it all to the stupidity of the British dyer?—I attribute it to the stupidity of the British public. You cannot get a fast dye for love or money. When you buy blue silk handkerchiefs, for instance, you find the colour soon fades. I submit that the synthetic indigo also suffers from competition of cheap dyes.

President.—You are not justified in challenging synthetic dye on that score. They have got you in quality and in price. Your battle is with synthetic dye, and there is no doubt they have you both on the score of quality and price.

Dr. E. Hopkinson.—With regard to the question of paste, the Association have not taken any steps since the outbreak of war to ascertain what the British user requires, or what he would be ready to take ?—In quantity or quality ?

In quality and style of making up ?—We cannot get tubs to send the stuff home. We made a certain quantity which we sent home for examination by British dyers. There is not a tub in the country to pack it in, and you cannot make paste just now.

You are not making any attempt to get into touch with the user as to what would suit him in the way of paste ?—We are sending home a quantity now, and it is on the high seas. We are sending it to the India Office ?—There is a Committee formed at home, with a dyer on it.

You attribute the increased output to a more economical method of working ; how did that originate ?—It is due to an experimental lot of seed which was brought from Java. We tried the plant and found it contained 100 per cent. more indican.

Who tried it ?—Mr. Bernard Coventry was the first to introduce it at Dalsingserai. There have been small lots brought in for several years, but there was difficulty in scarifying it. It was a private discovery.

Was it developed privately ?—Entirely so.

President.—You said that one of the difficulties in the way of progress is indicated by the fact that planters have not much faith in technical research. I suppose that is due to ignorance on both sides. Would it be practicable to establish small schools in connection with technical research, that is, demonstration schools for the purpose of training young planters in subjects like elementary chemistry and the principles of agriculture, with a view to introducing to them the results of technical researches ? Do you think they could attend schools of that kind during the off-season ?—No, I don't think there would be any good in that. The only good would be demonstration factories where men could go and see things.

You think that planters themselves do not want any knowledge of science ? - When I see the results of Messrs. Rawson and Bergtheil's researches, with regard to the manufacture of indigo, I don't think I would gain much benefit by taking up science. I believe in the results of science properly applied, but I don't believe much in our scientists, the one; or two we have tried.

That is a different thing. Is there any advantage in giving facilities such as the training of young planters in elementary science ?—I would prefer to postpone the answering of that question until some scientist had shown us that there would be some use in teaching planters the elements of chemistry. With our present processes there is no use in it.

Hon'ble Pandit M. M. Malaviya.—You certainly don't mean to say that all planters and agriculturists would not be benefited by knowing what results are obtained by agricultural research in other provinces ; therefore you would be in favour of some institute where these young planters should receive some practical training in agriculture ?—It may be ; I think they would learn just as much by pamphlets and reports. I doubt these institutions.

Supposing there was an institution at Pusa or elsewhere where such demonstrations could be seen, don't you think that young planters would be the better for having seen those demonstrations ?—Some of them might be.

Witness No. 64.

Mr. F. M. Coventry.

Mr. F. M. Coventry, *Indigo planter, representing the Bihar Planters' Association.*

Written Evidence.

Indigo.

The crisis in the natural indigo industry is due to two causes :—

(1) the competition of the synthetic dye ;

(2) the increase in the cost of production of the natural dye.

The latter is chiefly owing to the higher rates that have now to be paid for the land on which the indigo is grown, due to the rise in the value of country crops of all kinds ; in consequence landlords and tenants are asking higher rents.

Previous to the war, with indigo selling at Rs. 150 per maund of 60 per cent. indigotin, it was difficult for concerns to make a profit of more than Rs. 5 an acre, and it is impossible, with such prices, to pay more for the rent of the land, or for the price of the green plant.

There are two systems of growing indigo in Bihar :—

(*a*) The zerat system, chiefly practised in the districts of Muzaffarpur, Darbhanga and Saran. Under this system, lands are obtained from the landlords and tenants and are cultivated at the expense of the planter, who takes all risks.

(*b*) The raiyati system, in which the raiyats grow the indigo plant, on their own lands, and are paid either on the area or on the weight of green plant.

It would appear at first the raiyati system was on a better basis than the zerat, but when the fall came in the market price of indigo the zerat system was better able to withstand these bad times, as it was possible to utilize the lands in rotation with other crops than indigo, with a remunerative return ; the immediate returns realized from the crops sold locally, also greatly helped to do away with much of the outlays borrowed at high rates of interests.

The following are some of the instances in which the industry needs assistance :— Financial aid.

1. Loans to be used as advances to landlords and tenants.
2. Loans to tide over the period when indigo is tied up pending sale.
3. Assistance in the combine and marketing of indigo.
4. Improvement and concessions in freights.
5. Research work in manufacture.
6. Research work in selection of plant.
7. Seed farm.
8. Supply of manures.
9. Legislation.
10. Protection.
11. Assistance in allied industries.

As an example of what financial aid could do, it was in 1908 that Government in consultation with Champaran planters, decided to give an increase of Re. 1-8-0 per acre on indigo raiyati cultivation. Such a paltry sum is of little use to the raiyat, though to the planter who is only making a profit of Rs. 5 per acre, it becomes a very serious matter. If, on the other hand, the planter could have found money, at say 5 per cent., and given the raiyat Rs. 40 advance per acre, at a covering rate of interest, the raiyat would have appreciated such a step much more than the Re. 1-8-0 yearly increase, as it would be of more service to him, and the planter would have been saved the Re. 1-8-0, or 30 per cent. of his profits. Loans.

Further, it would be possible for the planter to put the Rs. 40 in an agricultural bank, in the interest of the raiyat, the planter receiving 12 per cent., a profit of 7 per cent. on the interest paid on the money borrowed, representing Rs. 2-13-0 per acre, which together with the Re. 1-8-0 he would be saved, makes a total benefit of Rs. 4-5-0 per acre, equivalent to a reduction of 30 per cent. on the cost of plant. Similar benefits could be derived in the zerat system, by advancing loans to landlords and tenants, and getting land on cheaper terms.

Much energy is needed here. The planters are contemplating a combine with the advice of agents and brokers in Calcutta, with the object of fixing a limit of sale, and also disposing of the indigo by "pools" made up of the varying qualities. Markets.

The Bihar Planters' Association have already joined the British Empire's Producers' Organization, as a help in pushing the sale of indigo, and obtaining any information procurable. The fund to meet the subscription of this organization is a separate one from the general funds of the Association, and it is desirable that Madras and North-West dealers in indigo should be affiliated with the Association, for this purpose, increasing the fund and the scope of work to be carried out.

Calcutta should be the chief market, and many, but not all, are of opinion that it should be the only one.

If natural indigo is to continue competing in the European and American markets, it seems imperative that the manufacture of indigo in paste form should be resorted to at once. The difficulties of obtaining a suitable and uniform 20 per cent. paste are nearly solved.

There is still the question of excessive freight charges, and in this concessions might be asked for. In adopting paste, the cake market must on no account be neglected, it is the best market for natural indigo, and is likely to be so for some time to come, especially in the Eastern trade. This market needs fostering and bolstering to the fullest extent, retaining those marks most suitable for cake for the cake market, ascertaining what the amount required is likely to be, and organizing up to that amount in cake form, so that the market is not overdone, and manufacturing the balance of the outturn in paste form.

Freights. In both the oversea and inland freights, much can be done to help indigo and also allied industries. The enormously heavy inland freight over such long distances, is one of the most crushing difficulties that so many trades are confronted with, assistance in this would do more generally to relieve and establish new industries, than any other form of legislation.

Research in manufacture. Government has already given the industry considerable help in the past, first the yearly grant of Rs. 40,000 to the Indigo Improvement Syndicate at Dalsingserai, and afterwards to the Bihar Planters' Association, during the services of Messrs. Rawson and Bergtheil, and now they have engaged the services of Mr. Davis for the work on paste and further research work.

Messrs. Rawson and Bergtheil were of opinion that there was little more yield to be got from the plant, but both Messrs. Bloxam and Davis are opposed to this, and hold that more can be obtained by improved methods of manufacture.

Research in selection of plant. Scientists are of opinion that the Indian yielding properties of the plant can be much improved by selection and the study of the botanical aspect of the plant.

Since the appearance of the psylla and wilt disease, there has been great difficulty in growing seed locally. Wilt is the most serious, and suggestions have been given as a remedy, such as rotation of land, increased surface cultivation, drainage, better selection of seed. I am quite satisfied that the disease cannot be avoided by attention to these, as the seed from these parts gives quite good and healthy results when grown in other parts of India. The only remedy I have found of any value so far, is by the application of phosphate and green-manuring, and this required further research.

Seed farm. A farm for the supply of seed, outside the indigo district, is a need we have long been in want of. The district chosen should be one free from frosts at the time the seed ripens. The farm should not be a permanent one, as after a few years disease may appear in the same way as it has done in Bihar.

Some years ago I arranged for seed to be grown in the Ranchi District, with excellent results, the frost does not affect the seed, as the seed ripens early before the appearance of frost. Seed is now being grown in this district.

In 1910 the British Government of Natal, under the supervision of Mr. Baily, grew some seed from the wild plant in Natal. About seven maunds of this was sent to me, but I found it unsatisfactory and just as liable to disease as our own plant.

The seed we import from Java gives good results, but there is much room for improvement in quality, the percentage of germination being seldom over 55 per cent.

Manures. Considerable benefit is to be derived from the use of manures if procurable at reasonable prices, superphosphate and oil cake in particular. Superphosphate could be manufactured locally, provided sulphuric acid could be obtained at lower prices. This is used in the manufacture and at present costs over 2 pence a pound, the cost in Europe is one farthing a pound.

Legislation. Some alterations are necessary regarding land-tenure.

Where there are large interests in zerat and káskári lands such as in indigo concerns and large estates, the entire area cannot be kept in their own cultivation, except with considerable loss, there is much trouble on this account especially at survey times.

Protection. Since the war, the manufacture of synthetic indigo has commenced in England and other countries, in England the Dyes Company, Limited, has been very extensively supported by the Government, in the way of a loan of 1 or 1½ million sterling, and a yearly grant of £100,000 for research. The Board of Trade have representatives on the Board of Control, and I understand they will protect the interests of the natural industry. It would be of interest if from time to time we were advised as to what they are doing for the industry.

The following extract from the *Daily Mail*, September 1916, is interesting on this question :—

"Mr. C. J. Whittaker presiding at the annual meeting in Manchester yesterday of the United Indigo and Chemical Company, Limited, said that whatever might be the true cause

of Germany having secured the monopoly in dye stuffs, considerable odium rested on some men in high places who, by unpatriotic intrigue with German competitors, had helped to barter away the nation's birthright.

It would be a guide in the future to know the members of Parliament or officials who, before the war, were instrumental in having deleted from the Government contracts for Army, Navy and Police clothing the clause specifying that those goods must be guaranteed dyed with natural indigo, thus allowing them to be dyed with German synthetic indigo, and thereby robbing our Indian Empire, and indigo planters in particular, of an export trade of £4,000,000 a year.

This policy put thousands of our Indian subjects out of employment when, instead they should have been given State-aided scientific assistance to improve the natives' crude method of production. He could not think that those responsible for the action he had referred to could be trusted to look after the business of the nation in future."

Protections could also be given to the natural dye, in some form of a trade requisition, so that shoddy articles dyed with synthetic, do not appear on an equality with goods dyed with vegetable dyes.

Allied industries. There are other industries, such as sugar, already established in the district, which might be worked with indigo to their mutual advantage, or as independent industries. I will mention two of special importance and magnitude, and in which I have had some knowledge and experience.

Starch. After the war broke out, the Board of Trade in London have been issuing bulletins on industries that might be taken up to improve British trade.

I was particularly struck with their information on starch, so followed up my enquiries with the Board of Trade Imperial Institute, manufacturers of machinery, brokers and consumers, and the Dutch Government which is one of the countries producing starch.

I am only referring to those varieties of starch used in commerce and known as potato starch or farina, used extensively by spinning and weaving mills. The chief sources of supply were Germany, Austria, and Holland. America supplies an inferior maize starch, sometimes used when there is a shortage of potato starch.

Previous to the war the price was from £10 per ton to £18 per ton and has since risen to over £30.

The whole of the requirements of the Indian trade and our Colonies are supplied from Europe. None is manufactured in Britain.

It can be manufactured in this country from the sweet potato, which is already grown in enormous quantities. These yield 12½ per cent. of starch, as against 16 per cent. from the potato used in Europe. Taking the low price of the raw material in India as compared to Europe and the oversea freights there is much in favour of manufacture in India.

The cost of a plant, dealing with 50 tons of potatoes daily, will cost about £3,000 exclusive of buildings.

Ramie (rhea or commercial China grass). This is a very large cottage industry in China, which country supplies nearly the whole of the China grass in the trade.

The cultivation and manufacture was commenced in Bihar in 1903, by the Bengal Rhea Syndicate, with a capital of over Rs. 3,00,000, and a cultivation of 2,000 to 3,000 acres. I was in charge of 500 acres at Dalsingserai. A complete factory with 12 decorticators, drying, and baling machinery was erected. A similar factory was erected at Turkaulia in Champaran, with 500 acres of cultivation, and smaller plants at other places.

The enterprise was not a profitable success, although the decortication and general manufacture was satisfactory. The whole of the produce was sold to the spinning factory at Emmindingen in Germany, but the return from the cultivation was unsatisfactory. This was due to want of knowledge in the mode of the selection of land and the method of cultivation. No one had had any experience and the whole of the literature on the question was incorrect and misleading, so that the plant was put into lands and localities quite unsuited to the growth of ramie.

I am convinced that this industry can be worked in Bihar with equally good results as to China, especially as a cottage industry. By this I do not mean to infer that it cannot be grown with success on an extended scale, as was intended by the Bengal Rhea Syndicate. But the selection of cultivation must be very different, selecting more especially those parts where

tobacco and such like crops are not grown, as these crops utilise the whole available manure of those parts. Where opium was grown and has been abandoned the land could very profitably be replaced by rhea.

On an extensive scale of cultivation, I would recommend that the manufacture be carried on to a further stage, that is as "filasse" which is the form China grass assumes after it has been degummed. If this process is carried out on the green ribbons, direct from the field merely hand-stripped with the pellicle still attached, the degumming process is more easily accomplished and with better results, as the resinous and mineral matters have not dried on the fibre, as in the case of China grass, and are therefore more easily acted upon by the degumming agents. The cost of production is much reduced, as the decortication of the fibre by mechanical means is done away with.

In 1907 there were only two degumming and spinning factories in Europe, now there are five at least in Europe and several in China and America. The price of China grass in 1907 was £ 27 per ton; just previous to the war it had risen to £35, and the consumption is fast increasing. A degumming factory, such as is usually erected in China, which deals with China grass, first converting it into "filasse" and then into yarn, in which form it can be sold universally, and which can also deal with the green ribbons, costs from £20,000 upwards.

General.

The following are answers to questions on which the Commission invite information.

Financial aid to industrial enterprises.

Q. 1.—Money was raised from planters and agency houses in Calcutta to erect a manure factory at Dalsingserai, for the manufacture and supply of fertilizers, called the Indigo Manures Supply Company. An oil mill was also erected on the premises, for the supply of oil cake. Such an enterprise can only succeed when there is an outlet for the cake. At first the company was well supported and did well, but afterwards owing to the crisis in indigo, planters curtailed all expenses working on the most economical outlays possible, so that there were not sufficient orders to continue. There was also no support from the sugar concerns where orders had been expected.

The difficulty in obtaining money to work new industries, is chiefly owing to the want of confidence, there is usually not sufficient data to be relied on, generally due to the experimental work having been carried out on too small a scale. With proper investigation, demonstration and the support of Government, there should be no difficulty in raising money for an enterprise with prospects of success.

Q. 2.—Money for industrial enterprises is mostly obtained locally and with the help of Calcutta agency houses.

Pioneer factories.

Q. 8.—After full investigation, and Government being satisfied that the industry is likely to prove a success, it should meet the request of the person asking for assistance as far as possible, even to the extent of the entire loss. A reasonable period should be given to test the merits and results of the enterprise and conditions and terms arranged for the repayment of the money, or taking over the plant, the pioneer receiving first refusal.

Limits of Government assistance.

Q. 14.—Financial help should be given until the enterprise can work for itself, but aids, such as concessions on freights, should be continued.

Technical aid to industries.

Q. 15.—For my experience, see remarks under Indigo (Research in manufacture).

Q. 16.—Much good has been derived as the result of researches conducted by Government Departments by the selection of seed. Both mustard seed and the new varieties of wheat are an example of this. Useful and labour-saving implements have been introduced.

Demonstration factories.

Q. 20.—There should be demonstration factories for starch and ramie (see remarks under these headings, under allied industries). I would also suggest the demonstration of the manufacture of sann hemp, as it is prepared in the Jubbulpore and Pilibhit districts. Sann hemp as prepared in Bihar sells for from Rs. 3 to Rs. 4 per maund as prepared in the other districts as from Rs. 6 to Rs. 12.

Research abroad.

Q. 21.—I have received much valuable information from the Imperial Institute, but this Institute is an example of all Government Technical institutions and such like bodies. Much good work is done and accumulated, but is seldom brought to use outside. The information lies dormant until someone happens to be seeking some particular information.

Industrial surveys and official organization.

Qs. 25, 27, 56, 57, 59, 60, 61.—The available resources of the country should be enquired into by Commissions, and local organizations, and the local Director of Industries. There should be at least one Director in each province, with powers to act, or with a Board of Industries (probably Imperial), with powers to act, of which the Provincial Director should be *ex officio* member.

The Director should be a practical man with knowledge of business matters, trade and finance, and it should be his duty to seek out and encourage what appears to be in the interests of trade. At present there seems to be no channel for the pioneering of an industry to put his suggestions before a Government representative, with powers to give him the help he needs.

ORAL EVIDENCE, 24TH NOVEMBER 1916.

Mr. C. E. Low.—You say that the higher rates that have now to be paid for the land on which the indigo is grown are due to the rise in the value of country crops. What has the planter to pay now compared with what he had to pay thirty years ago?—80 to 100 per cent. more.

You suggest that money could be lent by some agency to planters at five per cent. which the planters might re-invest at twelve per cent. in an agricultural bank. From whom do you propose to get that money from?—The benevolent Government.

These are your own views, or are they also the views of your Association?—These are my own views which I put before the Association at that time in 1908.

We are now in 1916. We want to know the planters' views now?—I referred to this in 1908 when the Government in consultation with Champaran planters raised the rate by Re. 1-8-0. I have heard nothing of it since, but I merely put it forward as an example.

The planters would give their joint security to get money at five per cent?—They will have to give some security. I look upon all these as means of giving help. We cannot get money from the commercial world at that price.

If the agricultural bank charged twelve per cent. to the raiyat, that would cover the weaker security of the raiyat and the increased cost of collection from smaller men?—Yes, the factory is going security for the money.

I am talking about money lent by the agricultural bank to the raiyat?—Instead of giving the man rent the planter puts that money into the bank for him.

And the agricultural bank lends it to the raiyat at twelve per cent.?—Yes.

The twelve per cent. which the agricultural bank charges is more than what the Government charges the planter, because the planter's security is better and it is easy to collect?—Yes.

The co-operative credit societies do the same thing so far as the raiyats are concerned?—I suppose they do.

The co-operative credit societies charge usually at nine to twelve per cent., and the societies have to pay anything from six to nine per cent. The only way in which the planter comes in is that he finds security and he gets seven per cent. for doing so?—That is what it really comes to.

How are direct shipments of indigo of planters financed?—We do not do any shipments. There are a few planters who do ship to London, but they are small amounts. I have no experience of direct shipments.

You speak of the jungle market. Was not that before the war tending to disappear as synthetic indigo encroached on the jungle market?—I did not say anything like that.

The synthetic was gradually cutting into the jungle market?—No. Not in the Gulf, Russia, and Persia.

You think the jungle market is well worth your attention while you are making an attack on the Western market?—They pay for high percentages of indigotin. They pay for shape and form.

You state there, "Messrs. Rawson and Bergtheil were of opinion that there was little more yield to be got from the plant". From the plant as it is, or, as it might be developed?—In the present style of the manufacturing process, Rawson and Bergtheil said that they had done all they could and that there was nothing more to do in the manufacture. Mr. Bloxam was opposed to this and he always said that there was decidedly much more to be got by improved manufacture.

You speak of protection being allowed to the natural dye?—Yes, by a trade mark or something like that.

You suggest that a particular form of merchandise should have a trade mark to show that the goods are dyed with natural indigo?—Yes, so that people would know when they are buying articles dyed with natural and when they are dyed with synthetic.

You speek of sweet potatoes. Have you any idea of the area of it in Bihar?—I have not gone into that.

Is it grown in garden plots under well irrigation or as a field crop?—As a field crop. The cultivation is very large. It is one of the staple crops.

It is not grown with well irrigation?—No irrigation at all.

You say that ramie industry was a failure. Did you ever hear that it was due to the consumers being very few in number and their fixing so low a price that the crop did not pay to grow?—No.

You say that there were only two degumming and spinning factories in Europe in 1907, but now there are five in Europe and several in China and America. You do not think things have improved in the matter of price?—The price had improved before the war began. And we knew the price in the open China market when we commenced manufacturing.

You state that a manufactory was erected at Dalsingserai. It prepared nothing but oil cake?—They imported fertilizers and mixed them in various quantities to suit certain crops.

Under whose advice?—My brother started this.

Not under any particular scientific advice?—Yes, we had research people at Dalsingserai when these things were going. We had Messrs. Hancock, Bloxam, Finlow, and Leake.

These mixtures and fertilizers were made on the advice of these scientific gentlemen?—It was really from the results of their work. There was an important publication issued by the indigo improvement syndicate and on that this was started, and great support from the sugar industry was expected.

But you did not get the support?—No.

Is it because the mixture was not suitable, or for what reason?—They were very suitable. Everything that was supplied was well known. It was merely because the planters would not put their hands into their pockets. They were so hard up in those bad days of indigo.

When was this?—From 1900 to 1904.

You say, 'Money for industrial enterprises is mostly obtained locally and with the help of Calcutta agency houses". By industrial purposes you mean for the erection of factories or for working expenses?—Capital expenditure. I was referring to manure company and rhea company.

Was this money put in by people as a venture, or did they lend it to the promoters of the industry?—As a venture.

You say that working capital is obtained from the Calcutta agency houses?—Yes.

At what rate of interest?—Eight per cent. and one per cent. for books.

What security is given?—You hypothecate your indigo crop.

You want concessions in freights for carriage of products of industrial enterprise. Do you allude to railway freights alone or to other freights?—I was thinking at the time chiefly of railway freights. It was brought to me very forcibly in the case of starch when I went through the figures of starch.

Do you recommend that much goods should be carried at less than the cost price? You know that the average railway freight yields railways only a comparatively small profit on their turnover. Railways only pay 5 or 6 per cent. and the turnover is a very large one?—I do not know what they earn. But that is the stumbling-block to so many things. For instance, the expenses of shipping rhea from here to Calcutta is as much as getting it in Europe.

Would you recommend an initial concession until the industry is well established?—That would be a great help. I say that these heavy freights are killing many industries.

If the industry cannot afford to pay what it costs the railway to carry it, it seems that the industry itself is not one that should be undertaken. Would you agree to that position?—Yes. I think so.

If you have an initial concession in freights, the railway in the long run will benefit because they get a larger amount?—Yes. Take the case of starch. The difficulty is to get the market. People buying starch would rather pay a higher price for what they are accustomed to use. We are only anxious that there should be concessions to begin with to get at the market. Now the conditions are good. The war has deprived them of the market and we can get at it.

You speak of the superior value of Jubbulpore and Pilibhit sann hemp as compared with Bihar hemp. You consider the difference in price is due to the superior method of preparation in Jubbulpore?—Yes.

Do you know how sann hemp is prepared in Jubbulpore?—Yes. The stalks are retted and then it is taken and dried, and, when it is quite dry the stalks are broken and the fibre comes away perfectly straight. Here, the stalks after being retted are beaten first by holding at one end and then holding them by the other end and all the fibres are entangled The plants are identical.

You allude to the information received from the Imperial Institute. On what point did you receive information of value?—On starch they gave good information.

That was useful?—Yes.

Have you been able to do anything with that information of a practical nature about strach?—I have made experiments, and nothing more than that. There is absolutely no literature on the subject whatever. They were the only people who gave me any information.

You suggest that the provincial director should be an *ex-officio* member of the Imperial Board of Industries. Would you have all provincial directors as *ex-officio* members?—I am not competent to deal with that point. There must be some linking up. There are thousands of pounds spent every year here on scientists' salaries and on the Directors of Industries, and the work is done two and three times over. In the British empire it is done three and four times over and paid for similarly. There is no outlet beyond a certain distance. Information in many cases never gets beyond the walls.

Your points are that the information obtained by scientific research in this country is not made sufficiently accessible to the public and that the work is duplicated?—It is duplicated here as well as in other countries. The work is done twice. Men go and do the same kind of work over again. Much of this money might be spent on pushing these things into existence. They never see life.

Hon'ble Pandit M. M. Malaviya.—You say that the crisis in the natural indigo industry is due to two causes—(1) the competition of the synthetic dye; and (2) the increase in the cost of production of the natural dye. And you say that the latter is chiefly owing to the higher rates that have now to be paid for the land on which the indigo is grown due to the increase in the value of country crops. Am I to understand that the advantage from growing country crops is greater to the cultivator than from growing indigo?—Not in every case.

Generally?—In certain villages, not in all.

How is it that a rise in the value of country crops of other kinds has brought about a demand for higher rent for indigo?—The demand for land.

Is it more profitable for the cultivator to sow land with other crops than to sow it with indigo?—At the cheap rate, yes; i.e., Rs. 5 a bigha. We used to get land for Rs. 5 or Rs. 6 a bigha and now we cannot get it at that rate.

Because the land is in demand for other crops?—Yes.

And the zemindar gets more rent from tenants who want to take it for other purposes than for indigo?—Yes.

Is the sowing of indigo unpopular with the raiyats generally on this side? Is it that they do not like it very much?—There are two systems, zerat system and raiyati system.

You say that under the raiyati system the raiyats grow the indigo plant and they are paid either on the area or on the weight of green plant?—Yes.

This raiyati system is of two kinds, the tincotta system and the voluntary agreement system?—I do not understand what you mean.

What is this raiyati system that you speak of?—There are two systems, the zerat system and raiyati system, which I have explained in my note.

By the raiyati system the land is cultivated by the tenant at his own risk?—Yes.

And he sells its produce to the factory and he is paid on the area or on the weight of green plant?—Yes.

Are not these raiyats of two classes, the first those who are attached to the factory, having taken leases from the factory, and who are bound by an agreement to sow indigo on some part of the land for the factory?—Yes.

And the second class is what are called the voluntary agreements?—It happens in kushki tracts. They are not voluntary. Khoosky is erratic.

Is it an agreement under which they promise to sell to the factory the indigo that they will grow for a certain number of years at a rate fixed in that agreement?—Yes.

Do you think that the raiyats have greatly improved in their economic condition during the last 25 years?—I should not like to say. In the last twenty-five years?—I suppose they have improved. But that is not very much.

In what way? Have wages risen?—Wages have risen.

The males get annas 2, and the females get 1½ anna per head. They come to the field at about sunrise, and return at about sunset, and they have an hour's interval in the winter and two hours' interval in the hot weather.

And so they work from sunrise to sunset?—Not literally, but roughly.

What does a boy get?—An anna. A mother brings three or four boys and she earns about Rs. 15 or Rs. 20 a month.

Do they use much cloth except in the coldest part of the year ?—No.

Do they go to any school and receive education ?—Yes. Every district has schools established.

Has every factory got a school ?—No. Every district has schools established.

Do you mean for the children of labourers ?—I do not say for that class.

I am confining my question to them.—They do not go to school.

Are they not able to pay a fee ?— I do not think they have risen to that yet.

If they were asked to pay fees, you do not think they would be able to pay them out of the two annas ?—I could not say.

Do you seriously think they can, out of the two annas per labourer ?—It amounts to a great deal more. A mother comes with three or four children and they each earn something.

Add it all. I want your impressions ?—Do I think that these people could afford to pay a school fee?

Suppose you put it at one anna per head per month ?—They can afford one anna per head per month.

Is there any arrangement for the education of the children of the labourers, so far as you are aware, in any factory that you know of ?—Not that I know of.

Have you never seen any school or any schooling arrangement about any of these factories for this class of persons ?—Not that I know of.

You say that in 1908, in consultation with the Champaran planters, the Government decided to give an increase of Re. 1-8-0 per acre. Why did the Government take up this question ? Was it in consequence of the Champaran riots of 1907 ?—Yes.

There was a Committee or a Conference ?—Several Conferences between the Lieutenant-Governor and the representatives of the planters.

And as a result of that the Government decided in consultation with your representatives that each raiyat should get Re. 1-8-0 more per acre ?—Yes.

You say that system did not benefit the raiyat very much ?—No.

You say that if the planter could find money at five per cent. and give the raiyat an advance of Rs. 40 per acre, that would be a better system ?—Both parties would be benefited.

How would it benefit the raiyat ?—Nearly every raiyat of Champaran has more land than he can cultivate, and he is the worst cultivator in Bihar. The difference between the Champaran raiyat and the South Bihar raiyat is merely due to the former not having proper bullocks and having too much land. He wants money to buy bullocks, and develop the land.

Do you think that the advance would enable him to develop the bullocks ?—Yes.

With the money that he earns he is not able to have a sufficiently good quality of bullocks ?—No.

Why do you think that the planters should be allowed to reap the profit of seven per cent. ? Do you think that their condition is such that they should have it ? Suppose the Government is persuaded to advance you money at five per cent., you would advance it at 12 per cent. to the raiyat ?—To the bank.

You will put the money into the bank and the bank would advance to the raiyat at 12 per cent. ?—Yes.

And it will pay you seven per cent. more than you have to pay to the Government ?—Yes.

Can you show any justification for the suggestion that you should reap this large profit from the raiyat ?—I do not make him pay more than he has to pay.

Suppose you lend him money at five per cent. and you give him the benefit of your security, for he is your raiyat, and if you lend him money at five or six per cent, how would you be worse off ?—I am trying to improve the position of my industry.

You think then that because the industry is not making sufficient progress you should add to its profits in this way ?—Instead of increasing the rate of the raw material you can equally benefit the raiyat by lending him money. If you can find money cheap—and that is business all over the world—and give it out to the people, you can get your things on better terms.

That would represent an addition of Rs. 2-13-0 per acre to your profits ?—Yes.

And that together with the Re. 1-8-0 would give a total profit of Rs. 4-3-0 per acre ?—Yes. And the raiyat is not paying any more than he has already to pay.

Suppose the Government were persuaded to give money, don't you think that the Government should lend it direct to the cultivator and let him have it at 5 per cent. ? Would you like that idea ? Do you think that it would be a benefit to the raiyat ?—That would be like not supporting an industry which is feeding all these people. You must remember that the planter is doing the district a great deal of good.

Do you think that it will do the raiyat much good ?—He wants money and we give it to him at the same rate that he would have to pay if he got it from other people.

You want the Government to help you to get the money ?—As cheaply as possible, either direct from the Government or through banks where we can get money.

You want this money in order that you should give loans to the landlords and tenants and get lands on better terms ?—Yes.

And you want also loans for the period that the indigo is tied up pending sale ?—Yes.

And you want the Government also to assist you with legislation ?—Yes.

And with protection ?—All these things we require.

Do you think that an industry which requires to be bolstered up in so many ways is a healthy industry to keep up ?—I have shown the eleven different ways in which we can have assistance, but we do not expect to get the whole of these eleven. It can hardly be expected that Government would help in all these directions. As long as we get cheap money, that is what I mean.

You say that the planter is making a profit of five rupees per acre only. You are speaking, I suppose, of the pre-war days ?—Yes.

What would be the cost of cultivation and manufacture per acre before the war ?—About Rs. 30 for an acre.

On that Rs. 30 you make Rs. 5 ?—Yes.

That works out to something like 15 per cent. ?—Not at all. Only 5 per cent.

You invest Rs. 30 and make five rupees per acre ?—What about the block ?

I want you to tell me what is your total expenditure on the indigo ?—Rs. 30 is my outlay, and I get Rs. 35 to Rs. 40 of indigo per acre. That is my profit on my block. I have a block on which I have invested more than six lakhs, being about 100 rupees per acre.

And spreading it over all, what would be your net profit ?—Five per cent.

Can you tell us what profit indigo is generally making now ?—I have not calculated that. The five per cent I am giving you now is on pure indigo. I am not talking of the benefits to the raiyat and working it along with other crops.

Cannot you enter into a co-operative movement with the raiyats who settle down on your estates so that you should share a lump sum of your profits and induce them to co-operate with you in a hearty manner ?—I do not think the time has arrived for that yet.

They do not understand sufficient of agricultural business ?—Yes; more than we do.

They are keen enough about their interest ?—But in a thing like indigo it is very hard for them to share with us. How are they to share ?

Give them some portion of the profits after a certain percentage has been reached by you ?—In the shape of bonus we have already done so.

Do you think that you can get them to co-operate with you in improving this industry ?—They would not share in the capital.

They would share in the toil. Toil is as important as capital ?—I do not know that it is.

Though you have any amount of capital you cannot get indigo, unless there is labour available ?—No.

Hon'ble Sir F. H. Stewart.—Take it that there is an open fight between natural and synthetic indigo. Do you believe that with improved methods of production and manufacture there is a profitable future before natural indigo ?—Yes. Taking a good crop of indigo the synthetic cannot compete with it. Let us get good seed and get disease cured, and can grow it at a cost far below that at which the synthetic pepole can make it. Even in the present conditions with a healthy crop we can make a profit.

About the manufacture of starch from sweet potatoes, did you make experiments on a commercial scale ?—Only in small quantities.

Has any one done it here on a commercial scale?—Starch has never been prepared anywhere *else* but on the continent.

Do you consider Bihar a suitable locality because of the abundance of sweet potatoes?—Yes, and the prices are sometimes ridiculously low.

Sweet potatoes have not been exported from India to your knowledge for the manufacture of starch?—No. Those were the ordinary potatoes grown in certain places and sold early in the season in the London market.

ADDITIONAL WRITTEN EVIDENCE SUBMITTED AFTER ORAL EXAMINATION.

Government assistance.

There have been some severe criticisms as to Government granting financial help to struggling industries.

The following is from a leading article in the *Englishman* of November 14th as follows:—

"Some people seem to be under the impression that the function of the Government should be to give financial doles to struggling industries, but several witnesses whose opinions and experience carry weight in the business world have very properly put their foot down on this wasteful proposal which could only result in the creation of a number of weak spoon-fed industries that would cost the country a good deal more money than they are worth."

It is views such as these that have deprived us of much of the trade which we might have held in place of other nations. It is well known what Germany and other countries have done to promote their trade, and what we have failed to do for ours, and yet in the face of this it is astonishing that people should still express such views which, if accepted, can only lead to a state of apathy regarding the trade interests of the country.

Too much importance should not be given to the opinion of men, who are probably more inclined to follow the views best suited to their personal interests, rather than those of national interests. Business men generally advocate that India is essentially a country of raw products, and not suitable for manufactures. This may have been the case many years ago, but is not so now.

Thousands of pounds are spent by the British Government at home and abroad, in salaries to officials of industries, research, agriculture, statistics, etc. Much of this work is done and paid for two and three times over, as there is a constant repetition of the work, and no proper means of pushing the results of the work done. If part of this expenditure was used in applying these results in practice, by means of demonstrations and financial assistance, it would be an important step in the right direction.

Conclusive proof that Government financial aid is a good policy may be seen in the case of sugar, which was a flourishing industry many years ago in this district, but succumbed to bad times. It is now struggling to re-establish itself, with every prospect of success. A little timely help in the bad days would have saved it.

It is the same as regards indigo. The industry was fast disappearing, when help came from Government and saved the situation in Bihar. Less enlightened districts like lower Bengal, Madras, and the North-West, did not avail themselves of this benefit, and went under, but are now again appearing stronger than ever on an improved market, a market which would have died out altogether, but for the support of Government and the energy of the Bihar planters. It must be a satisfaction to Government to see that the help they have given has borne such good results.

WITNESS No. 65.

Mr. J. M. Wilson. MR. J. M. WILSON, *General Secretary, representing the Bihar Planters' Association, Ltd.*

WRITTEN EVIDENCE.

The Bihar Planters' Association, Limited, comprises, among its members, European planters interested in the cultivation and manufacture of indigo, cultivation and manufacture of sugar, the cultivation of tobacco and other country crops, rice milling, etc.

Indigo.

The indigo industry, owing to the competition from the German synthetic product, has been in a struggling state for many years, but there has been a return to better times since the war started, and it is the anxious wish of those who have interests in the industry

that its prosperity, though in a lesser degree, should continue. Having this object in view, the following problems are under consideration:—

(1) The making of paste indigo so as to compete on equal terms with the German synthetic paste, even though the price paid for the cake indigo as against paste is at present higher per unit of indigotin. We are assured that the market for the former is a disappearing one and there will soon be no demand for it. The reason given for this is that the cake indigo is used by the dyers who are not up-to-date and that, as they improve their methods, they will take to the paste indigo. Mr. W. A. Davis, who has come to this country at the instance of the Secretary of State, made some paste during the last manufacturing season, and this has been sent to England for a trial and report. Indigo paste.

From what Mr. Davis tells us I have every hope that the paste can be made and there will not be the difficulties at first contemplated.

The making of paste is, however, being done at the express demand from the dyers at home, even though there is a strong market for the cake indigo, and this change will necessitate some extra expense. Up to the present time, however, we have had no reference to us from the dyers with a view to placing orders should the making of paste be satisfactorily accomplished. We cannot consequently make it in large quantities till we know definitely that the dyers are ready to take it and to pay a fair market price. How would the Industrial Commission advise us to proceed? Unless paste indigo is made on a large scale during the next manufacturing season, it will cause an undesirable delay in bringing natural indigo into use by the home dyers.

(2) With the object of better marketing of the indigo outturn a scheme for co-operative selling or pooling is under consideration, and the following suggestions have been made:— Co-operative selling.

(*a*) The outturn should be pooled and its marketing placed under the control of a small committee.

(*b*) The sales to be regulated so that stocks will be available for the consumers throughout the year.

(*c*) The committee will place itself in close touch with the consumers with the object of supplying them direct and getting to know exactly what their wants are.

(*d*) As the proceeds of the pool will be distributed proportionately after sales, a financing arrangement will have to be made so that funds will be available whilst the indigo is unsold and in the hands of the pool.

(*e*) Value of indigo being largely regulated by its indigotin content, the proportionate amount of the proceeds for distribution will probably have to be worked out on this basis.

The main difficulty in the way of forming this co-operation is, in my opinion, that Bihar represents only a small part of the indigo outturn for India. The estimated outturns of the different provinces for this year are roughly as follow:—

Bihar and Orissa	...	10,800 cwt.
Madras ...	...	40,000 „
Punjab ...	...	7,000 „
United Provinces	...	16,000 „
Bombay and Sind	...	1,200 „
Bengal ...	...	200 „
Total	...	75,200 cwt.

If the provinces outside Bihar could be induced to join the co-operation, matters would be much simplified. We are, however, unable to negotiate with them for the following reasons:—

(*a*) The indigo-growers and manufacturers in the provinces other than Bihar are nearly all small men.

(*b*) They have no organization which can bring them together.

(*c*) Their indigo has a lesser value, per unit of indigotin in the market, than the Bihar indigo.

(The above figures are taken from the Government forecast, Department of Statistics.)

Perhaps the Government of India through the Directors of Agriculture in each of the provinces can make suggestions.

In connection with pooling and co-operative selling, the planters are not unanimous on the following points :—

1. The scheme may not succeed and may, though not necessarily, break down the present arrangements for selling.
2. The useful purposes served by having middlemen will probably disappear.

The question whether the pool should be managed from Calcutta or London has not been settled. The majority appear to favour Calcutta for the following reasons :—

(1) Facilities of finance.

(2) Calcutta is on the spot, can more easily supply the Eastern market, can have a branch in London or Manchester.

(3) Calcutta firms with interests in indigo appear to prefer Calcutta as the selling centre.

(4) Calcutta can ship direct to Russia, France and America.

The advantages claimed for London are :—

(1) Home proprietors can look after the sales and they claim that better prices are obtainable in London.

(2) Sales can be made throughout the year whilst in Calcutta. Under present conditions, sales only last for three months.

During the last two years the members of the Bihar Planters' Association, Limited, have, so as to keep a control on prices, agreed among themselves to fix, from time to time, a minimum rate per unit of indigotin, and we are of opinion that this action has had the effect of keeping up prices. Sellers from the other provinces are also gaining an indirect benefit.

Having the above points in view, my Association would be grateful to the Commission if they would help us with advice. For the scheme of co-operative selling to be effective we consider the whole of the produce of India should be brought into it.

Finance.

When the indigo industry was in a prosperous state, outlays were easily obtainable from Calcutta agency houses, but their interest and commission charges were high and the industry would have fared better had there been on the spot a bank in Muzaffarpur which would carry on this finance. After 1897, when there was a considerable fall in the price of indigo, the agency houses, in a large measure, stopped financing and the want of funds caused some inconvenience to begin with, factories had to carry on from their own resources, that is, they grew crops which had not been previously grown by them to an important extent, the proceeds supplying the required funds during the currency of the year. Most factories have, by this means, become self-contained and there is now not the same necessity to borrow to carry on the working expenses during the year. It will be realized that this system, though sound, is cramped and the introduction of an industrial bank would enable them to arrange for extra funds, and to thus make good use of their credit and extend the scope of their work.

As a protection against competition from the enemy and other countries after the war, I would suggest that a preference for Government uniforms be given to dyes made within the Empire and protective duties be imposed upon dyes imported into Great Britain and its colonies. Such action by the Government would give confidence to the industry and encourage the extension of the cultivation of indigo.

I would also like to ask the Commission to take evidence from all the sources available on the "wilt" disease in indigo and to help us with their advice on this subject. Owing to its prevalence the Java Natal indigo plant which, when it was first introduced into this country, grew healthily and produced abundant seed, instead of remaining on the land for two and even three years, as it did at first, now "wilts" in the first year and dies off in the first year of its growth. The most serious loss connected with this disease is that the seed supply is not sufficient and the amount of land we can sow is restricted to the quantity of seed that can be produced. I understand that in Java this disease is not known.

Oil seeds and bones.

Steps should be taken to start oil mills in these districts so that the oil-cake, an important fertilizer, is retained in the country. A factory for the manufacture of superphosphate would also be a means by which agriculture would be assisted. It is most unlikely that private enterprise can find the capital required for these purposes. I would suggest that such industries on account of their importance should, in the beginning, be subsidized. Government would also have to supply the capital and the factories would be in the nature of demonstration

factories, their accounts and working being open to inspection and to be reported upon by the Director of Industries.

Saltpetre.

This industry is important in so far that it supplies one of the ingredients for the manufacture of explosives, it is necessary for agriculture, saltpetre being a fertilizer and it gives employment to a large number of the labouring classes. It is, however, being carried on under the following disadvantages :—

1. The activities of the Salt Department. The Nunias are subjected to black-mail by the subordinates of the Salt Department. They have to make a low grade saltpetre, otherwise they would be suspected of also making salt.
2. The Nunias have difficulties in getting their licenses.
3. The zemindars' charges when giving permits to make saltpetre within their zamindari.
4. There is not a sufficiency of refineries. These practically dictate the price of the crude saltpetre to the Nunias and the latter do not benefit, as much as they should, from a rise in the price of refined saltpetre in the open market.
5. The refining process is wasteful and, I understand, can be much improved upon. Indigo factories have hitherto barely touched this industry owing, in a large measure, to the chances of interference from the Salt Department. If this could be removed they would take it up.

Hides.

I would suggest that a tannery and boot and shoe factory be started within this division on much the same lines as those suggested for oil mills and manufacture of superphosphate.

ORAL EVIDENCE, 24TH NOVEMBER 1916.

President.—Do you remember anything about the work done by the Indigo Improvement Syndicate? Had you any personal acquaintance with it?—That is a long time ago. I have to take my recollection back to 1911.

They seem to have obtained some rather good results with the use of phosphate, and it is suggested that phosphates might be of value to indigo in trying to avoid the wilt disease. Is it correct that the planters have not been using phosphates to any considerable extent in the district?—No. I myself have been supplying fairly large quantities during the last few years in the form of superphosphates.

Has the use of superphosphate been on the increase?—There was a tendency to adopt it up to the time of the war. After the breaking out of the war prices went up and there was difficulty in getting it.

Has the experience been sufficiently long and definite to give you any reliable opinion as to whether the wilt disease was really avoided by the use of superphosphates?—I could not say anything definite about it. At Dalsingserai many years ago when wilt disease was prevalent it was reported that the addition of superphosphates to the land was of great assistance in making wilt less at any rate.

You cannot say whether these experiments were critically conducted, or whether the report you mention is a mere general impression of the district?—That is only so far as indigo is concerned. Subsequently the superphosphate that I supplied was more for the purpose of growing cereal crops.

If there is a general impression with regard to the value of phosphates, and if definite experiments were made on a fairly large scale with definitely reported results, these would be available for the whole of the Planters' Association. Do you know whether the question was brought before the Planters' Association in any way?—I do not think so. It is a question that has really been brought up by Mr. Davis after he examined the records of Pusa and after he visited a number of factories in the district.

Mr. Davis has only been six months in the country. Is this idea of the value of superphosphates only six months old?—Yes, with regard to indigo. But the value of superphosphate for the land and for the use of other crops is not new. Still it is only during the last few years that it has been really tried in this country. What was tried at Dalsingserai many years ago was given up.

Has there been no definite test on a fairly large scale of superphosphate to show the effect it has in resisting wilt?—No.

The question has narrowed down to whether the use of phosphate will save indigo from liability to wilt. If the impression that it can do so depends on the results obtained by Mr. Davis that impression can be only six months old?—The impression is not based on results obtained by Mr. Davis, but on an enquiry made by Mr. Davis into the records of Pusa.

The question reduces itself to this. Is the idea of superphosphates affecting the indigo plant in its resistence of wilt more than six months old?—There is the original trial made at Dalsingserai.

Did that have any effect on wilt?—I believe the plant was less wilted.

How long ago was that?—It is many years ago. I forget when exactly it was.

Was it tried in one year or more than one year?—I cannot tell you the details. I know that a trial was made and there was that result.

You cannot then precisely say how this general impression has grown up? There was an experiment made at Dalsingserai many years ago with favourable results. Mr. Davis has also examined some records at Pusa which indicate favourable results. We would like to know if there is anything more than that. Do you think that what appears to me as rather a general impression has any other foundation than these two circumstances?—Regarding the wilting of the plant there were also certain theories given by Mr. Howard. Recommendations were made by him to the planters and have been tried carefully at a number of factories. The result of these trials has been that they have not borne out what he led us to expect. Then Mr. Davis came and looked up the records at Pusa. He also visited a number of factories. He saw what the result of superphosphate was on other crops. He said that there was every indication that phosphate starvation and not water-logging was the cause of wilt Then he got the records at Dalsingserai too. Mr. Davis will be able to speak about this himself.

What one has to try to do is to analyse the circumstances so as to distinguish between positive evidence and negative evidence. The fact that the trials of Mr. Howard's recommendations were unsuccessful does not necessarily prove that phosphates are going to be a success?—No.

It is also possible that there is some good in both?—Very probable.

If the land were properly aerated or drained, the plant would then be healthier. That seems to be the only conclusion?—That is reasonable.

But aerating the land by subsoil drainage or any other form does not necessarily give the plant power to resist wilt. There are other circumstances that we have to take into account, namely, sufficiency of phosphate. But with regard to that you would like to refer us to Mr. Davis?—I think that Mr. Davis will be able to speak more clearly about it.

Are you in a position to give us the essential details of these tests that were made of Mr. Howard's recommendations regarding water-logging?—There was a trial made at Mallaya and the crop wilted badly. It was the worst wilted crop that they got.

What year?—This year. A letter came only recently.

To the Association?—It came to Mr. Reid. The same man writes that in another place where the land is wet and where he threw the seed broadcast he got a beautiful crop of indigo with grass growing all round it.

You have two cases then—one in which the land was water-logged and the crop results were satisfactory, the other in which the land was properly drained and the crop wilted. Are there any other cases in which this has been the experience?—Mr Reid got similar results. His lands got water-logged and they grew satisfactory crops while he has had wilt badly in high lands which could not possibly have got water logged.

Have you got a committee of your Association at a place where special attention might be given to the translation of scientific results into practice?—We have got what we may call an Indigo Committee, and we have got a Sugarcane Committee and the different departments have different committees which are expected to look after particular subjects.

Do they organize any test on a large scale?—No. The test is left for the research people to do.

There must be a little gap between the research worker and the practical man which one wants to bridge. It occurs in every industry that we know of, not only here but also at home. It seems to me that we can bridge that gap by utilizing the forces of both parties. We might then get a little further ahead in the matter of applying scientific research to practical indigo growing?—Yes.

Would it be possible for your Association to form any committee that will follow up these scientific results more closely?—In the Sirsah research station we had a committee which met once a month regularly and constantly discussed all the work that was done and followed it up very carefully. But after it closed in July 1914, the work was given up and handed over to the Government of India. Since then we have had to depend on casual reports and there has been no committee to follow up the work.

If you had a committee again, could you get the scientific workers at Pusa to attend the meetings and explain the progress they were making in experimental work?—I think so. Just before the arrival of Mr. Davis we formed ourselves into a committee, what we may call the

Paste Committee, and Mr. Davis has been regularly attending all the meetings. He has given us his views and we have given him our views and there is more co-ordination now than there was previously in connection with any other work, except perhaps at Sirsah where we had a special committee and we worked together.

Is Mr. Davis the only member of the Pusa staff who has been attending?—Mr. Davis attends regularly. The others do not come in so regularly. Mr. Hutchinson comes in sometimes and we have our yearly meeting to which the Pusa scientists come. But that is only once a year.

Cannot this friendly co-operation be regularized, and would it not be an advantage if you got the constant attendance of these scientific officers at your meetings?—We will be only too pleased if that could be arranged. It is hardly within our power to do it. We welcome their coming.

Mr. C. E Low.—Can you give us a list of the names of the members of your Association and a copy of the bye-laws?—I will send them.

We had evidence from one of the witnesses to the effect that in marketing indigo no attempt has ever been made to get into direct touch with individual dyers or dyers' associations, nor has the help of Government either here or in the United Kingdom been asked to enable you to do so. Do you bear out that statement?—We have never made any attempt to get into actual touch with the dyers. Paste indigo was manufactured some years ago and attempt was made to sell direct to the dyers and the dyers took a sample.

You speak of pooling. Do you refer to pooling of manufacture or of sale?—Pooling the outturn of indigo. The manufactured indigo could be placed in the hands of the selling committee so that it could be sold as if for a single interest.

Do you propose to effect that sale direct or through Calcutta?—It is under the consideration of the association.

Do you anticipate any opposition on the part of the Calcutta interests among you to direct selling to London?—The Calcutta firms who have interests in indigo would prefer to have the selling centre at Calcutta.

What are the reasons of the people who favour direct London connection?—The home people would like to have their own marketing for themselves, and there is also the idea that higher prices can be got in London.

You say that the home proprietors can look after sales and they claim that better prices are obtainable in London. Is it the idea that the Calcutta profits are unnecessary and could be eliminated?—The home proprietors think so.

You speak about the outturn of the different provinces. What difference in quality is there?—The Madras quality is very poor. The United Provinces grow indigo which is a little inferior and they get a correspondingly less price.

And how are the United Provinces and Madras indigoes marketed?—In the United Provinces they sell a certain amount locally.

To the mills?—Perhaps to the mills and also to the indigenous dyers and they send the rest to Calcutta and their selling channel is much the same as ours in Calcutta.

And about Madras? I am not sure about it. I think they sell through Messrs. Parry & Co. in much the same way. I do not know much about Madras.

The "jungle" market is supplied from Calcutta at present?—Yes.

Is the export direct from Calcutta or Bombay?—I think from Calcutta. It is sent in the first place to Calcutta. I do not know if it goes across to Bombay. I think it is most likely shipped from Calcutta.

Do the planters grow only indigo or do they grow country crops also?—In the prosperous time we grew practically only indigo and perhaps a small quantity of oats or some crop of that sort. But indigo was the principal crop. Now they grow country crops also.

You say there is a demand for finance not only for indigo but for other industrial concerns. Since how long have industrial concerns in Bihar reached a stage for an effective demand for finance on anything like a large scale?—So far as we are concerned, only recently.

Has any attempt been made to approach the Bank of Bengal or any other bank to open a branch here?—Many years ago the Bank of Bengal was approached. That was before I came to the country. Of late the Alliance Bank of Simla was approached and they do not seem to be inclined to do anything until after the war.

Was there any attempt made to approach the Bank of Bengal in recent times?—I do not think so. Mr. Filgate may have done so.

You suggest that a preference for Government uniforms be given to dyes made within the Empire. Would that include synthetic dyes made by the British Dyes, Limited?—They would come into our fold.

You ask the Commission to take evidence in order to advise on the question of the wilt disease in indigo. Do you not think that there should be some qualified authority to judge on this disputed question and give you a definite opinion?—I think so. Doctors are differing.

You suggest that industries, such as oil mills and superphosphate factories, might be financed by Government in the first instance and that the factories would be in the nature of demonstration factories? Do you not think that any other agency is likely to supply the capital in such cases?—I do not think so. Not at present.

How do you propose that Government should ascertain what the market would be for the product?—I take it that the Government will go into the question. I throw this out as a suggestion on account of retaining the oil-cake in the country for the purpose of benefiting the agriculture of the country.

Is there considerable difference of opinion as to whether superphosphate is required or desirable for indigo under certain conditions?—With regard to agriculture generally there is no question whatever to my mind about superphosphate being beneficial to crops. As I said I have supplied it now for some years and I have had the most successful results. If superphosphate can be supplied at a cheap rate in this country, it would be very largely taken up.

Could your Association furnish any estimate as to the probable amount of superphosphate that would be required by its members?—If it was made in the country, and it is available at a cheap price, I think it would be used very largely. I shall have to make an enquiry about it, but I think that not only would it be an asset to the planters but it would be a very large asset to the cultivating public and especially to the small cultivators. I have sold it to small cultivators.

There is no use in making a proposal of the kind, unless we know exactly whether it would be worth while to put up a factory?—I could get that information and let you know. * But I am quite sure that it would be very largely taken up if it is sufficiently cheap.

You might also consider the question whether bone-meal will be sufficient for the purpose?—Bone-meal acts very slowly.

On what crops?—On cereal crops.

Have you tried it on rice?—No.

Experience in other countries goes to show that bone-meal is very satisfactory. It seems to be used in the coffee districts of Southern India. Did you try very finely ground bone-meal?—I think there must be sufficient rain to bring the bone-meal to act.

It is obviously a case for scientific research. Are there no bone mills in Bihar so far as you know?—No.

You say that raiyats use some superphosphate and that you sold some. Did they come back for more?—Oh, yes. They took it in small quantities.

Do you propose to confine direct Government assistance to the supply of capital to demonstration factories?—Not quite that. Government should advance money to such important industries as the making of superphosphate and oil cakes on account of their great importance to agriculture. I would not bring other industries under my recommendation because other industries have a minor importance and Government perhaps would not be justified. But there may be cases in which Government may think it proper to help any industry.

Have you had any experience of saltpetre manufacture?—I have done a certain amount of trade in saltpetre.

We had certain evidence from one of the witnesses which went to show that the Nunias are prevented from carrying on their local business by being compelled by the planters and zemindars to perform labour. Have you any knowledge of such practice?—Certainly not with regard to the planters. It is one of the rules of our Association that any planter doing so would be turned out at once. But I know it is a very common practice among zemindars to do so.

Do they compel these men to work for nothing or on unfairly low wages?—I am referring to the practice of taking so much work every year for nothing.

That is to say, there is a custom that zemindars work these people for a certain length of time every year for nothing. In consideration of what?—In consideration of their belonging to the tenantry.

Does it apply to the higher castes?—It applies generally to the working classes, to the labouring classes.

* See note below oral evidence.

Are the areas in which saltpetre is obtained in large blocks, or are they in scattered patches?—I should say in large blocks, but in scattered patches within the blocks.

At a distance from each other?—Yes, the blocks would be separated by large distances.

How much have the Nunias gained in price at which they sell saltpetre owing to the war? Are you in a position to say?—It is rather difficult to say, but it is not very much.

On what do you base that information?—I buy saltpetre myself and I paid a higher price than what the local refineries are paying. I think practically all the saltpetres collected locally by these Nunias is brought to me. There may be cases in which some extra profit might have been made by them. But talking of the industry as a whole I do not think they have got much benefit.

Who makes the profits, because the rise in prices has been very large?—The refineries. The refineries are too far apart for them to compete with one another.

Could you form an estimate as to how many there are in the district?—There is one here, one at Pusa and two others. Four, I think, in all.

They are 15 or 20 miles apart?—I think nearly that.

Hon'ble Pandit M. M. Malaviya.—How long have you been Secretary of the Planters' Association?—Since January.

What is the number of factories comprised in the Association?—About 70.

What would be the area upon which indigo is grown by the members of the Association? I find that Mr. Stevenson Moore gives 75,000 sq. miles. Is it larger now or has it contracted? The report was made in 1901?—I would like to look into the matter.

Could you give us the figures of the labourers employed?—It would be such a rough guess that it would not be worth giving.

You say that the members of your Association are European planters interested in the cultivation and manufacture of sugar, the cultivation of indigo, tobacco and other crops and rice milling. Have you any Indian as a member of the Association?—If they have an European as manager. There are Indians but they are represented by their European managers.

The European manager represents them?—Yes.

The proprietor himself does not come?—No.

Your rules do not permit it?—The proprietors do not come. I do not think there is any mention in the rules. I would like to look up the rules. I would not say anything definite about it.

Have you any Indian proprietor as a member of the Association?—Yes.

Who is it?—Babu Kishen Deo Narain.

He has got a European manager?—Yes

Then that is a condition that the Indian proprietor who wishes to be a member must have an European manager?—I should like to look up the matter.

We would like to have the articles of association of your Association and also the bye-laws?—I shall send them to you.

Are these factories large, cultivating say about 5,000 acres on an average? What would be the average area under their cultivation, roughly?—There are 70 factories. I should think about 1,000 acres.

What is the number of labourers employed on an average?—It is very difficult to say. At some periods they are in great demand. At other periods they are not so much wanted.

I want to have a rough idea?—I would not like to say.

Would it be less than 500?—What kind of labourers do you mean?

All those who are attached to the factory, who help in the manufacture, the ploughmen, the cartmen?—It is not easy to answer. I have got a factory of my own of about 500 acreas and I use very little labour.

What would be the number roughly?—I cannot say.

So far as you are aware, is there any special arrangement for housing these men about the factories?—In a large number of cases the factory gives them land and helps them to build their houses; they live in their own home and they come and work in the fields.

Is there any arrangement for instructing their children in any way? I mean for the imparting of elementary instruction to them?—Not so far as I know.

Is there any arrangement for promoting their social welfare. Is there anything except the factory labour which brings the labourers and the factory into touch?—I think there is very friendly relationship.

But is anything done in the way of promoting their social welfare?—Do you mean to say getting gramophones and entertainments of that kind.

Getting them to attend lectures, religious gatherings, and promoting their social welfare generally?—Not that I know of

You suggest a system of co-operative selling for indigo for all India. Don't you think that the area is too large for an organization to sell indigo?—If all India could be brought together into one organization, we should then have a better market for indigo.

Have the manufacturers in other parts of the country communicated with you and expressed a wish for such an organization?—I have suggested that the Directors of Agriculture of provinces might go into the matter and get reports and then let us know.

You say that interest and commission charges were high in the case of money borrowed from the Calcutta agency houses. What is the average rate?—It was high in the olden times. It was 8 or 9 per cent. with a commission of 1 to 2 per cent. on the gross proceeds for keeping the accounts.

Did you borrow this money from Indian bankers?—From European agency house.

You say that most of the factories have now become self-contained by growing other crops. Do you think that the need for industrial bank is still much felt?—The factories have not been able to get the finance and they have had to make themselves self-supporting. If there was a local bank they could have borrowed from the local bank and made their working more extensive.

Have you any idea as to what capital would be needed to start a factory for the manufacture of phosphate?—I have not gone into the matter. I am only throwing out a suggestion.

You say that there is not a sufficient number of refineries and that these refineries practically dictate the price of the crude saltpetre to the Nunias. Has the Government or any other agency ever attempted to establish a co-operative credit society among these Nunias?—I have no information.

Are there not co-operative societies being established in this district?—Yes.

For what purposes?—For lending money.

To whom?—To cultivators.

Is not money lent to Nunias by the co-operative credit society?—Why not? If they belong to the co-operative credit society they get money as well as any of the others.

Would it be lent to them for agricultural purposes?—They could do what they like with the money so long as they give sufficient security.

Are they able to borrow money when they want?—So long as they have got security behind it.

If they combine they may have refineries of their own?—They might.

Hon'ble Sir F. H. Stewart.—Are the members of your Association individuals, factories or firms?—The application comes from the manager of the factory, who becomes a member.

Could you tell me a little more clearly what your ideas are about the selling pool? Do you want to approximate to the system in Calcutta in connection with the Calcutta tea sales?—I do not know what the system is.

Do you want to revert to the old system of sales?—There used to be indigo sales which were run by private firms of brokers to which buyers were attracted from abroad. That is still going on.

Instead of that do you want a central agency under the control of the Bihar Planters' Association?—Under the control of a small committee so that we can better market our indigo and also be in closer touch with the dyers themselves and know what they want.

With reference to the pool, do you think it is any use pursuing the idea unless you can get the rest of the indigo-producing districts to join?—It seems to me that it is a very important thing to make it a success and to include at any rate the greater part of the indigo.

Supposing that you can not do this, what then?—Its success is uncertain and that is why I say in my statement that we should be careful about breaking down existing arrangements.

Have you approached the Government of India in the matter?—The Government of India approve of the idea of co-operative selling. We are really anxious that we should bring this about, and we are trying to work it out. We find many difficulties in the way and as the Industrial Commission came along I thought perhaps I might get some advice as to how we should proceed.

Have you written round to the Directors of Agriculture in the different provinces?—No.

With reference to starting oil mills and factories for the manufacture of superphosphates you say that it is most unlikely that private enterprise can find the capital required for the purpose. Has any scheme been drawn up to your knowledge and put before people?—No. It is a surmise of mine that capital would not be forthcoming.

No scheme has been put forward either in these provinces or in Calcutta?—No.

Mr. A. Chatterton.—Was the cultivation of sugarcane developed by the planters here?—I think they have increased the area under sugarcane cultivation.

Has any money been put into the development of the cultivation of sugarcane in any way equivalent to the amount of money that has been spent on the manufacture of sugar?—Have you been cultivating on indigenous methods, or has there been an improvement in the methods of cultivation?—I would not quite say that. I think that factories have brought about a certain improvement in the methods of cultivation. They have got men from other countries where the cane is grown and they have introduced better methods of cultivation in the factories.

Are they extensively adopted?—At the factories only. Drainage has been introduced.

Has the big cane proved a failure?—There are some factories which are still growing the thick cane and they must find it pay.

You recommend that there should be oil mills started in the districts. Are there no oil mills at the present time?—There is one at Muzaffarpur.

What becomes of the oil seeds?—They are sent to Calcutta and from there exported to other countries.

There must be a local demand for oil?—There is a large demand for mustard oil for different purposes. I do not know to what extent castor oil is used. I do not know about the marketing of oil.

Are there no country mills in existence round here?—Except the village pestle-and-mortar kind of mill in which they extract mustard oil from the mustard seed.

Is it made on an extensive scale?—Every village has its man (Teli) who extracts oil for the supply of the village.

What is your idea? Should these village industries be ousted by big mills?—My suggestion is that a very important fertilizer is leaving the country and it is purely on that ground and not with a view to displace any particular industry.

You want more oil-cake?—Yes, for the improvement of agriculture generally.

Will the people be prepared to pay as much for the oil-cake as they do in other countries?—My point is that the sugar factories will buy up a very large quantity of oil-cake. They use a great deal of it as a fertilizer, and if they get it cheaper they would use it more.

You suggest that a tannery and boot and shoe factory should be started by Government. I simply throw that out as a suggestion. We have the hides and they are all going away. It might create a local industry if the raw material could be utilized here.

Mr. Wilson subsequently submitted the following note with reference to his oral evidence regarding the use of superphosphate and bone-meal in Bihar :—

When I gave my evidence I was asked to enquire and send to the Commission a statement showing the quantity of superphosphate and bone-meal that would be taken by the members of my Association if it was sold locally at rates which were the pre-war rates in England. At the time of giving my evidence we had a note by Mr. W. A. Davis, as well as our own experience, recommending the necessity of applying superphosphate. Since then we have been told by Mr. A. Howard, of Pusa, that phosphates are not necessary. In consequence of these opposite views I have thought it inadvisable to get in and send the returns and would suggest that we should be told by a responsible officer in the Agricultural Department which view is correct. If Mr. Howard's opinion is accepted then the need for phosphates would not exist. The experience of those who have tried superphosphates, however, support Mr. Davis' theory.

WITNESS No. 66.

W. A. DAVIS, B. Sc., A.C.G.I., F.C.S., *Indigo Research Chemist, Pusa.*

WRITTEN EVIDENCE.

Indigo industry.

During the past six months I have been engaged in investigating the possibility of improving the indigo industry. The immediate problem was to enable the manufacturers to put indigo on the market in the form of a paste containing 20 per cent. or more of indigotin, similar to the synthetic article. Experiments have this season been made at the factory of the Hon'ble Mr. D. G. Reid, Belsand, and a detailed report of the whole subject will be presented to Government shortly:

Provided that suitable mixing machinery can be obtained, there should be no difficulty during the next season in manufacturing indigo paste on a considerable scale in one or two factories. The only real difficulty which faces practical working is to ensure that the indigo paste does not undergo fermentation or change after packing and during transport to England. It is impossible to use any of the ordinary preservatives, because they would interfere with the use of the indigo in the so-called "fermentation vats", but from the large scale experiments made this season, it is probable that the addition of one per cent. of soda ash to the paste will prove effective.

The greatest difficulty next season will be to obtain a supply of suitable casks or vessels in which to pack the indigo paste. Arrangements must be made as soon as possible to organize such a supply.

I have recommended that Government should continue the work on indigo for a period of five years. The analytical and research work can conveniently be carried out in the chemical laboratories of the Agricultural Research Institute, Pusa, which is in the centre of the indigo district of Bihar. Instead of carrying out the large scale experimental work in a special experimental factory erected for the purpose, I recommend that it be done in existing factories, under a system by which Government initially purchases any special new machinery required and gives guarantees against loss to the planters at whose factories the work is carried out.

For instance, this season the experimental work on indigo paste was carried out at Belsand factory, and a guarantee given that any actual loss incurred by the experimental paste made being sold at a lower price in London than in the cake form (the quantities of indigotin present being gauged by analysis) would be made good. For next season's experimental work I have recommended that two suitable types of mixing machines be purchased by Government and installed in two convenient factories. Should these machines answer all requirements they would be taken over by the factories at their original cost.

One of the special points to report upon was the possibility of establishing central factories for the manufacture of standardized paste. Owing to the local conditions, principally the difficulty during the rains of transporting half-manufactured material to a central factory, such a scheme appears impracticable. It should, however, be quite possible for each factory to manufacture its own standardized paste under control from a central analytical station, established by Government. For the present this analytical station would be fixed at Pusa, making use of the special staff which has already been organized for the work. Later on, this staff may require considerable extension.

Government, this past year, budgetted Rs 35,000 for indigo research work. This amount will cover the cost of laboratory staff, experimental work and guarantee given to Belsand for paste experiments.

Possibility of improving indigo manufacture.

Evidence is adduced in my preliminary report that the existing method of manufacturing indigo is very inefficient and in most cases converts less than 50 per cent. of the indican of the plant into indigo. In the present system of manufacture the yield depends mainly on the nature of the bacteria which become established in the steeping vat. As there is no chemical or bacterial control, the results obtained are very variable and uncertain, the yield of indigo per 100 maunds of plant varying widely from factory to factory and also in the same factory at different seasons. I am of opinion that the average yields would be greatly improved and made more certain by selecting the best type of bacteria for use in the steeping vats and inoculating with these at the commencement of the season. The action of the bacteria on the plant could be made more uniform and complete by packing the plant during extraction between light grids of trellis work, on which the bacteria would develop and which would act as centres of propagation.

There are also other directions in which manufacture might be improved—these have been dealt with in detail in my report.

Indigo disease and seed supply.

The failure of *khoonties* and seed supply of Java indigo by disease has been the greatest difficulty in the way of the industry of recent years. In 1911 the General Secretary of the Bihar Planters' Association wrote to the Inspector-General of Agriculture, that "the disease this season totally destroyed the *khoonti* crop of Bihari and had there been no disease at least 10,000 maunds more indigo, valued at say £100,000 sterling, would have been made. The condition of affairs is most serious and, what is of the greatest importance, the plant that has been kept *for seed gives practically no return*". Since 1911 up to the present time, the disease nearly every year has devastated the indigo crop and the plant shows obvious degeneration in all directions. Owing to the present high price of indigo the losses from disease now represent far higher values than stated above.

It was suggested in 1914 that the wilt disease is due to water-logging and lack of aeration, and certain recommendations were put forward that the disease could be overcome by a better system of drainage, by soil aeration, by "thikra" and that the seed supply could be assured by August sowings on high well drained land. In my report I point out that these views do not accord with facts nor with the practical experience of planters and that the practical recommendations put forward have in nearly all cases led to unsuccessful results where they have been tried. In spite of the recommendations previously put forward, the seed difficulty is still acute and large areas have had to be planted under the Sumatrana plant instead of the better yielding Java variety, simply because sufficient seed was not available.*

I bring forward detailed evidence in my report to show that the "wilt" disease of indigo has been due to the fact that most of the soils in Bihar are practically exhausted of phosphates which are a vitally essential food for such a leguminous crop as indigo. The outbreak on different estates of "wilt" in 1907 can in fact be correlated with the chemical analyses of the soils of indigo factories made at Pusa in 1907 and as yet unpublished, which show that in this year the amount of available phosphate had fallen to a dangerously low level. Wilt occurred first in soils containing from 0·0002 to 0·0005 per cent. of available phosphoric acid, that is an amount 1-50th to 1-20th of that generally regarded as necessary for fertility (0·01 per cent.). When the available phosphate was above 0·0005 per cent. no wilt occurred. The view that phosphate starvation has been the cause of wilt is in accord with all the symptoms of the disease.

I consider that the remedy for the diseases which have so devastated the Bihar indigo crops lies in suitable manuring with superphosphate. Not only is such manuring absolutely necessary for indigo but it would probably greatly increase the yield of cereal crops. In fact wherever it has been tried experimentally (Dooriah, Dalsingserai, Dholis), such manuring has given very large returns, the crops often being doubled. The records of the Pusa experimental farm which have been placed at my disposal by Mr. Henderson, Imperial Agriculturist, show that double crops are obtained by manuring with superphosphate and that the application of other artificial manures, such as sulphate of ammonia and sulphate of potash, does not further increase the yield. Green manuring alone frequently produces poor returns but if superphosphate is added the crop is increased threefold.

Necessity of obtaining cheaper supplies of superphosphate.

I am of opinion that the crying need of agriculture in Bihar at the present moment is manuring with superphosphate. Under existing conditions due to the war the cost of superphosphate is very high and I would venture to bring before the Commission the necessity of obtaining cheaper supplies of this artificial manure. It would greatly benefit agriculture in these districts if new superphosphate factories were established or arrangements made by which cheaper and larger supplies could be obtained from existing factories.

Scope of Government assistance in the indigo industry.

From the above brief statement it will be seen that the Government can afford valuable help to the indigo industry in the following directions:—

1. In carrying out at Pusa research on the methods of improving indigo manufacture and cultivation including research on the improvement of seed;
2. In enabling factory trials to be carried out in existing factories by guaranteeing individual planters against loss and in purchasing the requisite experimental machinery on a system which enables the factories to take over such plant should it prove successful; and
3. In making arrangements to create a central analytical station which will control and standardise the quality of future supplies of indigo put on the market in the form of paste.

The above statement is necessarily of a very general character. The report on my indigo work when published will give details.

* (Cf. Indigo forecast, 1916-17, Department of Statistics, India, October 16th 1916). "The Sumatrana variety has been a disappointment in growth. A larger area would have been put under the Java-Natal indigo had there been a sufficiency of seed."

Oil seed, oil-crushing and bone mill industries.

The Hon'ble Mr. Morshead, Commissioner of the Tirhut Division, in his recent letter No. 5268-J., to the Hon'ble Mr. E. L. L. Hammond, Secretary to the Government of Bihar and Orissa, Financial Department, has, in paragraph 25, drawn attention to the importance of local oil mills and superphosphate factories to the agriculture of Bihar. At the present time large quantities of the plant food most essential to the soils of Bihar, viz., phosphoric acid are exported from India in the form of oil seeds which are pressed in Great Britain or foreign countries. In this way the soils of India are being stripped of their fertility in an alarming manner. It appears to me that from the point of view of improving agriculture, which is the main industry of India, steps should be taken to consider the possibility of introducing modern oil-crushing mills into this country. I must point out that I have had no direct experience with the oil pressing industry itself and can therefore only speak as to the influence that such an industry would have in improving fertility. If oil seeds could be profitably pressed in India on a large scale, the cake obtained as a bye-product would be of the greatest value to agriculture either as a feeding stuff for cattle or as a manure. The oil-cake would return to the soil a large proportion of phosphoric acid, which at the present time is absolutely deficient in the soils of many localities and acts as the limiting factor to the crops.

I cannot too strongly emphasize the importance of suitable phosphate manuring as a means of increasing the yield of oil seeds of all kinds. The first indication of a deficiency of phosphoric acid in the soil is the falling off of seed supply. Thus in the case of indigo for some years before the "wilt" disease occurred, the yield of Java seed had steadily fallen off in successive years from such high values as 15 maunds per acre to 12, 10, and 6 maunds until finally practically no seed at all could be obtained and the "wilt" disease occurred regularly in the early stages of growth of the 'khoonties'. The experiments made with mustard at Dalsingserai by the Indigo Improvement Syndicate, according to the report by Bernard Coventry (1901) showed that the response of the soil "to the action of superphosphates is marvellous and goes to prove that not only does the crop itself require them but that the generality of lands in Bihar are deficient in phosphoric acid". In 1899 with mustard there was an increase of 800 per cent., in 1900 of 300 per cent. and in 1901 of 250 per cent. caused by the use of superphosphate. The field experiments recorded on page 23 of the report referred to, show that the addition of nitrate of soda had very little, if any, effect in increasing the crop beyond the level reached by the addition of superphosphate alone. That heavy manuring with a superphosphate paid was shown by the fact that the nett profit per acre was greatest (Rs. 110) on the plot where superphosphate was most heavily applied (5 cwt. to acre); on the unmanured field the nett profit was only Rs. 51.

The possibility of directly dealing in India with bones by modern methods on the large scale so as to extract useful chemical products, such as gelatin, glue, size, etc., and leave the extracted bone as a valuable phosphatic manure should be considered by the Commission.

I have pointed out in an article which will shortly be published in the Agricultural Journal of India that the increasing deficiency of phosphate in many Indian soils not only causes a diminution in quantity of the crops but also a very serious falling off of quality and nutritive value. Thus many rices of Bihar grown in soils lacking sufficient phosphate contain about one half the quantity of phosphoric acid that they should do. In some cases the value reached approaches what may be called the "beri-beri" limit, 0·28 per cent. A further falling off in quality carries with it grave risks of malnutrition and the spread of endemic diseases, such as beri-beri and polyneuritis which are generally associated with phosphate deficiency.

There is no doubt too that the poor quality of the cattle in many districts of India and the low yield of milk are due to malnutrition owing to a deficiency of phosphate in the soil. It is well known that the supply of phosphate in the food has an enormous effect in increasing the yield of milk and dairy produce. In view of the fact that agriculture is the premier industry of India and that it is undoubtedly suffering throughout wide areas from the stripping of the soils of phosphates and an insufficient supply of phosphatic manures, such as superphosphate, bone-meal and oil-cake, the necessity of establishing such industries appears to me to be of the very greatest importance.

ORAL EVIDENCE—24TH NOVEMBER 1916.

President.—You came out in May, and have thus had about six months only to tackle a difficult problem. How long have you agreed to remain?—I made an agreement for a year. I thought it advisable first to look into the situation and see what prospects there were, and if necessary, the agreement could be extended.

You have already recommended that Government should continue the work for a period of five years?—Yes.

Have you any hope that the work will be finished in 50 years?—I hope that it will be possible to make improvements in a measurable period.

Don't you think that indigo requires continual and progressive scientific and technical research, in order to meet the competition that will arise by developments in other parts of the world?—Certainly.

And for the rest of India, we shall also want this problem considered?—Yes.

You recommend that there should be a special experimental factory erected for the purpose of carrying out large scale tests?—No, I don't recommend that.

Instead of that you would recommend it being done in existing factories?—Yes, so far as possible.

In different factories or in some specially selected factory?—I have been working so far mainly in one selected factory, although a number of trials were made at other factories to get ideas of local variations, but next year it will be best to get preliminary large scale trials made in not more than two factories, where considerable attention might be concentrated. It would then be a simple matter to extend the results to other factories.

That refers to this area, Northern Bihar?—Yes.

You would not propose to do it in other areas?—Conditions are so different in other districts, more particularly Madras and the United Provinces.

Referring to the assertion that the "wilt" disease is due to water-logging and lack of aeration, you say that this view does not "accord with the facts, nor with the practical experience of planters, and that the practical recommendations put forward have in nearly all cases led to unsuccessful results where they have been tried. In spite of the recommendations *previously put forward*, the seed difficulty is still acute". What recommendations were previously put forward?—That the land should be thoroughly drained, and that aeration should be effected by more extensive cultivation; that *thikras* (broken potsherds) should be applied during cultivation; and finally that the plant should be sown for seed in August during the rains. Those recommendations have been repeatedly tried during the past two years, and with the exception of a few isolated cases, have not shown any improvement.

Have you a list of the experiments that have been made to test this theory?—I have not got the full list but can cite a number of instances.

Will you give us some instances, which are fairly representative, and to some extent crucial?—You can take the Belsand test by Mr. Reid, the Dalsingserai by Mr. Coventry, the Dooriah by Mr. McKenzie, and the Barah by Mr. Macdonald. Those are the most striking instances where the tests have been made very thoroughly and given negative results. In all those cases worse results were obtained than in previous years.

You have looked into the reports of these tests yourself, examined them critically and satisfied yourself that they are a fair test of the proposed methods?—Yes, I have seen the land and also studied the methods applied. There are two more instances, Muktapore and Jitwarpore near Pusa. In all those cases, the methods recommended were adopted and gave negative results.

Do you think that better aeration of the land would give the indigo a better chance of withstanding wilt?—Strange to say, practical experience does not point in that direction; in fact at Belsand the very best results were obtained where the plant was heavily water-logged, and lay under water for some time. The worst results were obtained in well-drained land. My experience tallies exactly with the early experience recorded by Mr. Parnell. Mr. Parnell in his Sirsiah report of 1913 says, "I have spent considerable time in visiting factories in different districts in the hope of finding some constant condition affecting diseased plant that might throw light on the cause of the disease. *I have not seen the slightest indication that water-logging is a prime factor.* The plant on high lands is just as badly diseased as that in the low lands..... The low land plant on the whole has been more healthy, ... etc." (reads from report.) In my report to Government I give several pages of evidence of the same kind, and I cite particularly some statements of Mr. Howard's own experiments. He says in bulletin 51, "In a field where the plants were well spaced and the *drainage and cultivation was as near perfection as could be obtained under experiment station conditions, ... leaf fall and wilt began towards the end of the rains.*" Also, "In plots surrounded by trenches *where no serious water-logging was possible*, everything went well till after the first cut *after which the plant became unhealthy* and gave a very poor second crop." That is a very usual condition throughout all the estates in Bihar. I cite also in this report the evidence that was accumulated in reply to a circular letter issued in 1907, the year when wilt first broke out, and I have analysed the replies to the Bihar Planters' Association, showing that in practice in no single case of badly drained soil did wilt occur. In most of the cases it was in high and light soil which was particularly well drained. There is absolute evidence, to my mind, that there is no connection between water-logging and wilt disease.

Whatever the theoretical expectations may be, you think that the practical tests are sufficiently conclusive to show that water-logging has nothing whatever to do with the case?—Absolutely.

To whom was your report made?—It goes to the Indigo Committee of the India Office, London. It is directed in the first instance to the Agricultural Adviser to be transmitted to the Indigo Committee.

Has that report been put before Mr. Howard?—I submitted the part dealing with his work to him six weeks ago.

He has not given you an answer to these remarks?—The only answer was that my view that wilt was caused by phosphate deficiency did not tally with agricultural experience in Bihar. That is an independent proposition which I consider is not proved. All the information I have gathered is to the contrary. He has not given a definite answer to my remarks.

Will his remarks be included in your report before you send it to the London Committee?—I take it that they may be.

Whose duty will it be to collect Mr. Howard's opinion on that matter?—I don't know at all; that is beyond my province.

You say that the "outbreak on different estates of 'wilt' in 1907 can in fact be correlated with the chemical analyses of the soils of indigo factories made at Pusa in 1907, and as yet unpublished, which show that in this year the amount of available phosphate had fallen to a dangerously low level". Do you know why these analyses were not published?—These analyses were in the same position as a great deal of the work here. They are collected in the archives of scientific institutions and remain unpublished.

Who made the analyses?—Dr. Leather, or someone under his direction. I got hold of them through the kindness of the officiating Agricultural Chemist.

Do these analyses show, besides amount of available phosphates, the carbonate of lime in the soil?—In some cases.

Is it a fact that when carbonate of lime increases without phosphates increasing in total quantity, that the amount of available phosphates decreases?—Certainly; the available phosphate is measured by the action of one per cent. citric acid on the phosphatic soil. When there is a large proportion of calcium carbonate in the soil, the acidity is partially neutralized and you get a smaller amount of the total phosphates going into solution; but the "available" phosphate is still determined by that method and the result is an useful diagnosis of the phosphates that the plant can actually utilize, because the available phosphate in the soil that can be used by the plant is determined by the acidity of the soil, the acidity being due mainly to carbonic acid. When you have too high a proportion of calcium carbonate, the natural acidity is diminished so that the fertility is still measured by the values obtained for the available phosphate.

But these soils are highly charged with carbonate of lime?—Yes.

And in that case you must have a large quantity of available phosphate to counteract the carbonate supply?—Certainly. As my own experiments have shown, superphosphate does not attack calcium carbonate. If you add superphosphate to the soil, it is completely "available," so that the whole of the phosphate can be utilized for the plant. Superphosphate has been applied in Bihar in only a relatively few instances; for instance, at Dalsingserai, Dholi and Dooriah, but in every case it has given ample returns and in fact the greatest profit has been made on the most heavily manured plots.

But the experiments made at Dalsingserai were made on mustard?—They were made on all crops. The mustard results were however the most striking.

Are you confident that experiments made in mustard and other crops apply also to indigo?—I think there is no doubt that indigo would be greatly benefited by the use of superphosphate.

You have no definite proof that the application of superphosphate would enable the indigo plant to withstand wilt?—Experiments have been made in the past with superphosphate only in one case, but this year experiments have again been made at Dalsingsarai, and there is an enormous difference between plants treated with phosphates and those which have not been treated. This difference is both in quality and growth.

What do you conclude from that one experiment at Dalsingserai?—They made experiments three years ago and were treating the indigo crop with different manures to enable seed to be obtained, and the only successful plot was the superphosphate treated one. They repeated the same experiment this year and the results look very promising already.

The plants have not reached the seeding stage yet?—No, only the flowering stage, but the flowers look very healthy and very little wilt has occurred. All the other plots died out, but there has been very little wilt on the superphosphate treated one.

You think there should be further experiments made before one is justified in assuming that phosphates will enable indigo to withstand wilt?—Experiments are being made this year on several estates. Where they can get hold of superphosphate they are using it on my recommendation.

Is it correct to say that wilt disease is unknown in Java?—I believe so.

What is the source of your information?—I have seen a letter from the Director of the Botanical Institute in Java. He states that wilt has never been known in Java.

Are any of the facts connected with the condition of the soil in Java of a nature to enable you to account for this difference?—Probably the Java soil is sufficiently impregnated with phosphates. I have no actual analysis of the soils.

Mr. C. E. Low.—Has wilt been known in the United Provinces and Madras?—Not so far as I can ascertain. I have not gone into the question very thoroughly, because I have not come into contact with any growers though I have had some letters from planters.

You are not proposing to take up research in Madras and the United Provinces?—Not at present.

Turning to the question of making this paste, how far will the pastes of different concerns differ in value from the dyer's point of view?—There will be a certain amount of difference between the pastes, but the main feature in the dyeing value of the indigo is the percentage of indigotin. As in the dry material there may be a difference, say, between 50 and 80 per cent. of indigotin, you get in different pastes a certain variation due to the presence of different kinds of impurities. The proportion of impurities would be slightly variable.

Would that make any difference from dyer's point of view?—Not much difference, because it will be sold on the percentage of indigotin.

You speak of the outbreak, on different estates, of wilt in 1907, as a fact which can be correlated with the chemical analyses of the soils of indigo factories made at Pusa in 1907, and as yet unpublished, which show that in this year the amount of available phosphate had fallen to a dangerously low level Wilt occurred in certain soils very much more than in others; did the phosphatic content of the soil differ from year to year?—The available phosphate differs considerably. The amount present is determined by the bacteriological activity in the soil. The amount of phosphoric acid the essential point with reference to these Bihar soils, is not only extremely low, but the total "phosphate"; with few exceptions, is below 0·1. per cent. It is having its effect not only on indigo but on other crops. Rice grown in Bihar frequently contains less than half the amount of phosphoric acid that normal rice contains.

It is a very important matter from the point of view of nutrition. The cattle of Bihar are generally undersized and bad milk-producers. At Pusa many years ago they had a Government horse-breeding establishment which failed because they could not breed horses with properly formed bones. There was also much nervous disease. That is the natural sequence of the deficiency of phosphates in the soil.

You speak of the necessity of obtaining cheaper supplies of phosphates. You cannot form any estimate of the amount that would be taken up, or the cost under normal conditions of local manufacture?—I don't know the cost of raw materials out here. It is a question of the supply of raw material, e.g., rock phosphates.

Do you think a substantial reduction could be made by using local bones?—I should think so.

Mr. A. Chatterton.—Would bone-meal be of any use as a substitute for super phosphates?—Not in most cases bones *per se* without treatment with sulphuric acid. Dissolved bones or burnt bones contain insoluble calcium phosphate. They could probably be applied successfully in the case of rice crops. Superphosphate in the case of rice crops would probably not be economical. You would have a highly soluble form which would be lost in the water which is in excess in rice cultivation. In the case of rice, crushed bones would be very serviceable as a manure, but for ordinary dry lands, superphosphates would be the best form.

There is a certain amount of experience to show that although superphosphates are more soluble, yet finely crushed bones do produce the same effect and remain in the soil for a long time?—In certain soils where you have a large amount of organic matter rapidly decomposing, the finely ground bones can be converted into the soluble form. But those cases in which ground bones give the same results as superphosphates are rare.

Is it worth while having any experiments made in this direction here with ground bones?—I should think it would pay.

President.—Have they not done anything at Pusa?—They have, as a rule, only applied phosphate in the form of superphosphates; not, I believe, in the form of ground bones.

Mr. A. Chatterton.—Why do you make up a 20 per cent. paste; why not 40 per cent. or more concentrated than 20 per cent.?—The difficulty with natural indigo is that it is impossible to make paste much stronger than 20 per cent. on account of the large proportion of impurities in it. Twenty per cent. is the limit which is determined by the readiness of mixing. If you press the indigo paste in the press to a greater extent, it would be so thick that it could not be easily mixed.

What is the possible percentage in the case of synthetic indigo?—Probably 30 to 35 per cent. but not much beyond that, otherwise it gets too thick to mix. It is a question of mechanical mixing. I made a number of trials in that direction to determine the highest concentrated natural paste that could be made, and I found that with the present degree of purity, one could not expect to get more than a 20 to 25 per cent. paste. The synthetic is put on the market in the form of 20 per cent. paste.

President.—Is it your considered opinion that the indigo industry here has a real prospect of facing competition with synthetic indigo, when prices are restored to their pre-war conditions?—I think conditions are highly favourable. It should be possible to improve the methods of manufacture so that considerably higher yields of indigo are obtained. That is a bacteriological question on one side. It should be possible to introduce chemical improvements also, but at the present moment there is little doubt that, by the use of selected types of bacteria, the output of indigo would be nearly doubled. I have seen several instances which show that very definitely. When you get the conditions in the steeping vat, the yield is double the average of that existing in Bihar.

Double on the total or double only at the beginning of the season?—I have had cases in which one factory and its out-works working the same plant have got results differing throughout the season to the extent of 100 per cent. In one case you may get a yield of eight seers of indigo per 100 maunds of Sumatrana plant, and in the out-works, working the same plant, you get a yield of 14-16 seers. The lower yield is somewhat below the average throughout Bihar. When high yields are once obtained at the commencement of the season they are maintained for a long period. The high results have been exceptional, because probably they have had in the vats an exceptional type of bacteria.

Even there, there was no discriminating cultivation of bacteria?—It was purely accidental; that is the great difficulty at the present time when manufacturing. The bacteria probably vary widely from factory to factory, and according to the nature of the bacteria established early in the season, the results throughout the season are determined. I have some instances where with quite healthy and good plant planters have obtained only two seers of indigo per 100 maunds, which is a quarter of the average yield.

Most of the results of planting in this district seem to be the result of accident. Have you followed the researches by Messrs. Rawson, Bergtheil and Bloxam, and are you quite satisfied that they paid no attention to the bacteriological side?—Yes, I am pretty certain.

And you think that that was the fundamental omission that they made?—Yes.

Witness No. 67.

Mr. A. Howard.

Mr. A. Howard, *Imperial Economic Botanist, Pusa.*

Written Evidence.

I.—Introduction.

My personal knowledge of the industries of this country is confined to one only—Agriculture, which is and must remain for many years to come India's greatest industry. For the last eleven and a half years I have been engaged in investigations relating to the crops of India at Pusa in Bihar and also at Quetta in Baluchistan. In addition to a long scientific training, I have devoted a considerable amount of attention to practical agriculture.

II.—Technical aid to industries.

1. Technical aid in general.

In four cases, the investigations carried out at Pusa and at Quetta have materially benefited industry. In every instance, it is certain that without Government assistance these results could not have been obtained either by the trade or by the people of India.

Wheat.—Up to the year 1905, the varieties of wheat grown for export were types with soft grain which yielded weak flour and which did not mill well. It was soon found that the more valuable strong, free-milling wheats could be grown in all parts of India under all conditions of cultivation; that rust-resistance and high yielding-power could be combined with good grain qualities and that the types most in favour with the European millers were those most liked by the people. Suitable varieties were selected for the various wheat tracts; schemes of seed distribution were organized with the assistance of Officers of the Provincial Agricultural Departments and shipments have been placed on the English market with the object of bringing the new wheats to the notice of the trade. Efforts are now being made systematically to replace the whole of the wheats of the alluvial tracts of the United Provinces by Pusa 12. From numerous crop returns on cultivators' fields, it is estimated that the replacement of the local kinds by Pusa 12 will result in an immediate annual increment of £7,000,000 in the United Provinces alone. The potential value of one aspect of the wheat investigations at Pusa can therefore be estimated at at least £10,000,000 a year Pusa wheats are replacing the local kinds in every wheat-growing province in India including

the North-West Frontier Province, a result which proves that in such work there is no need for numerous experiment stations all over India doing similar work. All that is necessary are a few good stations adequately staffed and equipped.

Tobacco.—When the Peninsular Tobacco Company started its operations in Bihar, it was found that the local product was not suitable and that a new type of tobacco was required which, when cured in the ordinary way, possessed an improved texture and colour. After a considerable amount of work, a suitable type was isolated at Pusa, the seed of which is now being distributed on a large scale by the Peninsular Tobacco Company. This Company spent a large amount of time and money in an attempt to solve this question but without result.

Fruit.—Baluchistan is the California of India. It is possible to grow grapes and other fruits in the Quetta Valley which compare favourably with the produce of any part of the world. Adequate railway facilities existed, but the methods of packing were deplorable. The Local Government realized this fact and some years ago pressed for a Fruit Experiment Station under expert supervision. This was granted by the Government of India immediately suitable arrangements could be made. Improved methods of packing fruit were soon devised and brought to the notice of the trade. A supply of improved boxes and crates as well as packing material were purchased by Government and sold to the dealers. The sales rapidly increased and in 1916 over Rs. 5,000 worth of boxes were sold and at least fifty per cent. more could have been disposed of had the stock been larger. This result is the product of several years of work and of experiment. No fruit trader could possibly have spared the time and money necessary for such an investigation. Now that grapes can be packed and sent without damages to distant markets, like Madras, Bombay and Calcutta, the number of vineyards in Baluchistan is bound to increase and more money will flow into the country.

Drainage.—The producing power of the land in Bihar can be materially increased by th Pusa method of surface drainage. This is being taken up on the estates with very satisfactory results. The system was discovered in connection with work on the inheritance of quantitative characters in tobacco in which it was essential to remove all disturbing factors, such as soil-erosion and local water-logging during the monsoon. Here an investigation in pure science led instantly to what has turned out to be a new system of agriculture.

2. Research abroad.

I consider the continued existence of institutions of the character of the Imperial Institute in London is harmful to the development of India. I have now been engaged in research work in agriculture for seventeen years—three in the West Indies, three in England and eleven in India, and in no single instance have I derived any assistance from the published work of the Imperial Institute. As far as I can ascertain, this organization attempts to act as a middleman or broker between the investigator in the Colonies and India and firms and trade experts in England. In my investigations on wheat, tobacco, fibre plants and fruit, I have found it necessary to work with trade experts like Mr. Humphries and with shipping firms like Messrs. Ralli Brothers. This direct association with the trade has been of the very greatest use to me and I have derived considerable advantage from it, which could not, I feel sure, have been obtained had I made use of the Imperial Institute as an intermediary. All research work should be done in India itself where the local conditions can be studied on the spot. Any work done in London on Indian products is, I consider, a great mistake. The only way in which England can help India in these respects is in the training of investigators. Any interference with Indian work by Advisory Boards or Committees in London is, I feel sure, bound to fail. In research work generally, and particularly in research work of an applied character, Government should follow the maxim that the man is everything. Once the right men are found and provided with the necessary means, everything else will follow. On the other hand, no amount of organization and supervision by Committees will ever produce useful work out of mediocrities however numerous these latter may be.

III.—Assistance in marketing products.

In marketing improved agricultural products like wheat and cotton, the trade can readily be made use of and there appears to be no need for the creation of any new machinery. Messrs. Ralli Brothers are giving their organization free of charge in placing Pusa 4 and Pusa 12 on the English market. This arrangement is working very satisfactorily and has the additional advantage of bringing the new wheats to the direct notice of one of the most important buying agencies who will hereafter handle the trade.

IV.—Organization of technical and scientific departments of Government.

The impetus given to research and development in India by the Government of Lord Curzon has undoubtedly borne fruit and has proved of the greatest value to the country. At the same time, signs are not wanting that the movement now needs direction and that the various departments dealing with research and the opening up of the country should be brought together and that India should be regarded as a whole. There is a danger of loss of energy and efficiency mainly from the following causes:—

(*a*) The clash of Imperial and provincial interests.

(*b*) The conflict of research and teaching in applied work.

It is proposed to deal with these two matters in order.

1. Need of an Imperial policy in development work.

In all matters connected with such subjects as the commercial aspect of crop improvement, a well thought-out Imperial policy is required. The province is in no sense a commercial agricultural or industrial unit. The dominating trade factors in the case of exported agricultural products like wheat are the large ports—Karachi, Calcutta and Bombay. The wheat areas which supply these ports do not depend on Provincial boundaries at all, but on the railway systems. To obtain the best price for any improved product like wheat or cotton, two things are necessary—the produce must be true to grade and there must be an adequate supply. If these conditions are not fulfilled difficulties will arise. To quote a single example—wheat exported from India should be white in colour and it should either be free-milling or soft. A mixture of both types would not fetch a higher price than soft wheat and it may even fetch less. If in improving the wheat crop, two provinces shipping to the same port were to distribute wheats which do not grade together, serious harm to India would result. The province distributing low quality wheat would prevent the one distributing high quality grain fetching its proper price. Such action would rob the cultivator and also harm the trade interests. Similar considerations apply to all exported products in which quality is concerned. All schemes for crop improvement and seed-distribution have therefore a very definite and a very important Imperial aspect. Small areas of improved crops dotted here and there are of little value to the country. The trade requires large supplies of material of the same general type. The only way to meet these requirements when improving the crops of India is to have a clearly expressed Imperial policy. All research work should therefore be directly under the Government of India. The work among the cultivators should be under the Local Governments.

2. Conflict of teaching and research in applied work.

The rival claims of research and teaching on the time of the individual and on the aims of an institution constitute, in my opinion, a very serious danger. Whatever may be said for education, the fact remains that any attempt to combine teaching and research in applied science in India is certain to fail and to fail miserably. Applied research is a very different thing from research in pure science which can be done in a laboratory and often put aside for a time. In spheres of work like the improvement of crops, any successful investigation involves both science and practice and besides is most time consuming and laborious. Anything less than the whole undivided attention of the investigator is useless. To expect any one to give half his time to research and half to teaching and to accomplish anything useful in both these lines of work is to ask for the impossible. Nevertheless, many people holding responsible positions in all parts of the British Empire, have been in the past exceedingly prone to fall into this mistake. Recent events, however, have done much to show very clearly how greatly the Empire has lost both in wealth and in prestige by the neglect of research. In view of the reconstruction which must inevitably follow the war, it is the duty of every investigator to press the claims of research work as a profession by itself and to insist on the furure complete separation, in applied science, of teaching from research.

V.—Recruitment of investigators.

At present, the recruitment of research workers for India is somewhat defective. Men are either brought out to some service or are recruited for special posts. In all cases, the appointment is for life and the pension offered is one of the inducements. This system has two disadvantages. In the first place, unsuitable men are often confirmed, with the result that development in that particular branch is postponed for a generation. In the second place, India offers no opening for short-term men who would be willing to work for five or ten years before settling down in England. In research work, the man counts for much more than the organization to which he belongs. Only a few men are needed, but they must be the very best. The country can afford to pay well for good men and there should be a system by which the field of selection can be widened. One method is to appoint men for short periods, say 5 years on high pay, and to offer still higher pay for the second 5 years, and so on. In this way, Government could pay men what they are worth and so would attract talent to the country. Many men who would hesitate to leave England for good might readily give their services to India for 5 or 10 years.

VI.—Some minor matters.

In concluding this memorandum, I should like to record my opinion on three minor matters which come within the scope of the Industrial Commission and are referred to in the paper of questions.

1. Indian Science Congress.

It is too early to point to any very definite results obtained by this Congress as it has only been in existence for three years and like all other movements has had to feel its way and to acquire experience. The third meeting held at Lucknow last February was very successful and the general feeling expressed was that the future success of this movement is assured. The advantages of such a meeting in India, where workers often labour in isolation, are—(1) the breaking down of departmentalism by the meeting of scientific men from all services; (2) free discussion of the papers read; (3) the interest aroused in the public by the lectures and notices in the newspapers.

2. Study of foreign methods.

One of the great disadvantages under which scientific work in India labours is the narrowness of its outlook. Men are taken from English Universities and transplanted as it were in India. Things are therefore apt to run in grooves and there is apt to be a want of freshness in the point of view. This can be got over by encouraging the investigators to spend a portion of their leave in foreign countries for the purpose of seeing how things are done elsewhere after which they are likely to get new points of view. To bring this about, the leave rules and the study rules need to be made more elastic. On one occasion, it was necessary for me to ask for three weeks' deputation in England so as to lengthen the privilege leave due sufficiently to carry out some investigations. The necessity for this request arose from the fact that I had lost part of my leave on account of a serious illness. This small concession which has led to most important developments in my work on wheat was only given after four official interviews, two in India and two in England. The expenses to which I was entitled in England only paid a small fraction of the cost of the work.

3. Reference libraries.

India now possesses some very useful reference libraries but the contents of each are not sufficiently well known outside the department concerned. The most important portion of these libraries is the bound sets of periodicals dealing with the various branches of pure and applied science. I suggest that the Board of Scientific Advice should take up the preparation and annual revision of a catalogue of the periodical literature of the various libraries in India. A worker could then in a few minutes ascertain whether any original paper exists in India or not. In some cases, he could consult the paper while on tour, in others he could obtain a typed copy for a small fee from the library in question. The issue and revision of such official catalogues would not be a difficult matter. It would be of great use to many workers.

In some cases, the library of a Government institution is split up into sections and any worker or visitor cannot consult the whole of the literature on any branch in the general library. This is a great drawback. A rule should be made by Government abolishing sectional libraries and concentrating all the books and periodicals in the general library of its various research institutes. Any books in daily use in the various laboratories should be duplicated in the general library.

Witness No. 68.

Hon'ble Rai Bahadur Dwarka Nath, B.A., LL.B., *Zamindar and Vakil, Muzaffarpur.*

Written Evidence.

Hon'ble Rai Bahadur Dwarka Nath.

The principal industries of North Bihar are mainly agricultural. Indigo, sugar, tobacco and saltpetre are the four great industries of North Bihar. I will not dwell on indigo industry as the Indigo Planters' Association and its members are the best persons to give evidence about it. Similarly the sugar industry will be best dealt with by gentlemen who have got sugar factories.

Introductory.

A sugarcane selecting station has been made at Sipaya. Similar stations might be made in other parts of the province. My suggestion is that Government should start sugar factories in connection with the sugarcane selecting stations both for the purpose of education and employment.

The tobacco industry will be best represented by the directors of the great tobacco factory at Monghyr. But with regard to this industry I beg to suggest that Government should take steps to teach the proper curing of tobacco and its rolling into cigars and cigarettes at selected tobacco growing centres. At present most of us who are engaged in the cultivation of tobacco only dry the leaves, pack them up and sell them to the middle men. Government can very well take up the question of teaching the cultivators the art of curing tobacco and its rolling into cigars and cigarettes. This will greatly increase the profit of the cultivators who can take them to the nearest factory and convert them into more profitable products. Tobacco curing and cigarette making should be introduced as a cottage industry. There is a wide field for it in this province.

The saltpetre industry is another great industry of North Bihar. It was once carried on an extensive scale and was a very flourishing one. The raw material is obtained from earth which is collected from old as also from existing village sites. Such earth is scraped together in small quantities by Nunias who are very poor. The Nunias extract a crude saltpetre from such village earth; this is purchased by the refiners who prepare from it the much purer grade for export. These refining factories still follow the old methods and have not taken to the new method and apparatus for refining the crude saltpetre which has been recently devised in the chemical section of the Agricultural Research Institute at Pusa, and which is described in bulletin No. 24 published in 1911. I moved a resolution at the Technical and Industrial Education Committee held at Ranchi to the effect that an enquiry should be made as to the possibility of improving the prospects of the saltpetre industry in Bihar. The president of the committee (Hon'ble Mr. LeMesurier, C.S.I.) stated that the question would be examined but no enquiry has been held up-to-date.

I would be wanting in my duty if I were not to state that there is a universal feeling in the province that the Bihar School of Engineering should be raised to the status of a Central Institute with sections for (*a*) civil engineering, (*b*) mechanical engineering, (*c*) educational engineering and (*d*) industrial chemistry. There is also a universal desire that there should be an artisan school in connection with the Bihar School of Engineering and in all important towns. The Greer Industrial School at Muzaffarpur should be raised to the status of a well-equipped industrial and technical school. There should also be a school for imparting training in tanning, as large quantities of raw hides are available here which are imported to other places for want of necessary skill and enterprise. Such schools might with advantage be opened at other suitable centres from which there is a large expert of raw hides.

I also beg to suggest that fullest advantage should be taken of the Tata workshop, the railway workshops and the canal workshops for training as apprentices and for employment.

A list should be made of all engineering, mechanical and electrical firms on the Bihar and Orissa Government contract list and an undertaking should exist with those firms for taking apprentices from Bihar and Orissa.

The future of brass and bell-metal ware is seriously jeopardised by the introduction of enamelled ware. Siwan, in the Saran district, is famous for its metal works. It is high time that we should locally introduce the teaching of enamelling so that the *Thatteras* (as artisans following this craft are called) may fall back upon the enamelling industry. It is industrial chemistry and it might be very well included to be taught as one of the subjects in the Bihar School of Engineering.

The tusser industry in Bhagalpur is a promising industry and if arrangements are made for its improvement and expansion there are great possibilities for it.

Lastly, I beg to submit that the Bihar Government should encourage all local industries which either in their present state will supply Government needs or when improved are expected to do so and the Government should make a list of all such industries and always give preference to them in the supply of Government needs and requirements.

Financial aid to industrial enterprises.

I have found that great difficulties are experienced by the starters of industries in raising capital. Even the small Button Factory of Mehsi which is a promising industry is not making sufficient progress owing to difficulties in the raising of capital. There is a general air of mistrust and people are most unwilling to advance money to industrial enterprises. Mr. Bose's Cutlery Factory at Muzaffarpur, and Mr. Basanti Charan Sinha's Mango Preserving Company have all, more or less, experienced such difficulties. The capitalists are shy of advancing any money to them and the public are equally reluctant to buy shares in such concerns and companies. This difficulty can be removed only when these industries are financed by industrial banks supported by Government. There ought to be a great industrial bank in each province with its branches in every district. Their operations should be supervised by experts appointed by the Government. It should be the business of the banks to advance loans on the security of industrial plants and on stocks and shares. The number and scope of the co-operative credit banks should be increased. As one of the Directors of the Central Co-operative Credit Bank at Muzaffarpur, I have found that the scope of these banks is limited and should be widened. The Government should introduce a system of audit of accounts of industrial banks. In my opinion Government should help new business enterprises of approved character by guaranteeing dividends for a limited period. Money grants-in-aid and the supply of machinery and plant on the hire-purchase system may be made to encourage cottage industry. The Government might also provide part of the share capital of business enterprises.

The Government might also lend services of experts to private companies. The Government expert should help the industrial bank in finding out whether any particular industrial enterprise was a sound one. The Government might also aid existing industries as well as new industries by granting loans at a nominal rate of interest and even without interest repayable on easy terms.

Pioneering of industries.

I am strongly of opinion that pioneer factories should be established by Government. They should be introduced after careful expert examination and where private capitalists will not undertake the work, they should be made over to companies or private persons as soon as they have fulfilled the objects for which they were started. They should be run on sound commercial principles. Where possible the factory should be placed under a Board of Directors comprised of persons engaged in commerce and industry. Inquiry should be made as to the industries to be taken up. In my opinion it would be well to introduce the manufacture of glass and paper in this province.

Training of labour and supervision

In my opinion all industrial schools should be under the Department of Industries. The present arrangement by which the Principal of the Bihar School of Engineering in this province is *ex-officio* Inspector of Technical and Industrial Schools is very defective. He has not got sufficient leisure to look after them. I am strongly of opinion that all technical and industrial schools should be removed from the control of the Director of Public Instruction.

General official administration and organisation.

There is no provincial organization in this province for the development of industries other than agricultural. A Committee on Technical and Industrial Education was held at Ranchi in June 1914 but no practical effect seems to have been given to the recommendations of that Committee. I am strongly of opinion that there should be in this province a Department of Industries under a Director of Industries to deal with purely industrial questions, and the functions of this department should include (1) the introduction of new or improved methods and processes, (2) the carrying out of investigations and experiments, (3) the development of selected industries and (4) the organization of industrial and commercial exhibitions.

There should be an industrial museum and bureau of information under the Department of Industry for the supply of information and advice to the public on all industrial and commercial matters within the province.

The Director of Industries should be an expert in industries and commerce and should be a man of business aptitude and capacity. He should be a whole time man and should have experts in various industries under him. There should also be a committee of experts to report on the possibilities of new industries and the improvement of existing ones.

I am of opinion that a Board of Industries should be established in preference to an Advisory Board. The Board should have executive powers with budgetted funds. Two-thirds of the members of the Board should be non-officials. The Board should consist of employers, men of business, and men interested in technical and industrial education. The Director of Industries should be a member of the Board.

I am also of opinion that there should be an expert to go to existing centres of minor industries, including carpentry, smithy and pottery, to reform the existing workshops, to introduce new and improved implements and generally to make all efforts to raise the industries to a higher status and to give necessary teaching for the purpose. The expert should also try to introduce the co-operative system amongst the workers and to find a market for the articles turned out.

General.

I am very much interested in the weaving industry and consider that there are great possibilities for its expansion and development in this province. A weaving college should be established at some suitable place which should teach weaving, bleaching, dyeing and designing, dealing with all cotton, woollen, and mixed fabrics, and there should be schools at different centres all under the supervision of the Principal of the College. Students should be paid by piece work and not given stipends except under special circumstances.

The number of weavers in this province is very large, and if proper efforts are made to train these weavers and to supply them with capital at a cheap rate of interest great results are likely to follow. The weavers are generally poor agriculturists who supplement their income by weaving. They still follow old and antiquated methods of weaving and have not taken to improved methods of weaving owing to their dense ignorance and poverty. Small weaving factories should be established at suitable centres throughout the province and the Government should have some pioneer weaving factories. No sooner the people find that these factories are successful they will have factories of their own. These factories would not require much capital and the only thing necessary to ensure their success and stimulate their growth and development is to convince the people and the weavers that they are profitable concerns. Improved and up-to-date hand-looms might be very well introduced and demonstrations made in all villages populated by weavers. I am a believer in cottage industry and consider that there is great room for its expansion and development in this province.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. A. Chatterton.—When you say that pioneer factories should be established by Government what do you mean by "pioneer factories"?—Take for instance this aluminium factory. I am told that an aluminium factory was started in Madras first by Government, and afterwards when it became a success, it was sold to a company. I don't know how far that information is correct, but if Government actually shows any interest it may select any business that its experts advise them to be successful, and if they open it and show to the people that it is really successful, the people will at once take it up.

You state that you would like to see pioneer factories for glass and paper. There are already paper factories in Bengal and the United Provinces and there are glass works in various places. Do you mean that Government should start factories to compete with these or do something which these factories don't do?—No; only to teach us; only demonstration factories won't do. It must be conducted on business lines; I mean there should be large factories to show how we may manage them to learn the whole business. At Patna we have glass works which afford a very good field. At present most of the glass we use here is manufactured at Patna itself.

May I take it that your ideas of pioneer factories is that of factories to be established by Government, in which workmen and foremen and factory managers should be trained? It is to be a training school for workmen?—It would serve as a training school, but my idea is not that of a training school. Let us have the factories just as they are started by private

industry. The Government will start one and there apprentices will be attached to enable us to learn business.

President.—That will be a demonstration factory, because if it is started under commercial conditions it will be bankrupt in a short while.

Mr. A. Chatterton.—You are of opinion that there should be a Director of Industries to deal with certain matters including the introduction of new or improved methods and processes to carry out investigations and experiments, develop selected industries and organize industrial and commercial exhibitions, and alongside this Government Department you are of opinion that a Board of Industries should be established, and that that Board should have executive powers with budgetted funds, i.e., you are going to have two organizations working side by side. Who is going to control the executive work of the Board of Industries that you want to have appointed?—I have proposed that the Director of Industries would be a member of the Board.

But if the Director of Industries is going to carry on the work of his own department who is going to carry on the work of the Board of Industries?—The Director of Industries will have certain executive powers no doubt.

Under the Board?—The idea is this; at first at the Industrial Conference held at Ranchi the idea was that we should have a purely Advisory Board, which will consist of officials and non-officials and which will advise the Director of Industries, but public opinion in this province afterwards was that an advisory board would be merely an advisory body, the advice of which would not be binding on the Director of Industries, while if there was an Industrial Board, the advice of that board would be binding on the Director of Industries, and therefore we preferred a Board to a merely advisory body. As far as what would be the relation of the Director of Industries to the Industrial Board the idea is that the Director should be a member of a board and should have certain powers, just as we have got in other executive councils or bodies.

That is to say, the Director of Industries is to be subordinate to the Board?—He would be executive head of the Board. This Industrial Board will have to advise the Government. The Government will consult this Industrial Board on all important matters.

Is the Government to consult Director of Industries?—The Government will consult the Director of Industries, and the Director of Industries will put up the matter before the Industrial Board.

President.—You want him to be Chairman of the Industrial Board?—Yes.

You don't say that in your note?—I will add it.

And that Board will have executive powers and the control of the funds to be budgetted?—Yes.

Mr. A. Chatterton.—Is the Director of Industries to have any power independent of the Board?—No, not independent of the Board.

You state certain opinions here in regard to industrial schools; you are in favour of their being placed under the Department of Industries. Have you got any experience of the work that is being done by the industrial schools in Bihar?—Yes, I am a member of the governing body of the Bihar School of Engineering, to which the artisan class is attached, and there is also a school here called the Greer Industrial School. My experience is confined to the Bihar School of Engineering and the Greer Industrial School.

Why do you object to the Director of Public Instruction having any control?—Because he has no knowledge of industrial subjects as a rule. Of course there are exceptions.

You think that a weaving college should be established—by this would you mean a pupil's factory, which is really a demonstration factory—you want the various processes connected with textile industries to be worked on a practical scale?—Yes.

Why do you call it a college?—I would call it a weaving institute.

Would you run this weaving institute as a commercial concern?—Not exactly as a commercial concern; it would be more of a teaching character, the only thing is that the students would be paid by piece work, so that they may actually learn the work.

Would you advocate the policy of making the sale proceeds of the work done by the pupils' of the school cover the expense of the management as far as possible?—Yes, but I don't think it will be much in the beginning.

Have you got any experience or knowledge of similar insti utions?—There are none in this province.

Have you seen them in other provinces of India?—No.

Have you studied the weaving industry at all from the Bihar point of view?—I have got a large number of weavers who are my tenants, and I therefore take an interest in the weaving industry. I have tried to introduce hand looms, but so far found that it is very

difficult to induce these weavers to do anything practical or to take to these things unless a regular factory on commercial lines is run. What they want is employment, which I could not afford to give them.

That is the crux of the whole difficulty, viz., that the weavers want employment?—Yes.

Would you favour a scheme for organizing the weaving industry, apart from the question of introducing new and improved appliances?—I think both are absolutely necessary.

How do your weavers dispose of the goods that they weave?—They sell it in the market.

Are they in the hands of the *bunnias* much?—No.

They work independently?—My tenants are working independently.

And they find it difficult to get enough work to do?—Most of them are agriculturists as well as weavers. They don't confine themselves to weaving. They will go and plough the land, and they will also weave.

It is a sort of home industry?—Yes.

If you carry out your scheme of teaching improved methods of working, they will no longer be able to work their own lands?—At present what I find about my tenants is this; that if there are four members of a family, one takes to ploughing, another to weaving, and the third emigrates.

You state, with regard to the question of financing enterprise that such factories as the Cutlery Factory at Muzaffarpur and the Mango Preserving Co. experience difficulty in raising funds? why is that; why have the general public this lack of confidence in these undertakings?—For two reasons; one is that it is a new thing so far as Bihar is concerned. Here people have been so long accustomed to lend money on the security of land; and the second is that on account of the failure of these banks and commercial enterprises, there is a general air of mistrust.

Hon'ble Pandit M. M. Malaviya.—You speak of the saltpetre industry, and you think that it ought to be helped; has, at any time, so far as you are aware, a scheme for a co-operative society for these men been proposed?—None, so far as I am aware.

You say that there was a resolution moved at the Technical and Industrial Education Committee at Ranchi to the effect that an enquiry should be made as to the possibility of improving the prospects of the saltpetre industry in Bihar and that the President of the Committee promised that the question would be examined, but no enquiry has been held up-to-date. Why has no enquiry been made?—On account of the financial stringency all our schemes for educational, industrial and technical development of this province have been hung up.

Would it require a very large sum to help the saltpetre industry?—Not that; it would not require a very large amount.

You also advocate a school for imparting training in tanning. Has it ever been thought that the Chamars might be brought into the co-operative societies and helped to tan leather in a better way than at present?—No scheme has been tried in this province or ever proposed.

You have a Registrar of Co-operative Societies; have you got co-operative societies in every district to help agriculture?—Yes, almost in every district.

Do the agriculturists avail themselves of the help of these societies?—They do.

But the co-operative movement has not been tried in the industrial sphere?—Not much.

Not at all, I gather from what you have said?—No, it has been tried, at least so far as Patna is concerned.

In respect of what industry?—In respect of the glass industry. There is a proposal at least to try it.

Has a society been formed to help the manufacture of glass?—Not yet, it is only a proposal. It has not advanced any further.

You say that there should be an industrial bank in each province, with branches in every district, and you are sure that Indian capital would be invested in these banks, if Government rendered some assistance. In what shape should Government help—in the shape of making deposits in the bank?—The Government should purchase shares.

But suppose the Government did not purchase shares but made deposits of public moneys in the bank?—That would also inspire confidence.

But if the Government took up some shares, then it would inspire greater confidence and you think that the success of the bank would be assured?—Certainly.

You say the number and scope of co-operative credit banks should be increased; do you mean in the direction of helping industries?—Yes.

You have spoken of the desirability of introducing the manufacture of glass and paper in this province. If Government examined the schemes for the manufacture of glass and paper, and permitted its expert officers to publish the schemes with all the necessary details, do you think capital would be forthcoming to take up the scheme?—Yes, capital would be forthcoming, but in the initial stages we want Government aid.

You say that technical and other industrial schools should be removed from under the control of the Director of Public Instruction?—Yes.

Don't you think that it will be better that technical schools should remain under the Director of Public Instruction, and industrial schools under the Director of Industries?—A meeting was held at Ranchi and a long discussion took place. There was a difference of opinion among the members both European and Indian, who thought that it would be much better if the schools were removed altogether from the jurisdiction and control of the Director of Public Instruction, while there were others who thought that so far as the technical side of it was concerned, it might very well be under the Director of Public Instruction; but in my own opinion it would be better if the Director of Industries were in charge of both schools.

You say that the Director of Industries should have a committee of experts to report on the possibilities of new industries; do you mean that the Director of Industries should not make any recommendation regarding any proposal for industrial development unless he had received a report from the Industrial Committee?—He might do it, but as a rule he should consult the Expert Committee before taking action.

You have explained what you want the executive powers of the Director of Industries to be; do you think that in some matters he might have executive powers delegated to him by the Board of Industries, and that the Board might decide the larger questions themselves?—Yes, I think so.

Hon'ble Sir F. H. Stewart.— You are one of the directors of the Central Co-operative Credit Bank here?—Yes.

You say that the scope of these banks is limited, and should be widened; have you any definite suggestion to make?—My suggestion is that they should extend to the cottage industries.

The same banks could deal with both?—Yes.

WITNESS No. 60.

Mr. G. Richardson. MR G. RICHARDSON, *Indigo and Sugar Planter, Managing Director of the Japaha Sugar Co. Muzaffarpur.*

WRITTEN EVIDENCE.

Capital.

I have been an indgo planter for over 40 years and was fortunate when offered a share in a factory to be financed by a partner. Ten years ago, when indigo prospects were bad my partners and I decided to erect a sugar factory and refinery to save our property, we were financed by a Calcutta bank with the necessary capital. We had therefore no difficulties for block requirements but later when we found heavy advances had to be given out to secure a cane crop, having heard that the United Provinces Government had advanced a loan of 3½ lakhs rupees to the Bubnowlie Sugar factory Gorakhpur, on advantageous terms, we applied to the Government of Bihar and Orissa for a loan, but were refused.

We then proposed that we should be advanced co-operative bank money, we going security for the money and those who took the advances should do cane to clear the loans. This also was refused.

We have had no financial aid from Government for industrial enterprises, but the India Development Co., of Otter some ten years ago was given financial help to the tune of many thousand rupees.

Government assistance.

If we were advanced money on a fair interest to allow us to advance to cultivators, in the same way as Government did in the opium era, it would help us and the raiyat. Regarding the sale of sugar and molasses, we certainly should be allowed protection against Europe beet sugars, and also against Java importations of both sugar and molasses, the latter in a lesser degree than the former.

Pioneer factories.

Considering that oil mills have not been a success for financial reasons, I think Government might start a pioneer castor cake oilmill. With Government financial help we at Japaha Sugar Factory are prepared to erect one and work it under Government supervision, we supplying the land, store houses; and we already have the European and native staff to work it. A Government loan would be necessary to buy and erect the machinery, and to lay in a large amount of castor seed at harvest time; we would be prepared to buy all the castor cake ourselves and either Government would take the oil for their own use or we could dispose of it.

When I started cane growing I received considerable help from Pusa Government Farm regarding the selection of cane, and I have to thank them for the present country cane we grow which is free of disease so far. If a Government cane farm were started in Bihar properly worked, it would be of great benefit to us. Technical aid.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

President.—Do you deal only with sugar?—I deal in sugar and i digo.

Who recommended that the Government should grant a sum of money to the India Development Coy. of Otter?—I suppose the district officials.

How long ago?—Ten years ago.

Was sugar manufacture just beginning then?—Yes. The Otter was a poineer factory.

Do you know what the capital of that company was?—I cannot say how much it was

Did they pay back their money?—I could not tell you. I do not see any reason why Government should find the money and not be paid back.

Do you think that the sugar industry is now well established and does not want financial assistance?—Yes, except for advances to get our crop as they have done in the United Provinces, in the ordinary way.

You also suggest that Government should give financial help to the starting of oil mills but have not oil mills been started all over the country?—Oil mills in these provinces have not been a success. They have all had to close.

You think that there is nervousness about the starting of further oil mills?—They want o be properly financed and properly run. At present they are badly managed. That is why they do not succeed.

Would it not be sufficient if Government secured technical assistance as to the best way to proceed?—It is only a suggestion of mine because the Commissioner in his report said that something ought to be done. At present a great deal of oil cake is leaving the country.

You do not think that any body in the district would be enterprising enough to start an oil mill?—Indians have started mills but they have not been a success. Some have had to close down; one or two are just closing in Muzaffarpur. They were doing business on a small scale.

Oil pressing as a poineer industry was started in Cawnpore and after it had been made a success the concern was handed over to a small company which has made it a financial success. Should Government money be spent in poineering industries which have already been demonstrated to be suitable?—There was a small oil mill started and run by Europeans in the Saran and Champaran district which worked for a few years but had to shut down.

The dissemination of proper information on the subject would surely encourage somebody to tackle the problem afresh. Have you put this matter before the Planters' Association? Somebody might then be enterprising enough to move in the matter?—I never thought of putting it before the Association.

One wants to save Government money in all possible cases. The difficulty at present is that there is no Government official through whom Government can act; there is no Director of Industries for these provinces. Before any work can be done we have to suggest the machinery necessary to start industries and see that they are properly run on commercial lines. That will mean at least a year or two before there will be any mills. In the meantime I advise you to write to the Director of Industries in the United Provinces and to ask him to give you any kind of information that he is at liberty to give with regard to what is being done in the matter of starting oil mills in Cawnpore where they are at present very successful. If you start an oil industry that would be better than any amount of Government demonstration.

We also want to get some information from you regarding your relations with the raiyats and labour generally in your plantations. We understand that you are not working under the tincottia system?—I have got no agreements whatever. Most of my raiyats grow indigo to a small extent and they also grow cane.

What is your system of working with them? Do you make agreements of any kind?—I have got no agreement of any kind but I give advances to those who require them.

Merely on a note of hand?—Yes.

Have you had any trouble with them?—No. Some men take a longer time than others but they work it off in time. If a man's crop fails I have got to wait for some time.

Do you charge interest?—10 to 12 per cent.

Does the system work well and do the ryots make profits?—They do.

Would you suggest any other system instead? Do you think that the freedom of action between both parties is sufficient?—I have got a factory and we have got our own land. Two-thirds of my cultivation is done on my own land with my own labour. I have much less dealing with the ryots than Champaran. There they are working under the tinoottia system and they have quite a different system of working.

So far as your experience goes you think that the conditions are satisfactory and that the relations are not exactly the same as those in Champaran and other places?— Sometimes I have to put a ryot in the Court for rent. They pay it up and I have no trouble.

Mr. C. E. Low.—Do your tenants use manure?—Not a single one of them. They say they cannot afford it. I got two or three to use green manure but I never got them to use oil cake.

They have had no experience whether the use of oil cake would benefit them?—They have my own experience to guide them. I use it in the case of my own fields. They can see it for themselves. But of course they would require financing for manure.

There is no means of financing?—No. My cultivation goes under water and one often loses a crop from flooding. That is rather risky. The oil cake might settle in the land for the next crop but all the time interest on the money advanced is running.

Hon'ble Pandit M. M. Malavi.—If there was a co-operative society started would these labourers who work under you be induced to take advantage of it?—There is a co-operative society at Muzaffarpur. Do you mean for lending money?

Yes, for lending money to these labourers — Some of them already take from the co-operative credit society.

You think that all the facilities exist for their borrowing money from the co-operative society. What interest is charged?—They have to pay a higher interest. I think it works up to 16 per cent. in the co-operative society. But some of the money goes back to the borrowers.

Because they are co-operators? —Yes.

Can you say what percentage of the cultivators borrow from the co-operative society? —There was one circle in which they borrowed money and they borrowed from me to pay the co-operative society off. They were worried by the co-operative society to pay the money.

In what way?—The society itself was to blame.

It kept on advancing money while the cultivators were losing their crops and I am trying my best to get them out of it. That circle is in a very bad way and I have advanced a lot of money to enable them to pay off the co-operative society money.

But for this, they have no other difficulty?—Some have no difficulty. They pay back the money and get advances again.

WITNESS NO. 70.

Mr. L. W. Macdonald.

MR. L. W. MACDONALD, *Manager, Raj Hathwa, Saran.*

WRITTEN EVIDENCE.

Development of the sugar industry.

I am of opinion that the central system of sugarcane crushing factories worked on the same scale as at present, *viz.*, in factories capable of crushing from 200 to 400 tons of cane per diem is capable of extension in Bihar and in the United Provinces and of continuing as a paying industry provided Government regulation to a certain extent is immediately introduced and that if regulations are not introduced the industry will very soon get into an unsatisfactory state and capital will not then be forthcoming for its further development.

Pioneer factories.

Provided satisfactory regulations are laid down I am of opinion that no pioneer factories are now necessary and that it is not necessary for Government to give any financial aid towards the establishment of more central factories but that in other ways, to which I will allude later, Government financial aid might be given in the form of loans.

My reasons for the above remarks are as follow :—

(1) I started the first central sugar factory in Saran (*i.e.*, partly in Saran in Bihar and partly in Gorakhpur in the United Provinces) and can show definite results of working for ten manufacturing seasons.

These results show that sugar can be produced on an average over a decade of ten years at Rs. 6-2-10 per maund which is equal to £ 11-4-0 per ton and sold for Rs. 8-9-7 per maund equal to £15-11-9 per ton. These results would have been better if more powerful machinery had been used throughout that period but I submit they sufficiently prove my contention that a paying industry can be established.

(2) Throughout this period our raw material was partly grown by ourselves and partly obtained from small growers in villages within a radius of from 10 to 12 miles of the factory and transported by bullock carts over *kutcha* roads which were partly made by ourselves and partly by District and Local Boards.

(3) It was our intention to increase the capacity and deal fully with the available cane within the above or slightly increased radius after having fully satisfied ourselves that the industry could be carried on on a sound and economic basis, both to the sugarcane growing ryots and ourselves.

(4) My reasons for asking for Government regulations is because I understand that they are in existence in other countries such as Java and Formosa, with whichcountries we have to compete, and which in my opinion are necessary in order to produce sugar economically.

My reason for asking that regulations should be immediately introduced is because mistakes have already been made in the erection of central factories in unsuitable localities with the result that factors which are described by Mr. Bernard Coventry, C.I.E., late Agricultural Adviser to the Government of India, as "vicious", "unsound" and "uneconomic" have arisen and are being practised. Perhaps the easiest method of making clear the necessity of having Government regulations introduced in Bihar and the United Provinces is to refer to the present operations of the two existing central factories in the Saran District, *viz.*, the Marhowrah Sugar Factory belonging to the Cawnpore Sugar Works and managed by Messrs. Begg, Sutherland & Co., as managing agents, and the Purtabpore Sugar Factory belonging to the Purtabpore Co., Ltd., and managed by me as managing director.

These factories are situated 70 miles apart. The Marhowrah Sugar Factory, when first erected had no railway facilities for transport of cane, and like the Purtabpore Factory depended on local supplies which, in my opinion, ought to be the first principle in the locality chosen for the erection of a central factory.

The erection of this Marhowrah Central Factory was occasioned through an adjacent indigo factory being in debt to and subsequently taken over by the firm of Messrs. Begg, Dunlop & Co., of Calcutta, who sold the factory to the Cawnpore Sugar Works of which the managing agents were Messrs. Begg, Sutherland & Co., a corresponding firm to Messrs. Begg, Dunlop & Co., in order to enable Messrs. Begg Dunlop & Co. to dispose of it and get their money returned.

When this factory had been in existence for some time it was proved that the locality could not supply an adequate amount of cane and would have come to grief were it not for the fact that a branch railway of the Bengal & North-Western Railway was laid down close to it and connecting with the main line and rates obtained from the railway company which its Agent admits do not pay the railway company and thus enabled the factory to easily extend its operations to other localities situated alongside of the different railway stations.

These rates being so low made distance practically no drawback and as it was easier to obtain cane in a locality where the system of purchase of cane had already been established they naturally came to the railway stations which were within the radius of supply to the Purtabpore Sugar Factory which is situated from 3 to 8 miles of three railway stations on the main line.

These operations began in 1910 by the Marhowrah Sugar Factory purchasing cane from contractors who, in their turn purchased it from raiyats, who would otherwise have sold their cane to the Purtabpore Factory, the method employed by the contractors being to first of all ascertain the rates being paid by Purtabpore and then to offer higher rates per maund of cane at the Railway stations.

During this past season 1915-16 the cane was purchased by an employé of the Marhowrah Factory and abnormal rates were offered and paid to the ryots, the highest being 8 annas per maund of cane delivered at the railway stations so that the factory would have had to pay railway rates and loading charges in addition.

At the same time the Marhowrah Factory was not paying these rates to growers at railway stations nearer Marhowrah so that the inference is that the intention was to compel Purtabpore Factory to pay high rates while preserving low rates for their own local supply.

It may not be out of place to mention here that at the same time the Champaran Sugar Company, situated at Barrah in Champaran, was paying ryots at the rate of 3 annas to 4 annas a maund in villages adjacent to that factory and that Messrs. Begg, Sutherland & Co. are the managing agents of the Champaran Sugar Factory. This difference in rates makes

one wonder what these managing agents consider was the true value of cane during this past sea on and show that the economic value of cane is a matter of no importance to their methods of purchasing it and conducting the industry.

(5) I may mention that it was our intention when starting operations as soon as we had acquired the necessary knowledge of the comparative value of cane during the different mo.ths in which cane-crushing operations can be co.ducte.d, *viz.*, November to May, to introduce a sliding scale of rates according to the sugar value of the cane which sliding scale would have benefitted the r.iyats while maintaining a regular supply to the factory over an extended period which is necessary if any sugar factory is to be run on a sound economic basis. This intention has been frustrated owing to the advent of Marhowrah as a buyer which, as I have shown, purchases cane without any regard to its real value and deters the raiya s from entering into any arrangement for keeping their cane for different periods.

(6) It was also our intention to introduce better varieties of cane and fresh seed amongst our growers but it is obvious that if anybody is at liberty to step in and purchase cane at, or offer, any rates for it, the proprietors of central factories will naturally hesitate before going to expense and trouble in doing so.

(7) So far the Purtabpore Factory has not adopted retaliatory methods, having been each year assured that these purchases were only temporary and would be abandoned as soon as the supplies obtainable nearer to the Marhowrah Factory were sufficient for their requirements and that their cultivation was steadily increasing Messrs. Begg, Sutherland & Company propose continuing their operations unless we purchase canes on their behalf in our own locality and consequently against our own interest.

These circumstances prevail in a district where with properly selected sites other central factories could be established which would not interfere with the cane supplies of each other.

These facts, I venture to submit, show that some sort of Government regulations are necessary to ensure the further development of central factories.

(8) These methods may be of benefit to ryots or growers who happen to be within carting distance of railway stations, but if they interfere with the erection of central factories which deal with small zemindars and ryots who are within carting distance of railway stations as well as ryots and small zamindars who are not within carting distance of stations it seems to me that these benefits are doubtful and if they result in competition it means that more than the proper value of cane will be paid to the growers, thus preventing factories from being in a position to compete with imported sugars and would probably result in high protection having to be given if the industry is to continue; whereas I maintain that if suitable regulations are introduced by Government, the industry would be in a better position to compete with foreign countries.

(9) It appears to me that it is no longer necessary for Government to establish any pioneer factories as it has been already proved that given fair conditions the industry can hold its own.

Provided Government regulations were established which would secure us from competition regarding supplies of raw material, we would be glad to place all information and statistics and experience in the hands of Government or any responsible people desirous of investing capital in the sugar industry and would be glad to see many additional central sugar factories started in Bihar and the United Provinces, as this would strengthen the position of the industry, and no doubt others would be prepared to do so also.

(10) My suggestion for Government regulations are that central factories should be secured as to their cane supply and that Government should reserve to itself the right of permitting the erection of new central factories in order to prevent the erection of them in unsuitable positions. In addition to the circumstances of the location of Marhowrah Factory in a locality without a sufficient cane supply we have an instance of another central factory situated at Ottor which had to be bodily removed from the Muzaffarpur District to the Darbhanga District to a locality with a suitable cane supply.

That the Government regulations should include the right to fix the rates to be paid to the growers.

(11) With regard to my opening remark as to extension of central factories, I know several Indians besides Europeans in this district who are prepared to invest capital in and take an active part in conducting central factories and considering that there are many Indians in Cawnpore and Agra and other places, who have for ages been interested in the sugar industry and who understand it, I have no doubt that these Indians would invest capital in central factories. The number of central factories which could be established is limited so that existing local interests, both European and Indian should, provided the Government decides to regulate the industry as we suggest, be consulted and taken into consideration before permission is given to anybody to erect a central factory.

(12) With reference to my opening remark about Government financial aid in the form of loans, I venture to suggest that if a central factory can show that it has sufficient

capital to establish itself and can show that money is required in addition for improving means of transport locally then loans might be given.

(13) With regard to other forms of aid to the industry, research stations and farms for the supply of improved seed or varieties of cane might be organized and maintained by Government.

(14) No Government organization is required for the disposal of sugar or molasses as this branch of the industry is already established.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Dr. E. Hopkinson.—You do not refer specifically in your note, to the Dooriah experiments in growing flax which were started, I think, about 8 years ago and which were carried out on your estate. Are you familiar with the whole course of the experiments?—Yes.

Did they originate with the Planters' Association or otherwise?—I think I originated them through the Planters' Association.

And then the suggestion was made to the Agricultural Department, that it should help in defraying the expenses of the experiments?—Yes. I bore all the other costs.

You personally bore them?—Yes.

Is it correct to say that the general result of these experiments extending over several years was to prove that flax could be grown for fibre as a profitable crop?—Yes.

And of course at a time when the price of flax was at a considerably lower level than at present?—Yes.

It was shown also, I think, that flax could be grown successfully on indigo land that is land that had been previously used for indigo?—Yes.

And that the same land could not be used in rotation for indigo and flax as they are both crops that take a great deal out of the land. It was also shewn that the retting plant of the indigo factory could be made available for flax so that in the event of indigo cultivation disappearing, it then seemed likely to do, flax would have been an exceedingly useful crop to take its place?—I would not say that, because flax can only be grown on such a small scale.

I do not quite follow you. Why do you say that it can only be grown on a small scale?—Because the lands which are really suitable for flax are so small in a specific area like that of an indigo factory. It can only be grown on lands which are absolutely suited to it.

Is it not co-extensive with the indigo producing area?—All lands which grow indigo are not suitable for growing flax.

That is what I wanted to get at. The thing is that flax requires a great deal of moisture. The chief difficulty in flax is uncertainty of germination. It requires much more moisture than indigo. It is entirely dependent on the rainfall. It would be better to grow it in areas in which irrigation is practised. It is not practised at present at Dooriah But still here in Bihar it would have been a valuable crop in substitution for indigo if indigo had failed?—If it could be properly established, I think, it would be.

Do you consider that further purely experimental work is necessary?—No.

I see from the latest Pusa report which contains an introduction from the Agricultural Adviser to the Government of India that it was intended to continue the work with a central factory; but I believe nothing whatever has been done?—We gave it up on account of the uncertainty of germination and of its being dependent on rainfall. In addition to that each place would require an expert and that would be expensive. It will require an expensive establishment. It is possible that if developed on a co-operative system with a scutching factory and the raw material taken in from a number of different parts of the district to the central place flax growing might be a success in Bihar. I am informed that the retting at any rate in Ireland is done locally in small quantities. Is that not possible here?—I do not think it is, not if you have got to pay for the supervision. It requires an expert in each place.

There are no experts in Ireland, I think. There it is done as a matter of routine after the men have learnt how to do the thing? The scutching is better done in a central factory?—We find it requires a tremendous amount of supervision because it requires great care from the moment you begin to reap it. We had practically one European watching the whole process before we could get any satisfactory results.

Then it comes to this, that you are not prepared to say that further development is necessary to establish complete success, but that you have not sufficient land suitable to devote to flax growing?—We could do it only on a small scale of 400 acres.

Do you mean on your own estate?—Yes, and that only with difficulty.

What is the total extent of your land?—3,000 bighas of our own cultivation. Much depends on the rainfall.

The flax grown by Mr. Vandekerkhove was marketted or attempted to be marketted in Belgium, I believe?—Yes

Was that under instruction from the Planters' Association or on Mr. Vandekerkhove's own motion?—It was his idea.

Have you heard anything of the results?—We found it more satisfactory to send the flax to Belgium and have it sorted and made up there before selling it. We got a better price than sending it direct to Belfast.

Did it not occur to you that it might be shortsighted policy, and though you might realise a better price for the moment, it would create suspicion and confusion?—The Belfast spinners never offered anything like the same price. It was invariably £25 a ton less.

How did it come before the Belfast spinners?—For three years we sent it direct to Belfast.

And their tenders were satisfactory?—We considered them satisfactory. We had to work it up again and prepare it properly for the market.

Are you aware of any experiments now going on in the United Provinces in regard to flax?—I have heard of them.

You are not specially interested?—I am interested to see what their yield is. Our yield came only to 7 per cent. Theirs comes to 12. That will make a lot of difference. That was another disappointing thing. The yield was 7 per cent. and we had hoped when we started to get 12 to 14 per cent.

You never realised that?—No.

The experiments now going on in the United Provinces are farm experiments?—Yes.

To sum up the matter; so long as indigo retains its present position or anything like it you will not think any more about flax?—*No.*

But if indigo reverts to pre-war conditions would you then direct your attention a second time to flax?—*If I could get seed* now I should have put down flax again.

You could not get proper seed?—No

Mr. C. E. Low.—With reference to the limiting of the spheres of influence of the sugar factories what kind of rules would you propose to effect this?—Supposing the Government approved of regulations being introduced,—I should leave it to them to make the rules.

We must have a definite scheme before we could advise the Government?—I know that in Java Government allots localities to central factories. In these localities the lands are rented to the cultivators. It is grown under the contract system. In Formosa a specific area of land of varying sizes of about 17 miles square is allotted to a central factory in which the cultivators are not allowed to make sugar, but are compelled to sell their cane to the central factory. I do not propose that.

What penalty would you propose if the rules were infringed?—The rules could not be infringed if the central factory had power to prevent the erection of the factory originally.

Supposing there is an infringement, would the claimant go to he civil court or would be a criminal offence?—I do not know how it is done in Java.

The circumstances of Java may be different from the conditions here generally. Would your Association prepare a definite scheme?—I should be prepared to work out one myself.

(We shall be glad to have it and also if the rules allow it if you could place the matter before the members of your Association and get their views on the question.)

Do you think they would be insufficient agreement on the point?—Probably not.

WITNESS SUBSEQUENTLY FORWARDED THE FOLLOWING NOTE :—

Suggestions for the economic development of the sugar industry in Bihar and the United Provinces.

The present methods of manufacture of cane into sugar are primitive and uneconomic and it is desirable that modern machinery and modern methods should be introduced in order to extract the maximum quantity of sugar from the cane and thus place the industry on a thoroughly economic basis and in a position to produce sugar in competition with other countries.

In order to fulfil this object it is necessary to encourage capitalists to put up large modern central sugar factories. Owing to the complicated land tenures in these provinces capitalists cannot safeguard themselves by purchasing large tracts of country on which they could grow and supply cane to their mill—the usual course followed to assure full supplies of cane. Specific instances have already taken place in parts of Bihar which show that Government control is necessary to prevent the erection of central mills in unsuitable localities. The proceedings of certain millowners are also calculated to deter other millowners already interested in the industry from improving their existing mills or investing more capital in the industry. It seems, therefore, desirable that in order to encourage capital to invest in modern sugar plant Government should take some action to regularize the industry. The following suggestions are therefore set forward for consideration :—

I. Establishment of an Indian Sugar Bureau with a Director, to whom all matters connected with the industry would be referred, with an efficient staff, which would include at least onefirst class sugar manufacturing chemist and one agricultural chemist.

II. Issue of "Regulations for the control of sugar mills".

The Regulations suggested are :—

Regulations for control of sugar mills.

(1) Persons who desire to erect sugar mills in which modern machinery is installed shall apply for permission to the Director of the Indian Sugar Bureau in accordance with these Regulations.

The same procedure shall be adopted in case of any alteration in the plans of any sugar mill after erection.

(2) Persons who desire to obtain the permission referred to in the preceding paragraph shall apply on certain forms to the local authority.

The local authority, on accepting the application referred to in the preceding paragraph shall forward it to the Director of the Indian Sugar Bureau accompanied by an opinion (on the facts of the case)

Existing local interests should receive special consideration as the area for erecting central mills is limited.

(3) The chief of the Indian Sugar Bureau, on giving permission for the erection or alteration of a sugar mill, shall fix the limits of the district for the collection of material and this limit should not exceed a 20-mile radius from the central sugar factory and should not be less than a 12-mile radius.

Cane situated within the district for collection of material may not be transported beyond the limits of the allotted district without the permission in writing of the millowner in control of that district.

(4) Whenever the limits of the district for the collection of matreial are fixed, or changed, in accordance with the first paragraph of the preceding article, the fact shall be notified in the Government Gazette of the province.

(5) Any person contravening the first paragraph of article (1) and the second paragaraph of Article (3) shall be liable to a fine not exceeding Rs. 300 for each offence.

(6) In the case of sugar mills which have already been erected and come under Article (1) permission shall be applied for in accordance with these Regulations within three months after their enforcement.

(7) A Millowners, Association shall be formed as a medium for representing their interests before the Director of the Sugar Bureau.

(8) The rate to be given to growers of cane to be fixed by the Surgar Bureau, as representing Government, at the commencement of every manufacturing season.

(9) The Sugar Bureau to have ample powers to deal with any question connected with:—

(a) Any suggested improvement in communications, such as laying of tramway lines, utilization of waterways, irrigation arrangements, and making of canals.

(b) Making of contracts for supply of artificial manures on a co-operative basis.

(c) Making grants of money where required for (a) and (b).

(d) Infringement of any of the regulations by the millowners, or others.

Have you any knowledge as to what is the lowest price at which Java can manufacture and place sugar in Calcutta in normal days? About £ 7 a ton I am told.

Do you make it your business to get as much cane as you want by paying a larger price?—Yes.

What does your price run up to?—The highest is five annas a maund.

Has the growing of cane increased since your factory was started or has it tended to concentrate?—It is a cane growing district. The cultivation has increased.

Owing to the coming of the factories ?—Yes.

Has it tended to concentrate round your factory ?—It has tended to increase round our factory.

It is not the case that it has diminished in the outlying area ?—No.

You seem to have had a lot of difficulty with another firm whom you say has been encroaching on your area. Do you know how that firm's managing agents were remunerated ?—They have a commission on the sales of the sugar made.

On the total amount of sugar ?—On the total amount of sugar made.

Irrespective of whether it is made at a profit or a loss ?—Yes. Their object is to make sugar and the profit does not affect them.

The commission is paid on the quantity of sugar and not on the profits ?—Yes, I understand it to be so.

Supposing a light railway were started which would join your mill on the one side and extend to the cane growing areas on the other, I suppose you would object if it tended to help an interloping firm ?—I have built one myself.

Has that assisted the firm in question to get more cane away ?—I am putting up a light railway in order to enable me to get cane from outside.

Hon'ble Sir R. N. Mookerjee.—Is it your own private railway ?—Yes.

How did you get the land ?—It is on the Government road.

Government allows you to put it on the road and does not allow the public to benefit from it. Is it the District Board that has given permission that you alone should carry goods and that the public cannot use it ?—I have got such a permission. We are not allowed to carry passengers. We can only carry our goods.

At public expense ?—The public is inconvenienced by that much occupation of the road ?—That may be one way of putting the matter. The road is very broad.

You have got it done ?—Yes. It is done.

In what district ?—Partly in the Saran district and partly in the United Provinces.

President.—That is an unusual thing ?—It has been done in the Saran district before now by other sugar factories.

Whose sanction did you get ?—You must have had two Governments to deal with ?—The District Boards of Saran and Gorakhpur.

Is it run by steam ?—It will be.

What is the name of the railway ?—There is no name.

What are the limits of the line ?—It is limited to 8 miles. The road is only 8 miles.

What is the speed of the engine ?—I suppose it will go two or three miles an hour.

If the whole of the area be divided up they would become self-contained little islands. If these railways were passed through a number of areas or estates the sphere of influence of one area would extend with the normal expansion of the industry ?—The effect of limiting the area would mean that light railway would never be used.

Light railways are wanted for other industries. If you interfere with the very biggest industry in the district you will limit the construction of light railways and therefore also the general development of the district ?—You mean the carriage of cane by light railways. That would never pay.

I thought it was cheaper than the ordinary bullock cart if you wanted to draw cane from a long radius ?—Of course then it would be useful.

You have to make it possible to carry other things at a reasonable rate. There are two sides to this proposal and we have to think of the difficulties before we can put any proposal before Government. I should like to have the views of your Association ?—The Association's views are all against what is called interloping. There is no question about that.

Have you referred the matter to the Association ?—I should be very glad to refer the matter to them.

Would it not be better if you submitted your note to us and we referred your note to the Association. That will suit me quite well.

(*Witness subsequently added the following note*) :—

In my evidence I did not mean that I was opposed to the erection of light railways ; in fact provided the cane areas were defined, viz., that the railway could not carry cane out of one area into another without sanction of the controllers of the areas, I would prefer that

the ownership and working of the light railways should be in the hands of people independent of the cane factory owners and that they should carry all other goods and passengers without restriction.

Mr. A. Chatterton.—Do you propose to restrict the manufacture of *gur* ?—No.

Supposing instead of small mills central factories were established turning out 5 to 10 tons of *gur* every day worked by modern processes and high class *gur* were made instead of sugar, would you have any objection? —Not at all.

Hon'ble Sir F. H. Stewart.—I understand that you have intimate experience of indigo though you have not given us any written evidence on the point. You have got your records very carefully kept for a number of years ?—Yes.

Could you give us any information as to the different suggestions that have been made for the improvement of organization with regard to the necessity and possibility of co-operation among the planters on the subject ?—I look upon the indigo question as a matter of seed entirely. If we can get a good and large supply of Java seed I think we can make the natural industry a success and compete against synthetic.

You have definite views of your own on the necessity and possibility of co-operation? — If we have to make paste I think we are bound to have co-operation because I do not think it can be made at each factory successfully. It would have to be made in a central factory where if we send it in a rough form of paste it would be made into different forms suitable to suit the different markets.

Has the question been taken up by the indigo section of the Planters' Association ?—We have been talking about it.

President.—Anything of the nature must wait until you know the actual experiments on paste. One does not know at present whether the paste will be acceptable. I do not suppose we shall be able to consider the question until we know that the paste itself is good. That matter will be followed up by Mr. Davis ?—I set up a paste making establishment in 1900. I manufactured some paste myself and offered this paste directly to the dyers in Manchester and Stroud and Lancashire and they all refused to buy it.

For what reason ?—They said they preferred the cakes.

Hon'ble Pandit M. M. Malaviya.—You have spoken of the Java system. Have you any definite information about it ?—I cannot say that I have except that I have spoken with Java sugar planters.

The system, I find, is that under the regulations it is forbidden to hire more than one-third of the arable land belonging to a *Dessa*, that a maximum planting area has been fixed for every factory which cannot be exceeded when hiring, and that enough ground has to be left for the cultivation of articles of food. I do not find any reference to any restriction of areas such as you have suggested. You have no other information except what you gathered in conversation with some Java planters ?—None.

And therefore you cannot be sure that the view is supported by the actual state of thing in Java ?—I cannot tell you.

You did not find any difficulty in connection with your factory until the Marhowrah Sugar Factory came in ?—None.

And in your experience no other factory found any other difficulty ?—That is the only one.

Don't you think that this is a special case arising out of very special circumstances, namely, the sale by Messrs. Begg, Dunlop & Company, to Begg, Southerland & Company ?—It may, be a special case, but I understand that another sugar factory is also going to be put up.

Where ?—Close by.

How far ?—Within 12 miles of my factory.

Now, supposing that the Marhowrah Factory could not persuade the railway to give them favourable rates, do you think they would have been able to compete ?—They can always compete. It all depends on what you pay for the raw material. It also depends on what the railway rates were.

You say that they were able to obtain special rates. I am confining myself to that. I presume that you mean that the ordinary railway rates would have been higher than the special rates. Suppose they were not able to get this concession, they would have had to carry the cane 70 miles ?—It all depends as I say whether they do not lay any consideration at all as to what they pay for their raw material.

But that was because you say that they had the intention of compelling your factory to pay higher rates ?—That is the inference.

But apart from that, supposing another factory was doing business in the ordinary way then you do not think it would have carried the cane from such a long distance but for the special rates ?—Yes.

Taking these special points into consideration, namely, the transfer by Messrs. Dunlop & Company, to Messrs. Begg, Southerland & Company, and the special rates obtained from the railway, if you eliminate these two special factors you would not apprehend that another factory would come to interlope within your area ?—It would. Any factory might come and interlope. That is my object for asking for regulations to prevent it by legislation.

Have you not indicated in your note that the establishment of another factory might be of benefit to ryots and growers ?—Yes.

And don't you think that if no other factory is allowed to come in within a certain distance the ryots, the growers of cane would receive unduly low prices ?—No.

If there is no competition would not the prices tend to remain where they are or rise only very slowly ?—As I have said Government should have the right to regulate the prices. If sufficient rates are not given for the cane the ryot turns it into *gur*. He would not sell it. In addition some 37 per cent. of cane is grown by small zamindars and they have capital of their own.

So far as indigo is concerned you have your boundaries fixed by agreement, that within a certain boundary the manager or proprietor of one factory would not take in labour from outside the boundary ?—It is an unwritten law.

Could you not establish a similar unwritten law in the matter of sugar factories ?—I have tried to do it but I have failed.

Do you think that this one single instance would justify your coming to the conclusion that you cannot establish a similar rule in regard to sugar ? Do you not think it might yet be tried successfully in other cases ?—No.

President.—Would you like to make any supplementary remarks ?—With reference to paragraph 11 of my note I know a large Indian sugar refinery which has been in existence for a long time. The owner wants to put up a cane crushing mill now. He cannot get any machinery owing to the war. Another man, who has been able to get out machinery is now proposing to erect a mill within 200 yards of the first man's place. That illustrates my reasons for asking for Government regulations. I think the existing concern ought to be allowed to have a chance of changing the refinery into a cane crushing mill, as t he owner wants to do, without being interfered with by an outsider.

The proposed cane crushing mill is now in course of erection and trouble is certain to result. The man who is erecting it in the first instance offered to sell it to the owner of the established refinery who, however, declined it on the advice of his expert on the ground that it was not up-to-date. Thus the established owner of the refinery was put into the position of either purchasing machinery, which his expert considered would not prove satisfactory or submit to its erection alongside his refinery. I maintain this occurrence emphasises my contention in paragraph 11 of my written evidence that "existing local interests" should be consulted and taken into consideration before permission is given to erect a central factory.

We know of similar instances in other industries such as rice milling, cotton ginning, etc. ?—I would not call them similar industries because cane is perishable.

There is no doubt that this internal friction damages the industry as a whole in its fight with a foreign country. But we want to find out some practical solution of the problem without at the same time retarding the general development of the country in other ways. You know there is free and open competition in all British industries. One does not want to damp individual enterprize. That is why I have asked you to consider this point ?—If it is decided to do that then would you consider it feasible that Government should put all people interested in the sugar industry on the same basis. One set of people might have distilleries which they take on contract from Government and being in that position may be able to pay a larger price to the grower than the sugar manufactory which is not interested in the distillery.

Of course it is for you to put up proposals of that kind. We are only putting before you objections of a practical kind that will have to be considered before we are able to undertake to make any proposal. We know that in the case of ginning factories a good deal of harm is being done by their unnecessary duplication, as some of them are put up in order that they may force on a pool to buy them up.

Mr. A. Chatterton.—Would it do if it were made compulsory for new factories to obtain a license and an enquiry was made as to whether the factory was necessary or not before it could be started ?—I think definite regulations are required.

Supposing a Bill is passed by which no new sugar factory could be started without a Government license and if a public enquiry was made before the factory was started, would that prevent undue competition ?—I could not say definitely about that.

Witness No. 71

Babu Priyanath Banurji, *Acting General Manager, Raj Darbhanga.*

Written Evidence.

At the outset I must say that having not been engaged in any industry or trade, I have no practical experience or special knowledge of any particular subject on which opinion is invited by the Commission. It becomes extremely difficult, nay impossible, for a layman as I am, in the absence of statistics of small industries in which the people are engaged, to answer the most interesting set of questions put by the Commission, which can only be done by an expert who has made the subject of industrial development his special study. What I note below is the result of my observations in the course of a long residence in the province of Bihar. I shall therefore confine myself only to the subject of industrial development of the province.

Bihar is almost a purely agricultural province. Famines occur at regular intervals and floods also damage crops to a certain extent. These two combined cause great hardship to the people whose condition becomes truly miserable. If a certain percentage of the agricultural population were to take to manufactures it will greatly help them to tide over their difficulties when overtaken by the calamities noted above.

The following are the industries which deserve encouragement and the fostering care of Government :—

(*a*) Cultivation of sugarcane and all the products of its juice.

(*b*) Tobacco cultivation and tobacco manufacture.

(*c*) Fruit canning (Tirhut is celebrated for its mangoes and lichis).

(*d*) Oil mills.

(*e*) Manufacture of saltpetre. (This was once a flourishing industry but is now almost extinct.)

(*f*) Glass manufacture (Haveli-Khargpur in Monghyr district will supply, I believe, a number of ingredients.)

(*g*) Weaving :—

(1) Cotton.
(2) Blanket.
(3) Durrie.

(*h*) Basket-making.

(*i*) Woodwork.

(*j*) Hide curing.

(*k*) Manufacture of brassware.

The Commissioner of the Tirhut Division has, in his report no. 3268 of 28th September 1916 to Government, taken a right view of the existing state of things, and the excellent suggestions he has made not only deserve consideration but will, I hope, be adopted. As he rightly observes, the chief wants in Bihar are money, confidence, demonstration and training.

I shall now attempt to answer a few of the questions directly bearing on the subject.

Q. 5.—Methods of giving Government aid to existing or new industries :—

(5) Supply of machinery and plant on the hire-purchase system.

(7) Guaranteed Government purchase of products for limited periods.

Q. 7.—I have no experience, but I believe that pioneer factories and demonstration factories will greatly help the people in opening the way to new industries and perfecting the existing ones; but they should be made very popular and free access given to those interested in those industries. Pioneer factories.

Q. 20.—Demonstration factories should be established in each province and if they are popular, branches may be established later on when success is fully assured, in the divisions and in the districts. Great caution should be exercised and careful selection of the places made. Demonstration factories.

Q. 29.—Commercial museums should be developed and increased in number. As regards their situation, arrangement and working, they should be left in the hands of Government experts, who should consult the official and non-official members of the Committee. Commercial museums.

Exhibitions.

Q. 31.—Industrial exhibitions are of the greatest value to the people.

Q. 32.—Government should certainly take measures to hold and to encourage such exhibitions. These exhibitions should not only be held in the divisions but in the districts and subdivisions as well. They should not, however, be too frequent. Curiosity must be sustained. It will do, I think, if they are held after four or five years.

The Government policy should be to teach and instruct the people how the resources of a country may be developed.

Government patronage.

Q. 37.—The principal Government departments which use imported articles should publish lists of these articles and exhibit them in commercial museums.

Training of labour and supervision.

Q. 45.—To improve their efficiency and skill, the labourers should be given facilities to work as apprentices in factories and workshops, as they will thereby gain practical knowledge. Theoretical knowledge only will be of no avail.

Industrial schools.

Q. 50.—The industrial schools should be under the control of the Department of Industries.

Railways.

Q. 97.—The only specific recommendation I have to make is the construction of a bridge over the Ganges at Mokameh and the extension of the East Indian Railway line from that station to Darbhanga, so that passengers and goods may be carried direct.

The Bengal and North-Western Railway Co. should make such arrangements that goods when delivered to them are promptly received and despatched to their destination.

General.

To sum up, I may add that for the industrial development of the country, the Government will have to do everything: the people will do nothing as they have not got the spirit of enterprise and know almost nothing about what is going on in the other parts of the world as regards development of industries. Government will have to take the initiative, find out what raw materials are available, make researches, establish factories and workshops and give practical instructions to the people.

As handpower can never compete with machine power, all machines which are worked by hand without the aid of steam should be shown to them and their uses explained.

The country should be explored and all the available resources found out. The aim should be to be self-dependent as much as possible.

There will be impediments and obstacles in every undertaking, but they will have to be carefully removed and surmounted. Great caution is necessary. Unless success is assured in any industry, people will not adopt it.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. C. E. Low.—How long have you been manager?—For over two years.

What were you doing before that?—I was a sub-manager.

How long have you been engaged by the Darbhanga Raj?—About 42 years.

What has the Raj done to encourage cottage industries?—The Raj has nothing to do with encouraging any industry.

Do they give any help to weavers or to other cottage industries?—Nothing has been done so far. When people come and ask for loans and specially during famine, they get loans to enable them to tide over their difficulties: that is so far as agricultural operations are concerned. But as regards industries no request has been made.

The Raj has done nothing either by giving loans or otherwise to improve weaving or to get fresh looms?—The weavers have not applied.

Has the Raj anything to do with saltpetre?—Formerly we used to lease to the *Nunias*. Now I find that no lease is taken. Either they could not compete with the foreign market or they have not cared for it; they have migrated to East Bengal.

Has not saltpetre extraction been taken up again since the outbreak of the war? The price of the saltpetre has increased considerably?—I think the *Nunias* will take it up if they consider it profitable and necessary facilities are given to them.

What facilities do you refer to?—If the Government rules and regulations are less stringent, they will be able to take it up.

Has the Raj anything to do with sugar making?—The tenants cultivate sugar. The Raj simply settles the land. The Raj has bought eight-anna share in the sugar factory at Lohat.

Has the Raj brought any additional money into the factory?—We give money whenever it is required. We have now lent a lakh for the financing of it.

Hon'ble Sir F. H. Stewart.—How far is the Darbhanga Raj from here?—About 50 miles.

The railway which you propose would run mostly through the Raj lands?—From Samastipur it will run through Raj lands.

You say that the Bengal and North-Western Railway should make such arrangements that goods when delivered to them are promptly received and despatched to their destination. Do you mean to imply that they do not do so at present?—They do not.

You refer to the congestion at the river?—I am referring to the shortage of rolling stock. I have seen hundreds and hundreds of packages rotting at the stations. They come from far in the interior and when senders are refused waggons, they have to keep them at their risk.

If another railway were to come in you mean to say that it would stir up the existing one?—Yes, and I think that would be a great advantage.

Hon'ble Pandit M. M. Malaviya.—You say "To improve their efficiency and skill the labourers should be given facilities to work as apprentices". But do you not think that the lack of primary education is a great hindrance to industrial efficiency. Don't you think that if they had some elementary instruction that would benefit them?—So far as mere manual labour is concerned, I do not think that it would have anything to do with industrial development.

You do not think that elementary instruction is needed as the basis of general industrial education?—If you can impart a little education to the poorer classes that may help them.

Help them to benefit more by industrial education?—Certainly, that would help them.

You say that people have not got the spirit of enterprise and know almost nothing of what is going on in other parts of the world. Don't you think that more education both general and technical and commercial would enable people to know what is going on and feel more confident?—Most certainly, I should think so.

WITNESS No. 72.

MR. R. S. KING, *Sub-Manager, Darbhanga Raj.*

Mr. R. S. King.

WRITTEN EVIDENCE.

Co-operative societies.

Q. 12.—Co-operative societies should be encouraged to help weaving and any other old local industries which have survived the modern competition of other goods such as brass work, weaving, etc.

I do not advise financing such industries otherwise (than through co-operative societies)—

B.—To provide capital for raw material and advance machinery.

C.—To help to market the products.

Technical aid.

Q. 15.—Teaching fly shuttle weaving through District Board experts trained at Sirampur.

Q. 17.—The Maharaja proposes to start an industrial workshop at Darbhanga, if Government supplies expert teachers and business manager. These should be supplied by Government.

Q. 19.—A silk weaving shop on a small scale is being run in connection with sericulture at Pusa Imperial Institute. This would be a suitable centre for a weaving school.

There should also be weaving schools at Bhowarra (the centre of the "Kokdi" fine fawn self-colour cotton industry), and at Bhagalpur (the centre of tusser and bafta cloth weaving). Under a promise from Government officials that a weaving school would be started at Bhowarra if I founded a weavers' co-operative society there, I founded one eight or ten years ago, but the weaving school has not been started, the reason given being that there were no trained teachers available.

Marketing products.

Qs. 29 to 37.—There should be an exhibit room at each district headquarters (and if possible at each subdivisional one also) with priced samples of each local product.

By degrees this might be amplified as found advisable.

Qs 40 to 43.—It has always been notorious that the saltpetre industry has been preyed upon and unduly harassed by excise menials.

Training of labour and supervision.

Those indigenous industries which, despite the competition of cheap alternative goods from Europe have vindicated their merits and utility by continuing to exist, though weighed down by a stress of modern foreign competition, such as weaving, brass work, paper-making, lac work, should be helped by technical schools and workshops worked on a practical commercial basis, and the best methods suited to the local conditions taught therein to give those trades really worth it a fair chance of holding their own.

Railways.

Q. 97.—It is notorious for years back that valuable grains, including husked rice, linseed, etc., have been left lying on the open platforms of Nirmalt, Raharia, Bhaptiahi and other

railway stations on T. S. Railway, till the bags rotted and the grains were heavily damaged by weather and rats, etc. I have tried to get waggons for them but the stock was too short. (This I noted especially in 1911-12).

General.

Q. 111.—Oil seed presses and bone manure manufacture may usefully be started locally.

Q. 112.—Flax stalks fibre might be utilized for thread and paper-making and other industries.

Leather tanning and manufacture of leather goods might be introduced. Darbhanga is noted for its kid skins and the hides of cows and buffaloes are all exported imperfectly cured.

This leather trade was mostly in the hands of Germans and Austrians, and has fallen off greatly owing to the war.

It would seem worthwhile to ascertain whether it would be suitable to start a local tannery and leather goods manufacture.

The standardization of weights should be no longer delayed.

It seems a great pity that the Commission on weights and measures did not adopt the decimal and metrical system once for all.

There should undoubtedly be a special department, fully equipped for the improvement of local industries in Bihar and Orissa.

I would propose the following centres of industrial teaching :—

(1) Weaver's schools at Bhowarra, Pusa and Champanaggar (Bhagalpur).

(2) Industrial workshop for brass, motor repairs, aluminium, etc., at Darbhanga, to be financed and owned by the Maharaja and experts to superintend supplies by Government.

(3) Paper-making industry to be revived among the Kaguzies at Bhowarra and Jhanjharpur.

(4) Leather curing and leather work at Darbhanga.

(5) Priced sample exhibit of local products at each district headquarters.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. C. E. Low.—How long have you been in the employment of the Maharaja ?—27 years.

You state " The Maharaja proposes to start an industrial workshop at Darbhanga, if Government supplies expert teachers and business manager." What would the industrial workshop do ?—It would include the manufacture of brass-ware, aluminium ware, and it would also include a workshop for repairs of motors.

I do not quite understand what you mean, whether you mean a workshop working primarily for the purpose of manufacturing articles at a profit to which teaching would be incidental, or whether you mean an institution for the purpose of giving industrial instruction, and incidentally selling the articles which it makes ?—The chief object is to uplift the local industries, and at the same time on such a commercial basis that when they have been taught they could carry on the industry afterwards. It is not for profit.

Has the scheme been worked out ?—The Maharaja was asked by the Government to take up the aluminium industry which had been started at Madras. He considered over the matter. He had also an idea of having a motor repair shop at Darbhanga and I suggested that there are very large numbers of brass-workers in the Darbhanga District who are carrying on their trade under great handicaps, in very old fashioned methods. I thought a brass-ware factory might be started and he said he would also add an aluminium factory.

This institution, will, I suppose, have to investigate local matters and see whether they could assist ?—It would not require much investigation, as it has very thoroughly been gone into by the Hon'ble Mr. Cumming. He went as the Industrial Commissioner over the whole of India.

The weavers' co-operative society which was started to help the weaving school there, how is it doing ?—I was chairman of the union under which it was, till 1910. I am not able to speak very well about its present condition. I know it is carrying on. I cannot say how far it is expanding and becoming more efficient.

How was it managed when you had to do with it ?—It was managed as an ordinary co-operative society is with a panchayat of five working panches and three supervisors. It is under the co-operative union which was founded by me.

They get their money from the Central Bank ?—From the Union. That Union borrows for the purpose of the society. It is financed as a matter of fact by the Maharaja of Darbhanga.

Do you find that it added to the earnings of the weavers to be able to get better finance ?—Yes.

Did you investigate at all how much the earnings of the weavers have increased ?—That I cannot definitely state. The average borrowing rate was about 25 to 37½ per cent. and they are getting money now at 15⅝ per cent. through their society.

What about the purchase of yarn ?—They are left to do that for themselves.

You say that the hides of cows and buffaloes are exported from Darbhanga. Before the war were there any Germans up-country purchasing hides ?—Not just before the war, but for some years previously. For thirty years they had been carrying on the work. There was a German living in Darbhanga. He was connected with one of the German firms in Calcutta. I forget the name of the firm now.

Hon'ble Pandit M. M. Malaviya.—Do you think that Pusa will be a suitable centre for a weaving school ?—Not a very suitable centre because the weavers are not residents of Pusa. As there is a shop where they are doing work in connection with sericulture I thought it might be useful if a small school was started there. The chief centre is Madhubani.

In your opinion if a central weaving school is started it should be at Madhubani rather than at Pusa ?—Certainly. I meant to have them in both places.

You speak of the paper-making industry to be revived at Bhowarra and Jhanjarpur. Would you do that according to the old methods, or would you have modern machinery ?—I meant, if possible, that it should be done on a small scale, and afterwards, if it was found feasible, a factory might be started. I am not personally conversant with the details of paper-making. Across the frontier they still make "bassaha" paper which is very tough and insect proof. We use it for protecting records in our offices.

What is this paper made of ?—They make it, I believe, from old gunny and other cloths.

Do the people in Bhowarra and Jhanjarpur make paper of that kind ?—They said they have lost the art of making it. It is imported from across the frontier. It should not be hard to revive it.

Mr. C. E. Low.—Do you think that paper making on that small scale can possibly compete with a big modern paper mill ?—Paper has gone up within the last six months, owing to the war. If it is paying to manufacture and import it from across the frontier, it ought to be possible to make it locally at a good profit, especially if improved methods are taught.

Hon'ble Sir F. H. Stewart.—You say that the standardization of weights should no longer be delayed. Would it not be a very difficult thing to arrange and enforce ?—I am not qualified to speak on that, but I have seen other things that seemed to be difficult at first come round all right. The railways have brought in the Calcutta weights so thoroughly along their lines that everybody follows them. It is very hard for the ryots to sell grain because the mahajans cheat them over the different standards of weight that they use. They have what they call "chowda gunda" seer, "tera gunda" seer and "bees gunda" seer.

What practical steps would you propose to introduce the change ?—I should think that it could be gradually introduced by making a standard weight in the municipal bazars to begin with.

And that would spread gradually ?—Yes, and people will gradually calculate on that.

About the decimal and metrical system, is it any use adopting it here unless it is going to be adopted at home ?—I put it in the belief that it is bound to be the universal system in the world some day.

But would it be of much use taking the first steps in India ?—India is an enormous country and it will help India's development if brought in.

Even if the English system remained unaltered in the Colonies and the Dominions ?—I think so. I may be very ignorant but I cannot contemplate the British Empire sticking to the old weights and measures after the war, instead of adopting the decimal system.

Hon'ble Sir R. N. Mookerjee.—You say "the Maharaja proposes to start an industrial workshop at Darbhanga, if Government supplies expert teachers and business manager "?—The Government is in an exceptional position to secure a business manager, and I think it is the only hope of its being worked properly.

Is it to be on loan or on fee ?—On loan.

Ordinary business firms do not go to Government for business manager ?—They are accustomed to trade but the Maharaja is not.

The Government is not accustomed to do business ?—They have got dealings with many businesses and they have everything to help the industries in whatever way it is most efficient.

You complain about the railway goods lying idle on the open platforms of railway stations. Are you aware that godowns, which are known as mundies are generally built near

the railway stations by the merchants or zamindars for storing goods ?—I have tried to get the merchants to take up that idea and I offered to help them. In some places they do it. But they do not seem to do it in this locality. Grain business is for three months in the year, and at other times the sheds would be more or less empty.

WITNESS No. 73.

Babu Mahendra Prasad.

BABU MAHENDRA PRASAD, *Manager, Bank of Bihar, Ltd., Chapra.*

WRITTEN EVIDENCE.

Capital.

Q. 1.—I have not raised any capital for industrial enterprises, but I have raised capital for banking and trading companies, for the Bank of Bihar and the Chapra Home Stores.

I am also organizer for co-operative societies in my district, and have organized societies and supervise their work.

The difficulties were public scepticism in the eventual success of the enterprises and secondly the large interest which the public could get on their investments in land and house mortgages. The rates usually prevalent are 9 to 18 per cent. per annum, which no commercial venture can afford to pay from the start. This is the main reason, coupled with the risk and uncertainty of the venture.

Public confidence can be obtained by really competent and honest men taking to industrial pursuits. The Government can help in creating such confidence by establishing a department which will help people in getting the right sort of men and by giving them information as to particular kinds of venture which may have a good chance of success.

After all when a few enterprises have succeeded public will feel that it is safe to invest their savings in them.

In Bihar where there is an absolute lack of enterprise greater guidance in both these directions is necessary than in other provinces where the people are more advanced.

Q. 2.—The sources of capital are deposits from or borrowings from zamindars and the professional classes.

Government assistance.

Q. 4.—The Government, so far as I know, has not rendered any financial aid to any industrial enterprise in Bihar.

Q. 5.—In my opinion Government aid to existing or new industries should be by way of:—

(*a*) Guaranteed Government purchase of products.

(*b*) Supply of machineries on hire-purchase system.

(*c*) Guaranteed dividend with or without refund to Government.

(*d*) Provision of part of share capital by Government for sometime. That will create confidence in the public mind. But when any particular enterprise has succeeded to a certain extent such aid should gradually be withdrawn leaving the concern entirely in the hands of the people.

Bounties and concession in railway freight on raw materials or manufactured products would be of some help.

Pioneer factories.

Q. 7.—I have no experience of pioneer factories. But I think that in Bihar such factories will be of immense help to the people. They should, however, be handed over to private capitalists or companies when they have succeeded in demonstrating the chances of success of enterprises in the particular direction.

Financing agencies.

Q. 9.—Oil pressing is the only industry which is carried on on a comparatively large scale here. This is hampered owing to want of funds to store oil seeds in the beginning of the season, as also the manufactured oil in a falling market.

My bank is giving facilities for this now. We charge now 8 per cent. interest. There is a fairly large demand.

Co-operative societies.

Q. 12.—Cottage industries generally may be greatly assisted by co-operative societies. Among such industries may be mentioned coarse cloth making such as the weavers in the villages make, durrie making, saltpetre industry in which *Nunias* are engaged; there is room for the expansion of co-operation in regard to dairies which in out-of-way parts of the province will deal mainly in *ghee*.

The organization of such societies should be similar to that of existing agricultural co-operative societies. They should aim at supplying capital at cheaper rate than is done by mahajans and also at disposing of the product of the industry of the members to their best advantage.

Commercial museums.

Q. 29.—There should be a fully equipped commercial museum and reference library attached to it in each province, under the control of a Director of Industries, Bankipur, would be the best place for this in our province.

If there are such museums then there would not be much necessity of having trade representatives in other provinces of India.

The Government Departments should publish lists of all articles they use and also exhibit them in commercial museums.

Official organization.

Q. 59.—No provincial organization exists in our province.

I would recommend the appointment of a Director of Industries in our province. It would be difficult to form a Board of Industries in this province and much more difficult to make them meet. There is no one central town or district in this province where proper men might be available.

The Director should be a business man or a non-expert official. An expert would mainly specialize in his own line and would probably cost more without any appreciable gain as a whole.

A yearly conference of the Directors of Industries of all the provinces or of certain members or secretaries of the different Boards would, in my opinion, suffice to correlate the works of each province. An Imperial Department does not seem to me to be capable of doing much good.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. C. E. Low.—How long has the Bank of Bihar been established?—It was established six years ago.

What branches has it got ?—It has four branches.

You are manager of the Chapra branch ?—Yes.

How long have you been in their employ ?—Since the beginning.

What training had you in bank management before you entered the bank ?—I had no training.

What were you doing before you joined the bank ?—I was a B. L. student.

When you first entered the bank, who showed you how to do bank business ?—The General Manager of the Bank of Bihar, who was a business man.

What industries does the bank finance ?—We are doing a godown business in these days i.e., advancing money against goods stored in our godown, belonging to merchants who export goods from Bihar to Calcutta.

Do your lend money to finance the product of factories ?—Supposing a sugar concern starts business and wanted money to purchase sugarcane, would you do that kind of business ?—Yes.

What security do you ask ?—Only the personal security of those persons. They have got a business here and on the security of that business we lend. We have never done any such business up till now.

Have you been asked to do it ?—We would do it, but they would have to pledge the sugar they produce, i.e., we would have to have a lien on the sugar.

What is the capital of the bank ?—The working capital is about 11 lakhs.

How much of that is in shares ?—About Rs. 1,25,000.

And your subscribed capital ?—That is the subscribed capital.

I mean, what is the authorized capital ?—The authorized capital is 10 lakhs; subscribed 2,50,000, and 1,25,000, has been paid up.

Do you take deposits ?—Yes.

Do you issue cheque books for current accounts ?—Yes.

You say you are giving facilities for the oil-pressing industry; what industry is that ?—In Chapra there are a number of oil-presses. They have to purchase seed and we advance them money against that seed which they place in our godown. They take away these seeds, crush them and place with us oil and cakes.

You have a lien on the oil and cakes ?—Yes.

Are they selling all their oil ?—Yes.

How big are these concerns ?—They are not big concerns.

Are they working by steam power ?—No.

Have you any experience of co-operative work?—I have been connected with the co-operative movement for the last two years and have organized a number of societies.

Do your banks lend to central banks?—We deposit money with the Provincial Bank of Patna.

Have any industrial co-operative credit societies been started to your knowledge?—No.

Was there any particular reason why they should not have?—In our subdivision we have just begun.

In what industry?—We have not yet started societies for any industry. The co-operative societies have been started lately.

Hon'ble Pandit M. M. Malaviya.—How many co-operative societies do there exist in this district?—There are 50 in my subdivision, Sewan, and 5 or 6 in Gopalgunj, i.e., 55 in the whole of the district.

Do these societies administer to the needs of the agricultural community only?—Yes.

What interest do they charge on loans?—15 per cent. from the villagers.

What rate of interest do you pay to your depositors?—7½ per cent.

Why do you charge these cultivators such a high rate?—Central banks get money at 7½ per cent.; they lend at 12 per cent. to village banks; the village banks lend at 15 per cent. to villagers. There should be a little deduction in this. I have moved in this matter. I say they should not be asked more than 12 per cent.

When you can borrow at 7½ per cent., would not 9 per cent. suffice to meet all your charges?—In the beginning there would be trouble. It is a fixed rule, but it ought to be altered. As these villagers are persons who usually get loans at 25 per cent. they are thankful to get it at 15 per cent.

What is the amount of capital employed by these oil-pressing concerns that you have been financing; roughly?—About Rs. 1,000. It does not go beyond that, but at the same time they have to purchase. Rs. 4,000 to Rs. 5,000 will be quite enough for one machine for one place.

You say you are in favour of the appointment of a Director of Industries in your province, and that a yearly conference of the Directors of Industries of all the provinces or of certain members or Secretaries of the different Boards would suffice to correlate the work of each province?—Yes.

You don't think that an Imperial Department would do much good?—No.

What is your reason?—I think they would not be in touch with the provinces and with different persons. The provincial department has to do a lot of spade work and to be brought in touch with business men and business generally.

Hon'ble Sir F. H. Stewart.—With reference to the general manager of your bank, to whom you referred, he is an Indian also?—Yes.

What banking experience has he?—He was manager of another bank before the came to this bank.

How did he get his banking training first of all?—He learned the business in one of the larger banks in Calcutta.

WITNESS No. 74.

Mr. W. H. Williams.

MR. W. H. WILLIAMS, M.I.M.E., *Partner, Messrs. Arthur Butler & Co., Engineers and Contractors, Muzaffarpur.*

Financial aid. Government assistance.

I am of opinion that very little Government aid, if any, is necessary in the way of financial assistance: what is wanted is some Government help in the way of expert advice, both technical and business, in the initial stages of examination of the possibilities of a proposed enterprise. Such advice should be forthcoming *in each province* and should be given gratis. A great many industries or enterprises are started in India which, though quite sound otherwise are doomed to failure owing to the preparation of figures being in the hands of men who are too young to have the necessary experience: this is especially the case in underrating the amount of capital necessary, the result being that in a large proportion of new enterprises the whole business eventually passes into the hands of managing agents or mortgagees and the original shareholders lose their money. Also each provincial Government should be prepared to give preference as far as possible to industries in their own provinces when carrying out any works or indenting for any supplies: unless this is done there can be little development of industries in the mufassal and all work and supplies will go to the few big centres in India as heretofore.

Government patronage.

I think that preference should be given to Indian products other things being equal. Merchants, engineering firms, etc., should be allowed to buy in England through their agencies, as far as possible, when materials have to be imported. The purchese of materials in England direct by Government, in building contracts, for instance, does not result in any saving, since it leads to enhanced rates on other portions of the works and often to great delays.

Banking facilities.

Mufassal firms are very much handicapped at the present time through being unable to obtain payments of their bills, when working away from their own districts for District and Local Boards excepting by cheques on the Treasury of the districts in which work is being carried out. This entails considerable expense, with the additional risk of theft in bringing in money and a heavy discount has to be paid afterwards in transmitting these monies to banks. Facilities should be given to receive such payments either in Government Currency Notes or by remittance transfers with a nominal commission, the present rate charged being very high, viz., 3 annas per Rs. 100.

Land Policy.

There is great scope for Government assistance in the acquisition of land for approved enterprises, either new or the extension of existing ones. I am aware of several new and promising undertakings which have been held up for a very considerable period through the almost insuperable difficulties of acquiring sites. I would suggest that the ordinary Government land acquisition facilities be extended to approved undertakings.

Apprenticeship system and industrial and other Schools.

My firm (Arthur Butler & Co.) has had an arrangement with the Greer Industrial School of this town for some years past whereby we take a certain number of their boys in the mornings to work in our shops to learn in the various departments. These boys in the afternoon receive general education at the school. The inherent defect in this system is that it is impracticable for a boy to learn much in a business establishment unless he keeps the whole hours of that establishment, and it is manifest the management cannot give any work of importance to boys who are only with them at times. It is essential that apprentices' time should be whole-time during the period they are in training to become mechanics: their general education should precede the period of apprenticeship and the technical instruction for boys who show marked ability, should be given either by means of evening classes or after the apprenticeship is completed. This is the procedure usually followed in England. I have seen it advocated that municipal workshops should be developed by Government for training mechanics; from my experience of such shops I could not imagine a worse training; generally speaking, although there may be municipal workshops in some few of the big towns where certain amount of useful training would be possible. There is also another serious objection to this proposal inasmuch as should Government put in machinery and develop municipal workshops the inevitable result would be that Government would also have to do all it could to provide work for the shops, and this would lead to serious interference with private enterprise with no advantage to Government. It is of the utmost importance that such training should be done in shops which are obliged to work on business lines if the apprentices are to be properly equipped to make a living at their trade. These remarks apply to mechanical engineers as well as to mechanics for it is only the best of the latter who will be able eventually to qualify as engineers.

General Official administration and organizattion.

I suggest there should be a member for Industries with a suitable staff, on which the business side should be well represented Also that the Commissioners of each division should be empowered to collect in each province information and for this purpose appoint commissions of 2 or 3 local business men to enquire into and report on any proposed scheme in his division; he could then submit his report on the proposal to the member for Industries. It would be, I think, necessary to empower the Commissioners to pay for the services of men acting on such commissions, for a business man's time is valuable and the best advice obtainable would be needed. This would appear to be a simple and expeditious way in which to make the necessary preliminary enquiries, and the question of Government aid could then be settled by the member for Industries.

Railways.

This province, as far as the north side of the Ganges is concerned, is very seriously handicapped by the want of facilities by rail. This is chiefly due to the break in gauge and the necessity of crossing goods over the Ganges by boat. The delays which occur every year, owing to shifting the Ghât from time to time, are most serious and it is by no means an uncommon experience for goods to take anything from one to two months in transit from Calcutta. I see no improvement in these irregularities over a personal experience of some 22 years and indeed in the winter of 1915-16 the constant delays were if anything worse than they have ever been. The remedy, of course, is a bridge over the Ganges, but I am aware that in all probability some years must elapse, owing to financial reasons, before we can hope to see a bridge erected. In the meantime however I cannot help thinking something might be done to improve matters and I would make a suggestion that the alternative crossing at Digha Ghât should be put into an efficient state to deal with all forms of traffic when Mokameh Ghât is blocked. This is a matter in which the public welfare should be considered irrespective of purely railway interests, otherwise State control is of little use.

ORAL EVIDENCE, 26TH NOVEMBER 1916.

Mr. C. E. Low.—You propose in the first paragraph of your written evidence that provincial Governments should give preference to industries in their own provinces. Would you

propose that District Boards should give preference to concerns in their own districts ?—As far as they can. My idea is that each province should be explored to find out its resources.

If that policy were adopted do you not think that it will tend to prevent the growth of large concerns, concerns of world wide importance ?—I do not mean to say that they should do it to such an extent.

You speak of preference being given to Indian products, other things being equal. Do you refer to purchases by Government ?—Yes.

I suppose you are aware that the stores rules do provide for this ?—But I do not think that they are strictly carried out.

Do you know of any instance in which this provision has not been carried out ?—I have seen many instances since I have been in business. I have often been provided with joists, for instance, which come from England.

When you could have got them equally well from Indian manufacturers ?—Of course, Indian manufacture is only a matter of recent years.

You refer to Government purchasing from importers. What advantage would that give ?—It would save time for one thing and it would give the importer the chance to mport and I think it will help the country.

At the cost of the tax-payer ?—At the same price or perhaps less.

There are certain materials on which much depends. Their unsatisfactory condition might result in serious damage or loss and hence they are manufactured under inspection. In that case would you recommend purchase from importers ?—I think leading firms will not do the work badly.

That is not always the case ?—I do not think there will be such instances in the future. We are gradually getting forward and that sort of thing will be eliminated.

Leaving aside joists made in the country, there are many other things which if they are brought on a wholesale scale from England could be bought more cheaply by Government than importing firms which would also get the same things from the same manufacturer ?—Generally speaking, I think they could be bought as cheaply.

Do you understand the system by which the Secretary of State purchases. He gives standing order to certain manufacturers that the latter should deliver over a fixed period as much as he wants of certain classes of goods to him at certain prices. It is a sort of running contract. In what way can importing firms here purchase more cheaply ?—I do not think it is necessarily more cheaply. I say they can purchase as cheaply and I think it possible they could do it, more cheaply. I know that a few years ago the system was so bad that the Public Works Department used to specify one particular make of joists and in isolated districts Government Engineers go even further.

When there are cases of this sort the best way in which a reform can be effected is by getting complaints from the Public, not general complaints but specific complaints. Have you forwarded any such ?—No Plenty of complaints have been forwarded by the Chamber of Commerce since I have been in India. When you are talking about getting the things as cheaply you are not taking into account the cost of the Government Departments for procuring them. If you consider them, the boot would be on the other leg.

You mean the cost of the Stores Department of the India Office ?—The India Office or part of the India Office.

You complain of the difficulty which is experienced in acquiring sites. There is the difficulty of purchasing and there is the difficulty of securing the title. Which do you allude to ?—Either. No one would build a factory unless he had a long lease. I am talking about industries. I know people who have been trying to start an industry have had great trouble and the industry has been held up for a very long time. I can, to a certain extent, talk from may own experience. But the difficulty is always there. If you want an acre of land, while you are dealing with one man at home you are probably dealing with 20 or 30 out here. You may acquire the whole plot and you may have one small plot lying in the middle, you my have to deal with 20 people interested in it and you cannot get the land either for love or money. The whole thing is left standing and you have to begin all over again.

It is chiefly the difficulty of title ?—It is the title chiefly.

It would be much less of a departure for Government to see whether there is a clear title to land than to extend land acquisition rights possessed by public companies to private undertakings ?—It would not be half so expeditious. The danger of delay would be just as great as ever. It might be worse. If the man appealed to Government to give him a title it would probably take a long time. I do not think that would help. It seems to me that the most expeditious way would be to have some rule of acquisition in cases of approved industries.

I do not mean to say that you should wait till the title is investigated. If you can negotiate with the possessor of the land ?—We cannot agree and in some cases you cannot even see the owner of the land.

You propose this in the case of all enterprises whether public or not ?—Only if the industry is approved of by Government or the Board of Industries as being in the public interest. In that case I would propose that Government should give some facilities for acquiring the land.

If it was an industry which it was desirable to introduce or demonstrate ?—Yes.

Not in the case of ordinary well-established industries ?—Not unless the Government considered that to do it would be in the public interest.

You do not approve of the idea of using municipal workshops as a training ground for mechanics ?—No.

Is there any municipal workshop in Muzaffarpur ?—I think so.

You say " These remarks apply to mechanical engineers as well as to mechanics for it is only the best of the latter who will be able eventually to qualify as engineers ". You do not mean that the only way in which a mechanical engineer could be trained is by training him simply as a mechanic and by no other means ?—No. The context will show that I am talking about technical education.

You propose the appointment of a committee of two or three local business men to go into any proposed project and report. Do you think that you will be able to get business men everywhere who will command public confidence ?—I think if you get two or three business men in a district you will pretty well eliminate the chance of exploitation for any one interest. You must have a business proposition investigated by business men.

How do you propose to deal with the technical side of the proposition ?—I take it that the Director himself would supply the information.

Government would then be in a position to form an opinion of it both from a technicail and business point of view ?—If any one applies to the Commissioner of a Division saying that he wants to start anything the Commissioner should have power to appoint a few business men to give him the first information as to whether it is likely, from a business point of view to be a success.

Do you think that in the majority of places you will be able to get men ?—There might be districts where there is a paucity of business men. But I fancy they could always be got They might not be on the spot. They might be found inside any Commissioner's Division.

Would you propose that they should be given any salary or fee ?—I think so. Otherwise you would not get specialists who would give up their time. You would not get also the best men.

Hon'ble Sir F. H. Stewart.—The " Member for Industries ", whom you refer to, you mean by that the member of the Local Government in each province ?—I mean the Director. That was a mistake.

And the two or three business mean whom you suggest would be practically a Board ?—They would advise the Commissioner of the Division and through him they would advise the Director of Industries. The Commissioner would send on the report along with his comments.

Who would have the final power to decide ?—The Director of Industries. This is only suggested by me as an easy way of getting information on the spot expeditiously.

Why do you propose to bring in the Commissioner ?—He is the head of the executive in the Division and I think he will be the best man. If you went to the Collector of a district then you would be multiplying work.

Why not go to the Director of Industries straight off ?—He would not know about business men in any particular division.

Mr. A. Chatterton.—You are, I understand, a contractor carrying on engineering work. Do you practise as consulting engineer ?—Yes.

You say that, in your opinion, Government aid is necessary in the way of expert advice and you propose that this advice should be given gratis. Do you not think it desirable to build up a class of professional men of the type of consulting engineers. Do you mean that Government should pay for this consulting advice ?—I simply say that Government should give advice. I am talking about a district like this. There are many men in the district who need technical advice but they would not pay for it.

People are perfectly willing to pay very high fees to lawyers. Do you not think it desirable to encourage the people of this country to pay fees to experts in the same way ?—I think so if it is feasible. You will have to begin with a nominal fee.

One objection to giving advice gratis is that many enquiries are made of very futile character and a small fee chokes off those that are not likely to lead to business ?—Quite so.

You allude to the desirability of each province developing its own resources in the matter of Engineering workshops. I suppose that is so that local firms and local factories should be able to obtain help on the spot and so that the managers should be less dependent on help only available from the great ports, and to let them know that there is a factory in which they can get business and which would enable them to keep larger stocks ?—Undoubtedly they would feel much more secure.

Do you think it would help industrial enterprise if the Director of Industries on the advice, if necessary, of expert bodies or expert evidence were to prescribe certain classes of

machinery as being suitable for use in the country ?—I think he should do that. He would probably work out his schemes for erections and lay down certain classes of machinery and plant as advisable. On the whole I think it is very necessary to standardise.

Would that apply to machinery and plant made in the country or also to imported machinery ?—It would apply where they could make it in the country. Where they could not do so they would import. It is a question of open competition. At the same time the Director should help the people of the province, other things being equal.

After some years' experience you find that in engineering work and construction work, difficulties are raised when the work becomes more expensive through the want of local stocks?—Talking of this district there are practically no stocks because we are never sure of a market for them.

You would have been encouraged to keep more local stocks if you had a definite statement from some Government department that the stocks you are holding are suitable for the district ?—Yes.

With regard to the question of acquiring land do you have any difficulty about temporary sites, say, for example, for brick manufacture ?—Nothing like the same difficulty. In the case of bricks you simply excavate the land and take a certain amount of earth. The owners do not altogether part with the land. They then use it for paddy.

You express the opinion that it is not at all desirable to associate general education with industrial education. You think that evening classes might be introduced. Would you be in favour of a system of apprenticeship in which instead of having evening classes you allowed boys to go two or three afternoons in the week to get elementary instruction to substitute the evening classes ?—Yes. I think it would be better. There would be difficulty in this country if you had evening classes. It is a great difficulty even in England to get men to attend evening classes after doing a hard day's work. I fancy it will be more difficult in this country.

At what age do the boys come from the industrial school to your works ?—I should think about 10 to 14 or something about that. I could not say from the looks of them. They might be even 15. Over 12 and under 15 I should say.

Your idea is then that they should get literary education before they take up industrial education ?—They should certainly get the elements.

I understand that you have considerable experience here in rural undertakings in connection with boring for water. Is that capable of enlarged development here ?—I should say very great development. There are difficulties. Certainly the sub-soil is very fine sand. There is great difficulty in boring.

In this part of the world is it practicable to put down engines and pumps for the development of irrigation ?—Yes, but we have got to get the raiyats to dig big wells. The wells are very small at present.

In the hot weather is there plenty of water in the jheels and rivers ?—Would it be of benefit if you could erect pumping machinery on the banks of rivers ?—I should think you could get a good deal of water from the rivers in that way. Many of the jheels dry up in the hot weather. Speaking generally, water sinks to about 20 feet from the surface in the hot weather.

Have you any experience of getting machinery on the hire purchase system ?—No.

If there was a Department of Industries established in this province and if competent engineering and technical officers were available, do you think it would lead to any considerable development of rural engineering and establishment of rural factories ?—Yes. I should say so.

We are told that capital would be freely forthcoming for industial enterprises if advice were available. But when it assumes a specific form we feel that individuals will not put their money in it ?—They would not do it all at once.

It is not sufficient therefore if Government merely recommend an undertaking ?—You will have to demonstrate it. They would not get an inch forward here unless they felt perfectly sure.

Hon'ble Pandit M. M. Malaviya.—You have spoken of the difficulty in the acquisition of land. Is there any municipal land lying fallow ?—Not much. Not that I am aware of.

Do you know of any cases in which an application was made to Government for a lease of land for industrial purposes ?—No.

You speak of the difficulty of sending goods and the absence of a bridge and you suggest that the alternative crossing should be kept in an efficient state. Have you made any representation to the Railway Board ?—No.

Do you know that anybody has done so ?—I have not heard that any one has done so. It has been my own idea for many years.

Who works the river traffic ?—The Bengal and North-Western Railway.

Mr. C. E. Low.—Have you got any supplementary remarks to offer ?—I should like to add something to my statement regarding the difficulties of banking. Things were very much better before. It appears that some new order has been recently made and the Government

Treasuries have not been allowed to grant us cheques on Calcutta or on the Muzaffarpur Treasury as they used to do previously. That is a retrograde movement. Previously we used to get cheques on the Bank of Bengal.

Did you represent this to Government ? —We have represented this to various officials and they only tell us that they have not orders to do it.

Did you represent this to the proper authority ? It is rather difficult to find out to whom to go to.

WITNESS No. 75.

MR. MOHANLAL BULCHAND CHANDIRAMANI, *Agent, Benares Bank, Ltd., Muzaffarpur.* *Mr. Mohanlal Balchand Chandiramani.*

WRITTEN EVIDENCE.

Indian capital is very shy except in Bombay where there are large textile factories mainly owned and managed by Indians. It is therefore very difficult for industries in other parts of India to thrive. The greatest misfortune of India is that capital and enterprise seldom go hand-in-hand. Enterprising men get no financial support from their well-to-do countrymen who are either indifferent about the regeneration of industrialism in India, or are not sufficiently educated to appreciate the enormous drain on India which could be stopped if we could replace our imported manufactured articles by things manufactured in the country. But if Government materially encourages and fosters indigenous industries just as the Mysore State has been doing, private capital will be gradually attracted and a greater portion of the hoarded wealth of India will be employed in financing industries. Financial aid.

It has been observed that once Indian capital is assured that the business started would be properly worked, it easily pours in to assist the same. As an example, the large number of light railways started recently, have received material support from Indian capital. But few industries can thrive on the support that the Government generally gives to railways, as this is a very old industry (if it can be included in the category of industries) and the capitalist has full confidence that his investment will yield a steady return. Therefore, in the case of other indigenous industries, more direct Government aid would be necessary for some time. I would suggest that in all large industrial undertakings, direct State help in the shape of subscription towards the capital up to a certain percentage not less than 33 per cent., is necessary with the proviso that the remaining two-thirds is subscribed by Indians. In such cases Government should be entitled to appoint their Directors in the same proportion as the amount of capital subscribed by them. The auditors should also be appointed by Government. These enterprises will serve the object of pioneer concerns and will simultaneously attract Indian capital which would not otherwise be employed for financing industries. The above assistance may be gradually withdrawn when the confidence of the Indian public has been gained, and Indian enterprise can take the initiative. In course of time, it will be quite enough if Government simply guarantee dividends on the same basis as in the case of railways. In such cases the factories should be inspected by Government experts and the accounts audited by Government auditors.

The above suggestions relate to large enterprises managed by joint stock companies. But in India there are several small industries which are languishing for lack of knowledge of improved devices of manufacture and capital. These industries should be helped by money grants-in-aid or loans without interest or on nominal interest, for say three years or more according to the circumstances of each case, and by the supply of machinery and plant on the hire purchase system, also, wherever possible, by small demonstration factories. Free expert advice should also be given to these industries.

By way of general encouragement to all industries, and to enable them to compete with foreign products, it would be desirable to increase the duties on such foreign articles and specially those amongst them as are subsidised by the countries of their origin. I think there are several industries in India which are handicapped by foreign competition. The cotton industry is one which is burdened with an excise duty, the result being that Indian manufactures cannot compete with those of Europe and Japan. This is a very great hardship as it distinctly gives impetus to foreign countries to compete with an important indigenous industry. The sugar industry is another which suffers by foreign competition. For instance the German beet sugar can compete with Indian sugar mainly because the German Government gives a sufficient bounty on every ton of beet sugar produced in that country to enable it to compete with Indian cane sugar. The button industry in the Tirhut division is also a victim of foreign competition which is evidently fostered by subsidies. There is a small button factory in Mehsi in the Champaran district which manufactures mother of pearl buttons. Now few factories have the advantages that this factory, enjoys. It can secure any amount of raw material in the vicinity for a nominal consideration, and it can get labour on very favourable terms. The expert in charge of the factory who has had practical training in Japan, assures me that the machinery employed by the factory is up-to-date. Notwithstanding all this, Japan is able to undersell this factory by producing a well finished inferior article. But I cannot understand how Japanese manufacturers can manage this. Labour in

Japan cannot be cheaper than that in India and Japanese products competing with the local articles, have to pay the ocean freight and customs duties. It looks to me, therefore, that this industry in Japan is being subsidised by the Japanese Government.

It is, therefore, incumbent on the Indian Government to impose countervailing customs duties on certain foreign products, and to abolish any excise duties that might be hampering indigenous industries.

To finance existing industries which are working on a paying basis but cannot expand their scope for want of capital, Government should start an industrial bank with its head office in Delhi and branches in important towns all over India, as existing joint stock banks have to keep their assets in more or less liquid investments and cannot obviously finance industrial concerns ; and even if they did it, they could not do so on such favourable terms as the newly started Industrial Banks which would be able to command capital at comparatively lower rates of interest. The capital of this bank may be thirty lakhs, of which Government should provide one-third, the remaining two-thirds will then be readily subscribed by the public. One-third of the directors of this bank should be nominated by Government and such nominated directors should be business men ; and when Indians are available, they should be given preference, as they will be better conversant with Indian conditions.

The working of this bank should be supervised by Government in the same way as the co-operative banks. The Bank should not take deposits from the public as these deposits would embarass the bank in times of panic. The Government should deposit money with it on the same terms as in the Presidency Banks, and Municipalities, District Boards, Official Trustees and Official Assignees, Receivers and also Insurance Companies who invest large sums of money at a low rate of interest should be encouraged to keep their surplus money with this bank. This will enable the bank to get money cheap and to lend it out at a fairly low rate of interest.

The bank can easily command a working capital of two crores of rupees which will got a long way to begin with. If this capital is obtained in the manner I have suggested, it will not cost the bank more than 4 per cent., and if the bank has a dozen offices, the working expenses will not amount to more than Rs. 4,00,000 a year, *i.e.*, 2 per cent. If then, the bank can lend money at 7 per cent. it will be able to pay a dividend of 6 per cent. and have a balance of Rs. 2 lakhs which could be carried forward as a reserve fund. The following statement gives in detail the working expenses which the bank is likely to incur.

STATEMENT SHOWING APPROXIMATE EXPENSES OF MAINTAINING THE PROPOSED INDUSTRIAL BANK.

Head Office.

	Rs. Per mensem.
Manager	3,000
Deputy Manager	1,000
Assistant Manager	700
Inspector of branches	700
Accountant	300
Head Clerk	200
Twenty clerks and four cashiers	1,000
Other staff and menials	200
Rent	500
Auditors' fees, Law charges, etc.	500
General charges including stationery, etc.	1,000
Total	9,100

Bombay and Calcutta.

	Rs. Per mensem.
Manager	700
Assistant Manager	300
Accountant	150
Twelve clerks and cashiers	500
Other staff and menials	150
Rent	1,000
Stationery and other charges	400
Total	3,200

Madras, Karachi, Lahore and Cawnpore.

	Rs. Per mensem.
Manager	500
Assistant Manager	200
Accountant	150
Eight clerks and cashiers	400
Other staff and menials	100
Rent	500
Stationery, etc.	250
Total	2,100

Rangoon, Nagpur, Bankipore, Ahmedabad and Chittagong.

	Rs. Per mensem.
Manager	500
Assistant Manager	200
Accountant	150
Eight clerks and cashiers	350
Other staff and menials	100
Rent	300
Stationery, etc.	250
Total	1,850

SUMMARY.

	Rs. Per mensem.
Head Office	9,100
Two branches at Rs. 3,200 each	6,400
Four branches at Rs. 2,100 each	8,400
Five branches at Rs. 1,850 each	9,250
Grand Total	33,150

Technical aid.

The Director of Industries for each province should have a suitable staff of experts and wherever necessary, the services of these experts should be lent to private enterprises if the Director of Industries is satisfied that such help is deserved. In the case of concerns in prosperous condition, such help should be charged for, otherwise it should be given gratis. Where no charge is made for the help given and the Director of Industries is satisfied that the results of researches made by the experts while attached to private businesses are of general interest to the whole industry, they should be published so that other concerns in the same industry may benefit by them. But if it is feared that the publication of the results will be detrimental to the interests of the concern employing the expert, this should not be done.

To begin with, there does not appear to be any need, at present, of arrangements for research work on any elaborate scale. But in course of time when a number of industries have been started, a separate institution for industrial research might be opened. For the present, it will be sufficient if the Imperial Research Institute at Pusa and the science sections of all educational institutions give ready help to solve difficulties which may be presented to them by the indigenous industrial concerns, and others through the Director of Industries and the Board of Industries.

The Government should organize a large number of scholarships for technical education in Europe, America and Japan. Suitable arrangements should also be made so as to ensure that the scholarship holders obtain practical training in the industries for which they are sent out, so that their knowledge may be of practical utility on their return to India. The experts so trained should be suitably provided for by the Government on their return to this country.

Assistance in marketing products.

Commercial museums are very helpful in assisting the marketing of industrial products and I think the Calcutta museum is of very great service to the local industries. I would suggest that similar museums be opened all over the country in all provincial capitals and they should be worked on the same lines as the Calcutta museum. But the catalogues issued by these museums should be revised periodically and should be circulated amongst all Government offices, public libraries and banks.

I am of opinion that sales agencies for the display and sale of the products of minor and unorganized cottage industries should be opened in all divisional headquarters. A number of cheap articles which are the products of small cottage industries are at present very little known. If, therefore, these products are marketed in the above manner, the artisan would be able to get a better price and a larger sale. Wherever possible, arrangements should be made by the Divisional Industrial Committee, consisting of business men and some officials, to put the sales agencies in charge of private firms on suitable terms. But when this cannot be done, the Divisional Committee should make proper arrangements by keeping a paid staff to conduct the business of the sales agency.

The Divisional Committee should also hold an Industrial Exhibition in the divisional headquarters once a year. The expenses of these exhibitions can be defrayed from public subscriptions and suitable grants from the Government, the District Boards, and Municipalities. The chief object of these exhibitions would be to bring sellers and buyers into contact; but they should provide amusements and other entertainments so as to draw as many visitors as possible. Admission of visitors to these exhibitions should be free or on nominal charges.

It does not appear to me to be necessary, at this stage, to appoint trade representative in Great Britain and Foreign countries, as for a long time to come, Indian industries will hardly be able to supply local wants.

All principal Government Departments which use imported articles should publish lists of these articles and exhibit them in Commercial museums, with the prices marked on them. As I have already said, all Government Departments must give preference to Indian manufactures.

Industrial Banks should make advances freely on the security of indigenous products and the manufacturers should also be provided with banking facilities by means of cash credits on the recommendation of the Director of Industries. This latter arrangement will help the manufacturers to allow credit and their customers to carry on their business without financial obstacles.

Training of labour and supervision.

The labourer should be recruited from a better class of people than at present. There should be an industrial school in all divisional headquarters where training should be given in such work as would enable the students to work in factories in or near the division. Admission to these schools should be free with an additional temptation of suitable scholarships to such students who have also received some English education. Also students should be paid for the work turned out. Further, there should be a system of cash prizes and medals for good work done by the students, and promising students should be provided with small capital on leaving school to enable them to start small workshops on their own account unless they can be suitably provided for in an indigenous factory.

These schools should be under the Director of Industries who should, with the assistance of the Divisional Committee of Industries, organize a system of periodical inspections.

I would also suggest that, where possible, technical classes be attached to all primary and secondary schools, and attendance to such classes be made compulsory for certain hours in the week.

All factories should set aside a portion of their profit to provide for cash prizes and medals to the best workmen. Suitable provision should also be made by all factories for pensions to disabled workmen, and their families, and specially for men who have done good work.

Suitable scholarships should be provided by Government for heads of technical and industrial schools and managers of industrial factories to acquire up-to-date knowledge in other countries.

Where a factory is assisted by Government, and there is room for the expansion of the industry, the factory should train apprentices who would subsequently be employed in the same factory or in new factories in the same industry. Educated men desirous of receiving training in factories maintained or subsidised by Government should be afforded every facility for doing so.

Official organization.

In every province there should be a Director of Industries with a suitable staff of experts. The Director should be a specialist himself. The Director and his staff will make investigations as to the possibilities of certain industries in their provinces and the results of these investigations should be published in an "*All-India Weekly Industrial Journal*" which should print the results of the investigations made by all the Directors of Industries in the country. This journal should be widely circulated and, if it is properly conducted, the cost of publication will be more than covered by advertisements.

There should also be a Board of Industries in every province, like the one in the United Provinces, consisting of business men and some officials if necessary and this Board should have executive powers with budgetted funds, and in all cases of help, should consult the Director of Industries for expert opinion before awarding financial help to industrial concerns. Also the Board might be assisted by Industrial Committees in all divisional headquarters.

All Directors of Industries would be subordinate to the Commerce and Industry Department of the Government of India. In all cases of new industries on a large scale the Directors should consult their colleagues in other provinces with a view to utilise the results of their investigations if any.

Technical and scientific departments.

Colleges of Commerce like the University College of Commerce at Bombay, should be affiliated with every Indian University. The sort of higher commercial education imparted by the Bombay College of Commerce, is absolutely necessary for training Indians in the scientific handling of business problems and the proper organization of industries. Failures of Indian industrial and other concerns and the recent failures of Indian Banks were mainly due to the inexperience and want of expert knowledge amongst those who managed the concerns. If the existing industries are properly organized and new ones opened, India would require an army of young men well versed in scientific and up-to-date methods of business for the successful management of these concerns, and this want would be supplied by graduates turned out by these colleges. These graduates could also with advantage be employed under the Director of Industries, in responsible positions in the existing Presidency Banks and Industrial Banks that may hereafter be started.

Collection and distribution of commercial intelligence.

If there is a Director of Industries in every province, no separate Commercial Intelligence Department should be necessary, as the Director will then supply all information in connection with indigenous industries and foreign industries which compete with the same.

I recommend the publication of an *All-India Weekly Industrial Journal* which should contain information on all matters relating to industries and the results of investigations made by the Directors of Industries and the experts employed under them. The journal should also accept and encourage contributions from private persons possessing expert knowledge. It will also contain the weekly market reports of prices of the principal exhibits in all commercial museums. This journal should be supplied free to all public libraries, Government offices and banks, and should be obtainable by the public at a nominal subscription.

General.

In the Tirhut division there are three industries which can with advantage be encouraged by financial help and proper organization.

The chief of these is the fruit-canning business which has vast possibilities before it. The Bengal Preserving Company is owned by a single individual, a leading lawyer of Muzaffarpur, an extremely enterprising gentleman, who has devoted the better part of his life to experiments for the perfection of methods of preserving fruits. He has now succeeded and has been preserving a variety of fruits from the last few years. He manufactures jams also and has recently secured large orders from the Army Supply Department. This industry is capable of large extensions; and efforts should be made to start a joint stock company to carry on this business which should take over the existing Bengal Preserving Company after paying a suitable amount to the proprietor as goodwill, the new concern also utilising the services of the proprietor of the present concern on a suitable remuneration. If one-third of the capital of this concern is taken up by Government, there will be no difficulty in securing the remaining two-thirds. But if this cannot be done, the proprietor should be given financial help by way of loans at a low rate of interest on condition that he trains some apprentices who may ultimately start similar concerns in other places with such limitations as may be necessary to prevent unhealthy competition.

Button manufacturing is another industry which has also a great future before it, if only unfair foreign competition is not allowed to crush it. As I have already said, the Tirhut Button Factory of Mehsi has at its command large quantities of mother of pearl which can be obtained at little or no cost. The factory produces good buttons at prices which compare favourably with those of European manufactures. But the industry is handicapped by Japanese competition, as Japanese exporters are able to put on the Indian market an inferior stuff at about 25 per cent. less than the prices of the Tirhut factory. This appears to me to be due to the Japanese button industry being subsidised by Government. This industry therefore can only thrive if it is nursed by grants-in-aid by the Government or District Boards and also by the employment of an expert whose remuneration should be paid by the Government for a certain number of years. This assistance will enable the factory to make suitable extensions and improvements which will certainly enable it to beat down the imported article.

The third industry which is also of great importance is the manufacture of cutlery. This business is at present owned by a joint stock company but unfortunately it has not been able to get the support it deserves. Only a small portion of the capital has been subscribed and the result is that the industry is not being fostered and extended as it ought to be. The manufactures of this factory which include articles made of ivory, sandal-wood, etc., can successfully compete with foreign goods but the business is suffering for want of financial support. On account of the financial difficulty, the promoter of the company, who is an expert himself, has to look after everything, *viz.*, keeping books, selling goods, and supervising the labour. This gentleman is a teacher in a private school and cannot therefore pay all his attention to the business, although even then he is doing a great deal. This business should also be organized and financed on the same lines as suggested in the case of the Bengal Preserving Company.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. C. E. Low.—How long] is it since the Benares Bank was started ?—It was established in 1904.

What is its share capital ?—10 lakhs.

Paid up ?—Fully paid up.

How many branches has it got ?—One here and one at Bhagalpur. Benares is the head office.

How long have you been in the employ of the bank ?—Since 1908.

What were you doing before ?—I finished my educational career in 1904. After that I was partly in service and partly in business.

What banking experience or banking training did you get ?—I had theoretical training at Davar's College of Commerce in Bombay and I hold certificates from the London Chamber of Commerce in Banking and Currency, Methods and Machinery of Business, Book-Keeping, Commercial History and Geography and Commercial and Industrial Law.

Had you no practical training in banking ?—I had no practical training in banking when I joined this bank in 1908.

In what capacity did you join the Benares Bank ?—As an Assistant Manager in the head office, and after a month I was placed in charge of this branch which was opened by me in 1908.

Did you get any help and training from the Manager ?—I got practical training for a month. That was quite sufficient as I had already got theoretical knowledge.

Who is the Manager ?—Babu Maharaj Kishore Khanna.

Has he got experience ?—He has got a lot of experience.

His father was the gentleman who started the Allahabad Bank and was the first accountant of that Bank.

What lines of business do you finance ?—We generally make advances to merchants on bills of exchange or approved securities.

Do you finance produce ?—Not directly. In this part of the country merchants generally draw money on bills of exchange. One party draws on another and the other party draws on the former similarly. That is the way business is financed in this part of the country.

Have you financed any industries ?—No. In my experience I have come across only three small industries in Bihar, and of course it would not be in accordance with our mode of business to finance them. They cannot give us the security we would like to have and then we never want to lock up our money. In financing industries money gets locked up.

Have you ever been approached by any sugarcane mills or oil mills or concerns of that sort ?—No, except in a small way. We were asked by the button factory here to finance them, and as a matter of fact we advanced money, though indirectly, when the promoter himself deposited with us his life policies. That was only in an indirect way.

Supposing a concern approached you and said that they wished to buy a large quantity of oil-seeds and that they would pay the money after selling the oil—would you be prepared to look at that sort of business ?—If I were assured that the money would be coming in after six months or so.

If they hypothecated their oil-seeds and the products of their oil-seeds, would you be prepared to do business ?—We would have no objection. Of course it would depend upon how long the money would get locked up On account of the banking crisis in 1913 and then the panic after the war broke out, we found from experience that it is never sound policy to lock up money. We always prefer to make advances on securities which can be easily realized.

You say that if the Government materially encourages and fosters indigenous industries just as the Mysore State has been doing, private capital will be easily attracted. Do you know anything of the working of the Mysore State Industries Department ?—Not beyond what I have read in the papers.

You do not know whether that succeeded in attracting captial from the public ?—So far as I am informed they have recently started a cotton seed oil factory ; the State subscribed a portion of the capital and the rest was subscribed by the public.

Have you had any personal experience of it ? —I have no personal experience of it.

You suggest in the second paragraph that in all large industrial undertakings direct State help in the shape of subscription towards the capital is necessary, and then you go on to say that these enterprises will serve the object of pioneering concerns. Do you mean that only

pioneer enterprises should receive Government subventions or that all enterprises should receive it, whether pioneer or not ?—In the beginning, in order to attract Indian capital to help Indian industries, the Government must take the lead, and when they have subscribed a portion of the capital, the rest of the capital would be easily subscribed by the public. Of course I do not mean that this should be a permanent usage but only for a short time, just to give the industries a push and then of course gradually when people are sufficiently educated they will begin to start industries on their own initiative.

During this preliminary period in any industrial concern which is to be started provided of course it has been reported as satisfactory, Government should take up a certain portion of the shares ?—Not necessarily in every case. Wherever it is practicable, the public should subscribe the whole. I think that in the Bombay Presidency Government help would not be so much necessary as on this side. But, of course where the public is not so willing and enterprising Government must take the lead.

Do you mean whether they are established industries or not ?—If they are established industries, I do not see why Government should interfere.

Suppose a man starts a jute mill in Calcutta or another cotton mill in Bombay ?—Then, of course, it would not be necessary.

You speak of the German beet sugar competing with Indian sugar. You know there has been practically no German sugar for some two or three years before the war except a few hundred tons. It is Austrian sugar you allude to ?—May be. I have been under the impression that it is German beet sugar. I did not look into the details.

There is Mauritius sugar which does not receive any subvention and also the Java sugar which does not receive any subvention. They compete more seriously than Austria ?—I have no knowledge of these.

Your reason for saying that the Japanese Government subsidises industries directly is that they have been able to compete effectively with Indian manufactured goods ?—In this special case.

You have no knowledge otherwise whether there is any Government subvention in Japan in the case of the button industry ?—No.

You propose the idea of an industrial bank. Is that to finance existing industries ; or to find money for erecting and purchasing machinery ; or to be spent in bricks and mortar ?—To assist industries generally, in whatever way it may be necessary.

Where is the banks' money to come from ?—I have suggested that the Government should deposit a portion of the money that they are now depositing with the Presidency Banks, and Municipalities and District Boards should also do the same.

The Government has floating balances in the Presidency Banks and District Boards. That money does not go into machinery and bricks and mortar. How is the money to be got back ?—We could safely lend a certain proportion for block purposes, plant, etc.

Government balances have fluctuated a good deal. They are particularly low at present ? —This is an extraordinary time. Ordinarily there are very large balances and I do not suggest that they should deposit all their balances. They might deposit only a certain proportion.

In so far as they deposit those balances the balances will not be available in the same way as the deposits with the Presidency Banks if they went into bricks and mortars ?—If there were certain restrictions as to the percentage to be lent out for block purposes I think that could be made workable.

You speak of the bank getting money at 4 per cent. You are aware that Government is not likely to be able to borrow at 4 per cent. in future for some time to come ?—So long as the results of this war exist they cannot.

You know that the British Government have borrowed at 6 per cent. ?—I know it. My suggestion is for normal times. Before the war the Government of India was able to get money at 3½ per cent. and the Secretary of State was investing very large balances at home at 2 to 3 per cent.

You suggest that the services of experts should be lent to private enterprises. There are two ways in which that can be done. Do you mean that the expert should work as a servant of the private undertaking or that his advice should be lent ?—In cases in which the concern required the whole time services of the expert and the Director of Industries is satisfied that such assistance is required, his whole time services may be given and in such cases in which the concern can afford to pay for the services of the expert, they ought to be made to pay, but in other cases when the concerns are poor, and are in their infancy they should be given free help for a certain time.

Don't you think there is likely to be a certain amount of difficulty in lending the whole time services. Supposing the manager of the concern wants the expert to do something which he does not like ?—It is a point of detail which the Director of Industries will have to settle.

It is rather an important matter. If you send the man to advise merely, that is one matter. It is another matter if he is put under the orders of the manager of the concern ?—It is just possible there might be difficulties. In such cases Government might sanction a certain amount monthly to the concern for payment to the expert and then he might be kept as the concern's own man.

What educational institutions do you think have science sections capable of dealing with commercial subjects ?—At present they will not at all times be able to help commercial people. I mean the science sections of the Arts and Science Colleges. I think that if some slight changes are introduced they would be able to do useful work.

The point is that these educational institutions are teaching pure science, whereas what is wanted is commercial chemistry applied to the different kinds of industries. How can these educational institutions keep up chemistry with special knowledge of dyes or oils, etc. Do you think that the pure chemist is worth having for commercial questions of this sort ? I think there ought to be some alterations in the course of study to equip men with the necessary knowledge. We might have practical chemists also as professors.

With respect to the appointment of trade representatives, would they not represent commerce besides industries ?—Commerce dealing with raw products, exports, etc.

Is it not advisable that India should get the best help she can by appointing trade representatives so long as she has to dispose of her raw products ?—If India cannot manage to work up all her raw products, it might be useful.

Till India can herself utilise the raw products, do you not think it would be a good thing if she had people to help her to get the best price she can for her raw products ?—That will also be an advantage.

You say that the Director of Industries should be a specialist. In what ?—I mean that he should be a business specialist.

Have you seen anything of the working of the United Provinces Board of Industries ?—I have no personal knowledege.

Not in Benares ?—No.

You also propose that the Director of Industries should be subordinate to the Commerce and Industry Department. Do you propose to eliminate the Local Government ? Do you mean to say that the Local Governments will have nothing to do with the Provincial Directors of Industry ?—It is a matter in which I do not think any executive control of the Local Government is necessary.

Don't you think that the control of the Local Government would be of any help ?—It is just possible that it may be better to let the Local Government also have some control.

You do not think that a separate Commercial Intelligence Department is necessary if there is a Director of Industries in each province ?—Yes.

You propose that the Directors of Industry should communicate among themselves. Supposing there are some cases where a Director is in doubt as to whom to write to, what would he do ?—He would in that case write to the Commerce and Industry Department direct.

You mean the Government of India ?—Yes.

Do you not think that oil mills and mills for making artificial manures require help in the Tirhut Division ?—I have referred to three industries in my note and I am acquainted with them only.

You mean these are within your personal knowledge ?—Yes.

Hon'ble Pandit M. M. Malaviya.—Your object in recommending the creation of an industrial bank seems mainly to be to encourage Indian capital being invested in enterprises; am I right in taking that view ?—Yes, to a certain extent.

Suppose there is an industrial bank started and the Government takes some shares in it, say for five years, and promises not to withdraw its money for that period; do you think that will create sufficient confidence ?—Yes.

If the Government offered assistance for a limited period of five years only to put the bank on a sound footing and then withdrew its support by selling its shares, do you think that that will inspire confidence ?—In the beginning it will, but the ultimate result will depend on the circumstances at the time the control is withdrawn.

During that short period it may or may not be placed on a sound footing ?—It may or may not be.

Suppose Government did not take any shares, but made a deposit for five years and promised not to withdraw it, and allowed the interest on it to be appropriated towards dividend among the shareholders, that is to say, if the Government guaranteed interest at a certain rate, do you think that that would inspire confidence ?—It will.

You speak of the need of a large number of scholarships for technical education in Europe, America and Japan. And then you also say that the experts so trained should be suitably provided for by Government on their return to this country. I suppose you mean so far as it may be possible for Government to do this ?—Of course, when the Government begins to maintain a number of experts under the Director of Industries, very probably they will be able to provide for them.

You mean that they should be given appointments where these are available, but you do not mean that they should be guaranteed ?—If Government find that they can easily provide for them they might guarantee it. That will make the scholarships more attractive.

You say that the labourers should be recruited from a better class of people. Do you think that the lack of general elementary instruction is a hindrance to the efficiency of the people industrially ?—Yes.

You think that there should be general elementary education first and then industrial, or technical education ?—Yes.

You also say that technical classes should be attached to secondary and primary schools. Do you not think that it would be a better system if there is technical education after primary education ?—That might be done. Unless you make this technical education compulsory to a certain extent it would be no good.

Do you mean that technical education should be made compulsory or do you want that it should be provided for largely ?—I think that if we could make it compulsory it would be better. There are certain classes of people who would never take to technical education. What I mean is that, as far as practicable, it should be made compulsory.

You speak of the advantages of an *All-India Weekly Industrial Journal*. Do you think that it should be published in English only or in the vernaculars of the provinces also ?—In the principal vernaculars of provinces where industries have made sufficient progress.

To create an army of young men versed in scientific and up-to-date methods of business do you not require a college of commerce in every province ?—If you had colleges in each of the several provinces it would be better.

In your opinion then the ability of India to utilize its raw materials depends on the amount of scientific and technical education given in the country and upon the financial assistance and encouragement afforded by the Government, and of course, on the co-operation of the people ?—Yes.

If there were sufficient technical and scientific education provided on a large scale and if the Government gave the necessary assistance, then you could utilise a great deal more of the raw products into manufactures than you could hope to do otherwise ?—Certainly.

You spoke of the very large balances being invested at very low rates. Do you think that part of it should be invested in India ?—I was talking of times before the war.

About these subsidised foreign articles, do I understand you to say that wherever you find a foreign industry subsidised by its Government you want that the Government here should enable the indigenous industry to compete with it by giving the necessary assistance ?—Yes.

With regard to the loans to be advanced by industrial banks do you think it will be a desirable course to lay down that industrial banks should advance loans to those companies which had subscribed and paid up half the amount of capital with which they wish to start the business ?—That will be a good idea.

That would afford some security for the loan that would be advanced ?—Yes. Of course the banks should assure themselves that the money they are advancing will be safely invested.

If the buildings, equipment, and plant and machinery could be taken as security for the loan in addition to such other stocks as the company may have, do you think this would be sufficient ?—I think that will be a fair margin.

Hon'ble Sir F. H. Stewart.—Why do you think that Delhi would be the best centre for the proposed industrial bank?—Because it is the most centrally situated.

Do you think that it will be most in touch with industrial enterprises?—I think it ought to be.

More than Bombay or Calcutta —Bombay may be better than Delhi but then it would be far away from Calcutta. Similarly, Calcutta would be far away from Bombay.

And do you think that suitable directors, business men, could be available in Delhi to manage the affairs of this bank?—If suitable salaries are given I think they can be found. But I do not mean that the Directors should be restricted to men in Delhi. You could select the men from all over the country.

Do you propose any close connection between the industrial bank or branch of the industrial bank and the different Boards of Industry?—What sort of connection?

Who would you advise the bank as to what industrial enterprises are to be financed for instance?—Of course the management of the bank ought to be able to decide. They would be advised by the Director of Industries of the province.

Do you say that the Board of Industries should have executive powers with budgetted funds?—Yes, for small advances.

You discriminate between quite small enterprises and the bank which would work on a much larger scale?—Yes.

At what college were you trained?—Devar's College of Commerce. It is a private college.

The training you received there was sufficient to enable you to get five certificates from the London Chamber of Commerce?—Yes. That is an examining body which holds examinations in Bombay under Government supervision.

The examination is the same in Bombay as it would be in London?—It is the same.

Are there many other students among your contemporaries who got these certificates?—There were a few. At present there is a very large number of students.

How many roughly were there then?—There were about 15 or 20 in my time.

How many students are there at this institution now?—At present there seem to be about 100 students or so.

Do they largely go into banking as a profession?—Not all of them. Many of them go into business for themselves.

What I am trying to arrive at is this. One of the difficult questions which face us is that of forming a trained banking class who would develop banking facilities all over the country and I want to ascertain from you if you think that such institutions as you were at and which seems to have answered the purpose very well in your case is likely to provide such a class gradually?—So far as the theoretical training is concerned, I think it provides all that is necessary; but I think it would be much better to give a little practical training after the theoretical training has been received.

Have you any suggestions as to how that practical training could be given?—By employment in the existing banks as apprentices and the Presidency Banks which are almost Government banks might help in this respect.

Do you think it would be a good thing if something like the Institute of Bankers were started here?—That would be much better than any of these private colleges.

And you think that students would take up these examinations?—I think they would.

Hon'ble Sir R. N. Mookerjee:—You lay much stress on Government taking one-third shares. Is it your own personal opinion or is it based on any experience? If the Government takes one-third risk what is the advantage in that?—Because Government takes one-third of the risk, the public will readily take up the remaining two-thirds.

That does not give any guarantee to other shareholders?—How is it that crores of money have been given for light railways.

Because Government gives a guarantee?—Then the system I suggest will afford a better attraction.

If the Government gives a guarantee, say of 4 per cent., the shareholder gets 4 per cent. even if the concern does not earn anything?—When Government give one-third capital they will see that there are no possibilities of failure.

Is that your idea that Government can always be successful in their commercial undertakings?—Would you not change your opinion?—I stick to what I have said in my written evidence.

Then you say that loans could be advanced on plant, building and machinery?—Will your bank advance money on bricks and mortar?—If you build an industry like a paper mill and it does not pay, the building and the machinery would be worthless?—It would all depend on the particular circumstances of each case.

WITNESS No. 76.

BABU SHYAM NARAYAN SINGH, *Personal Assistant to the Commissioner, Tirhut Division, Muzaffarpur.*

WRITTEN EVIDENCE.

At the outset I beg to submit that I have no experience of any particular industry or trade and that all that I had to say is contained in my note* appended to the Tirhut Commissioner's letter No. 5268-J., dated the 28th September 1916, to the Secretary to Government, Bihar and Orissa, Financial Department. I venture, however, to submit the following few lines:—

Financial aid to industrial enterprises.

I have had no direct experience of the raising of capital for industrial enterprises but I know of efforts made by the Hon'ble Mr. Morshead, I.C.S., the present Commissioner of the Tirhut Division, to raise funds for two industrial concerns in Tirhut, and as his Personal Assistant I know what difficulties he has had to face:—

(1) The Commissioner tried to secure capital for the knife and scissors factory (which is registered under the Company's Act) owned by Mr. M. N. Bose at Muzaffarpur but people hesitated in coming forward to aid the industry because they were not sure if accounts were properly kept. Mr. Bose, however, complained that it was expensive to employ a passed accountant. This difficulty could be tided over if Government had an Industrial Department or a Director of Industries with some accountants to assist, and if these accountants could audit the accounts without charging any fee. This would enable the Director after some necessary enquiries, to pronounce his opinon regarding this concern authoritatively and this would go a long way to remove some popular misgivings. I would suggest this audit without charging any fees in the case of the budding industries which cannot meet the cost of audit themselves. Of course the general supervision, advice, and opinion of a competent Government official (be he named a Director of Industries) would instil confidence in the public mind regarding industries.

(2) The Commissioner made an endeavour to find money for the improvement and enlargement of the Tirhut Moon Button Factory at Mehsi in Champaran district. It is an unregistered body and the proprietors wanted Rs. 5,000 to purchase materials and machines to extend their business, but the money could not be had because the money-lender who was approached wanted the proprietors to mortgage their other landed properties in addition to the button business and its building. The proprietor's case was that he could not register his business as a limited liability company as it would cost him Rs. 600 a year for a qualified accountant, Rs. 200 a year for auditor's fee and it would require Rs. 150 to meet the initial expenses of registration. He urged that with the additional capital of Rs. 5,000 the outturn would yield a net profit of Rs. 1,000 a year, but the expenses pointed out by him would cover more than 15 per cent. of the additional capital and would almost absorb the profit in case he had also to engage a suitable manager. The money-lender's point of view was that the securities offered (*i.e.*, the stock of buttons, the machinery and the building which the proprietor of the factory valued at Rs. 5,819) was insufficient and the interest offered at 3 per cent. was very low and the period of repayment which was to be spread over 10 years was rather long. The money-lender also thought that it was necessary for him to insist upon a very sound and substantial security specially as it was a purely private concern.

Now much difficulty can be solved in this case if facilities are offered as regards registration and audit as I have submitted under (1).

I may also mention that the proprietors of this factory applied for monetary assistance to Government and were told in reply that "the principle which has been laid down by the Secretary of State for dealing with such applications is that State funds should be expended upon the assistance of indigenous industries when such assistance is likely to be of benefit, not only to the firm assisted but also to the public, by familiarizing them with such improvements in the methods of production as modern science and the practice of European countries can suggest". As the case was for giving financial support to a private enterprise solely for the improvement of its own methods of production and for its own benefit, Government did not see its way to render financial aid.

So far as my information goes capital for industrial enterprises is drawn either from Europeans or from the middle class educated Indians whose resources are very limited. I have never heard in Bihar of any bank advancing money on the security of industrial enterprise except in one case. In Bihar the agricultural raiyats have not got sufficient money to spare and the landholders and the bankers who have got money always invest it in landed property or in money lending business backed by the security of landed properties because landed property is so secure and valuable in these parts specially as it is all permanently-settled. Of course with European capitalists and landholders who are all more or less educated and enterprising and who have a broad vision it is quite different.

*Not printed.

I have had no experience of financial aid of Government for private enterprises. There are several ways in which Government can afford this aid:—

(1) Money grant-in-aid can be given in some rare cases in very backward and poor places, but generally speaking it is to be deprecated. If an industry cannot yield interest on its own capital sooner or later it is hardly worth while to encourage it. It may be desirable to allow bounties and subsidies in some special industries, such as sugar, as in some countries sugar has prospered on account of the system of bounties and subsidies and has beaten down Indian sugar on this account. I hear the Java sugar is backed by bounties.

As a general proposition, I should think that money grants-in-aid or subsidies should be offered in very rare cases of those industries to which aid cannot be practically given in any other way.

(2) It is necessary in cases of many industries to grant a dividend for a limited period to begin with with subsequent refund to Government of the expenditure incurred at the guaranteed rate. It may be stipulated that profits beyond a certain point may go to Government for the security it offers. Unless dividend is guaranteed I do not think the shy capital of the landholders and money lenders in Bihar can be drawn upon to support industrial ventures. The well-to-do Indians will subscribe to industrial enterprises if Government or local bodies grant interest for a certain length of time. I have heard that in the Shahabad district two light railway schemes succeeded because their interest was guaranteed by District Boards.

(3) Provided that Government is satisfied that there is a sound industrial venture and that there is guaranteed liability and that the men concerned are competent men of business, loans with interest may be advanced. But Government can be sure of the soundness of the business only when it has got an industrial and business expert, i.e., an experienced business man in its service to examine the prospects of industries. In some cases it may be necessary to consult some reliable experts not in the employ of Government. In case a loan is allowed by Government I think Government should have some control over its utilization, i.e., Government should know what materials and machinery can usefully be purchased.

(4) The supply of machinery and plants on a hire purchase system may also be advocated. When the machinery and the plant prove useful, the industrial concern may be given option to purchase them. This may be tried in some sugar factories which require an improved and up-to-date machinery. But this principle should be applied to cottage industries only when some sound, cheap, easily workable and up-to-date machines are available and when there is some material benefit by way of instruction in improved methods to the country.

(5) The provision of part share of company will guarantee the soundness of the company in the eyes of the people but I do not consider this method as efficacious as that of granting dividends.

(6) But above all I should put the "guaranteed Government purchase of products for a certain period." After all, finding a ready market for large products is a great problem and if this can be assured, much complaint will be removed. The industrial concerns will then have only to find capital and skill and it may be understood that when Government will guarantee purchase of products which must be of very good quality, surely Government will help with skill and direction to a considerable extent. I mean the Government business experts will make up for the deficiency in skill and ways of management by their advice every now and then when Government guarantees purchase.

I think Government should have some control over every business to which financial aid is given. But this control should not become an undue interference and should be limited to seeing that the main lines of its advice are followed. Government should always audit accounts. This control cannot however be exercised unless there is a business expert employed by Government who may go round and see from time to time how the business is managed. Thus it will be his business to see how the loans advanced by Government are being applied, whether the business for which Government has granted dividend is being diligently and carefully run, whether the machinery and plant supplied by Government are being properly used, etc., so as to justify the Government aid.

Pioneer and demonstration factories.

I have no experience of pioneer and demonstration factories but I am of opinion that these factories may be started when they do not compete with any established industries and when it is not likely that people will otherwise engage in the industrial concern. These factories should be closed or sold to private factories as soon as they are about to compete with private enterprise.

When Government are satisfied that any industry could be successfully worked, and that its establishment is desirable, offers should be called for from respectable commercial

houses to undertake the establishment of a factory and arrangements concluded with the firm, offering the best terms by giving, if necessary, grants-in-aid or any other help tending to the maximum benefit to the public with the minimum expenditure to Government. Government should not, in my opinion, be permanently interested in any enterprise excepting for State reasons. For some very advanced industries even in the Province of Bihar and Orissa an Industrial Bank which may advance money on the security of the industry itself may be of great use. But it is generally thought that such an Industrial Bank should be run on co-operative principles in order to safeguard its interest and that the bank should have the advantage of the disinterested advice of business or industrial experts which can be the case only when they are in the employ of Government and well paid. I am of opinion that Government aid should cease as soon as it begins to compete with existing, or as soon as it discourages fresh private enterprise, sufficient notice being given to the persons receiving the aid before the aid actually ceases. I have had absolutely no experience of banking or co-operative societies system. But I am of opinion that co-operative societies may be very useful for some cottage industries, such as weavers, etc.

In addition to these methods, I suggest one which some well-to-do Biharees may do well to take up. I suggest that a syndicate of Indian capitalists should be formed with a guaranteed capital of ten lakhs, of which only one lakh should be called up. The syndicate should be in touch with the Director of Industries, and when that functionary is shown any scheme which appears to him to be worth following up he should recommend it to the syndicate. The syndicate, having satisfied itself that the promoter was a business man, could then finance him to the extent of the capital that he himself was able and willing to invest in the enterprise.

Technical aid.

I have no experience in this line but I should think that demonstration factories may be started in some industrial centres and will be specially useful if they form part of business concerns run on business or commercial lines. I think that every important municipality may have a demonstration factory, showing the improved processes of the industrial possibilities which cluster round it. I mean only the cottage industries such as blacksmithy, carpet and basket making, etc. Arrangements may be made for training apprentices at these demonstration factories. Government experts may be lent to private firms or companies but the publication of their researches may be left for Government discretion The private firms should pay for the loans of these experts. It will be very useful if the results of the researches of scientific men in England are made known to business men in India. This can be done in the form of a regular paper issued by the Commercial Department in India for the supply of which some price should be charged.

Assistance in marketing products. Commercial museums.

I think commercial museums should be established at the headquarters stations of divisions and districts so that people may have some idea of the industries in each district or subdivision, of their manufacturers, of the places of manufacture, their prices, etc., and the qualities which may be supplied. There is a great want of knowledge specially regarding cottage industries and the establishment of industrial museums will remove this want. I think the industrial products may be sold at the museums to a certain extent, or arrangements may be made with the actual dealers to supply to the purchasers through the agency of the museums. I should further propose that all products of good quality which may be registered and exhibited in a museum should be published in some widely read newspapers.

Exhibitions.

Industrial exhibitions are useful and should be encouraged. They show the large products of a large area in a small compass and the Government should meet a portion of expense of such exhibition wherever people care to get them up. At present in Bihar Government has to take an active interest in getting up these exhibitions as people generally have not yet begun to understand their usefulness.

Trade representatives.

I do not think that there are any industries in Bihar and Orissa except indigo and sugar which require trade representatives elsewhere.

Government patronage.

The Government Departments which use imported articles should publish lists of these articles and exhibit them in commerical museums so as to encourage their production is India. I should propose that a list of those articles giving their descriptions and prices, etc., should be available at a small price and Government should enquire from time to time through official and non-official agency if any of these articles are or can be manufactured in India, and if so, how. I may also suggest that articles may be purchased in India not only when their materials are available in India but also when they are only manufactured in India although their materials are imported from elsewhere. Under the rules in force as I have understood them the former class of articles may be purchased in India even when they sell at a slightly greater price than abroad. But the latter can be purchased only when their prices and quality are exactly as in London. I think both classes should be treated alike.

Other forms of Government Aid.

Land Acquisition Act.

At present land can be acquired under the Land Acquisition Act only when it is meant for public purposes. If it is desired to acquire land for private industrial concerns the law will have to be changed so as to enable Government to acquire land even for private enterprises if Government consider it desirable in the interests of a private industry. I do not think there will be much room for exercise of this power at present but it may be taken to meet cases in future if any.

Training of labour and supervision.

I have no experience of any attempt made to improve the labourer's efficiency and skill. But I am told that labourers engaged in advanced factories under skilled (European) supervision, are more efficient than labourers engaged elsewhere. I have come across some blacksmiths who are much above the average class of cottage workers, and, on an enquiry I have learnt that they once worked under skilled supervision. I think that the efficiency of labour can be improved in well organized factories where work is actually done. If in addition to this some industrial education combined with a little amount of literary one is given in the factories themselves or close to them so as to keep them in touch with actual work, so much the better. I think young labourers may be taken in on wages prevailing in the locality and as they advance in their industrial and technical education their wages may also be increased.

Industrial schools.

I think industrial schools where industrial instruction may be combined with a little literary one may be established for any particular industry or industries where classes or castes following them actually live and work. Thus I would have a blacksmithy and carpentry school in a locality where there is a large number of families following these avocations of life. But it must be remembered that we have to teach not the existing but the improved methods of production.

In some very important trade centres I should have technological schools where instruction may be given in a highly developed form of industries but I should have such schools attached to business concerns where practical work is done for the market and I should have a practical and well trained business man at the head of such schools. I may also suggest that the syllabus in primary and secondary schools may include a book showing what industries exist in the province and where to look for them.

Official organization.

At present there is no organization in the province of Bihar and Orissa for the development of industries. I propose a Director of Industries who may be an experienced business man and may be enthusiastic in the performance of his duties and sympathetically inclined to deal with and prop up cottage industries. He must not be impatient about results and should freely mix with local officials to gather information and support. He should have sufficient funds at his disposal to help some industries, and his recommendations for the encouragement and support of industries as by loans, guarantee of purchase of products, should carry weight with Government. I should expect him to possess—(*i*) Sound and expert knowledge regarding Bihar and Orissa industries, (*ii*) accurate information as to sites for industries, demands markets, possibilities, proper times and materials.

Though not at present absolutely necessary, there may be a Board of Industrial Advisers or a Committee of Advisers for each important industry. Their recommendations should be duly considered by the Director in adopting it in a particular line of action and differences of opinion in important matters may go up to Government for orders.

One of the chief functions of the Director with his staff or Advisory Boards should be to supervise the funds subscribed to by Government or people if they desire it.

In my opinion India is not sufficiently advanced in the matter of indigenous trade or industry to call for the creation of a special Imperial Department.

Technical and scientific departments.

I do not consider the establishment of a College of Commerce yet necessary in the Province of Bihar and Orissa, but I think that there should be a good library with technical works of references in this province, and that loan of books may be given through the agency of local officers on the payment of a small fee Only the other day the Commissioner of Tirhut wanted a special book of reference on button colouring for the Tirhut Button Factory but it was not available

I think the time is not yet come for increasing the number of Technological Research Institutions in the country as the number of their seekers is limited, and we should direct all our efforts to improve the usefulness of only those that exist instead of yet creating new and costly Scientific Imperial Research Departments. I think the number of those seeking highly specialized knowledge is at present very limited in the country.

Collection and distribution of commercial intelligence.

I have no particular experience of statistics. I am not aware of any advantage from the issue of *Indian Trade Journal*. But I think an industrial journal may be started in each Province to convey useful information regarding industrial developments. This may be undertaken by the Director of Industries and the co-operation of the vernacular and English papers may be enlisted to publish the information as often as they can afford to.

Monographs on industrial subjects are useful and give considerable information in a small compass but they have not yet achieved any result because capital is not yet forthcoming. The main point is to induce capital to be more active.

Other forms of Government action and organization.

I have no experience of these matters, but to improve the quality of the products it may be well to introduce a system of industrial certificates after actual test. But to begin with, these certificates which are bound to institute a system of comparison must be as local as circumstances may justify. It is not wise to put down rising industries by comparing them with highly advanced industries.

I think the saltpetre industry of Tirhut division is of Imperial importance and should be specially developed and encouraged. It is said that saltpetre is now-a-days one of the main ingredients of gun powder.

I have no experience but I have heard from several people that the match and pencil industry of India suffers much because the requisite wood cannot be conveniently found insufficiently large quantities in one locality, *i.e.*, it is scattered.

It is generally believed that the competition with jail industries is very wholesome. The jail products are generally better in quality and finish than the products of a similar kind available in the local market and induce the improvement of local products.

ORAL EVIDENCE, 25TH NOVEMBER 1916.

Mr. C. E. Low.—You say that the difficulty in the case of Mr. Bose's factory was that he could not register the company as a limited company ?—Yes.

Do you think that if it was registered as a limited company you would get people to invest ?—People would have confidence in the firm. Mr. Bose keeps his accounts himself and the result is that the people do not know how his accounts are really kept.

You seem to think that it would be difficult to get landholders and capitalists in Bihar to put money into industries direct ?—I think so.

Don't you think it would be easy if you had an industrial bank or some such thing in which gentlemen could invest and the bank finances industries ?—Unless the industrial bank is backed up by the Government, I do not think it will inspire confidence in the zamindars to invest money.

What sort of backing do you think that Government should give to the industrial bank ?—I think that Government might purchase some shares in the bank and that will give some confidence to the people to invest their money in the bank, and through the bank the industry will be benefitted.

You do not think that if Government placed at the disposal of the bank their industrial organization the bank would get money ?—This will inspire some confidence. At present they do not know where they are.

Have you considered this position ? Suppose the Government Industrial Department through its experts say that a certain concern was technically sound and it afterwards failed owing to bad business management ?—It will have a very bad effect, if people know that a certain concern was at first recommended by Government and then ended in a failure.

You think that the people will not differentiate between failure due to technical causes and that due to mismanagement, and they will only consider the failure and blame the Government for it ?—Yes People will lose confidence

How could that be remedied ?—I should say that if Government has got a very good business expert and if he cares to give sound advice regarding certain small industries in this part of the country, I think there would be more success than failure.

Why is it necessary to have a Government business expert ?—Cannot you utilise the services of a committee of other business men who are not employed directly by the Government ?—The reason is that people will have no confidence in ordinary men unless they know that Government have got confidence in them.

These people would have a place in the official committee and would have recourse to the assistance of Government technical experts ?—In that case it will be all right.

If Government is in the same position as a big Calcutta firm is in when a certain proposal is made to the firm they examine it from the business point of view and they get the help of such technical advice as they can get and their business knowledge enables them to decide whether it is a good venture to go into or not ?—I do not think it will be encouraging enough in these backward parts.

Government would put itself in the same position as the business firm of Calcutta ?—Practically speaking.

Do you think that a municipality is a suitable organization for running a demonstration factory ? Or do you mean that a demonstration factory of some industry or other should be situated in every important municipality ?—No. I should not put one in every municipality. I should have a demonstration factory for all small industries which exist in a particular municipality.

Who would manage the demonstration factory ?—It would require an expert.

Who would be the controlling authority—the municipality or the Industrial Department of the province ?—Partly the municipality and partly the Industrial head of the province.

You have heard that municipal workshops are not well conducted, and if they cannot conduct their own workshops they presumably cannot conduct any demonstration factory ?—I do not think so. I submit that it will require some Government control and some Government supervision.

What do you think will be gained by bringing the municipality to manage the factory ?—Because in this place most of the artisans or men who carry on these village industries generally flock to the towns where they can get a ready market and it will be very good

to give these men a training in improved methods. It will direct the municipal efforts and resources into useful channels and educate the Indian public opinion through the municipal bodies.

When you say demonstration factory, do you mean for cottage industries or a big organized industry?—For cottage industries, such as weaving, brass making, etc., on improved, up-to date and scientific lines as far as practicable.

Hon'ble Pandit M. M. Malaviya.—You think that if there was a Government system of auditing accounts without fee it would generally help the nascent industries?—Yes.

Do you think that will induce the people to advance capital for such industries?—It will induce many people to do so.

You are not in favour of Government having shares in a company because you think the principal is unsound?—Ordinarily, I should not do it.

In special cases you think that it might be done to inspire confidence?—Yes.

If the business to be started is of an important character, important to the industrial development of the country?—Yes.

You say "The efficiency of labour can be improved in well-organized factories where work is actually done. If in addition to this some industrial education combined with a little amount of literary one is given in the factories themselves or close to them so as to keep them in touch with actual work, so much the better." Don't you think that a general elementary education supplemented with a little technical education would promote the efficiency of the labourers better?—I think so.

You are not in favour of a special Imperial Department for promoting industry?—Not at present. I do not think that our industries are so well developed at present.

You think that the Provincial Department of ndustry will serve the purpose?—I think so.

Hon'ble Sir F. H. Stewart.—Have you put forward any suggestion for the formation of a syndicate among well-to-do Beharees to finance industries?—This is the proposal I have made for the first time.

Do you think that it would be found acceptable?—My opinion is that people in these parts are so very backward that I do not think that at present they will come. But still the method might be tried.

With reference to saltpetre industry in Tirhut Division you say that it is of imperial importance. Is it confined to that division?—It is mostly confined to Tirhut Division. There is some of it in Patna and Bhagalpur Divisions—but the major portion comes from Tirhut.

Have you any special suggestion to make how that can be encouraged and developed?—Yes. I should say that the rules may be made more lenient in the interests of this important industry. For instance, I heard from gentlemen who are concerned in the industry that as soon as a Government official knows that it is not only saltpetre that they are working but salt partly, they are taken to task and the result is they have to give up the work.

Is it commonly thought that the exactions of the subordinate staff of the Salt Department are very severe?— It is the common idea which I have gathered from many gentlemen in these parts.

Do you think that it is likely to be true?—I believe it, is true, though I have no experience of it.

You advocate some relaxation of the rules?—Yes.

Would you make these refineries pay a small tax and then allow them to have such salt as they wished to manufacture?— I would do that, but I should keep them within certain limits. I would not encourage the production of salt to a very large extent under the cover of saltpetre industry. In all important places, in almost every subdivision, I would establish a saltpetre refinery where they would work salt along with saltpetre so that the production may be checked.

A salt refinery along with the saltpetre refinery?— Yes.

That is to say the *Nunias* will bring the waste of the saltpetre stuff to the salt refinery and refine it into salt?—Yes.

So far as you are aware, the Salt Department in this province is working at a considerable loss?—I do not know much about it.

Is it shortly going to be transferred to the Local Government?—So I have heard.

Do you think that it is a step forward?—The local officers will have some intimate control over, or connection with, the saltpetre industry and they will be able to look into the things more closely and carefully.

You think that they can mitigate the severity of the rules while seeing that they are properly administered?—Yes. They are more in touch with the people and can appreciated and remedy their difficulties.

WITNESS No. 77.

BABU JNANENDRA MOHAN DUTTA, *Pleader, Director, Muzaffarpur Central Co-operative Bank, Muzaffarpur.*

WRITTEN EVIDENCE.

Financial aid Capital.

*Q.*1.—I myself did not start any industry on a large scale; but I found many persons not being able to start industries, and many persons put to difficulty in continuing industries, for want of funds, *viz.*:—

(*a*) Many students, who were sent to Japan, America and England to learn industries by the Scientific and Industrial Association, when they came back after completing their studies, could not start industrial business in India for want of funds.

(*b*) *Confidential.*

(*c*) Mehsi Button Factory is unable to work satisfactorily for want of sufficient funds.

(*d*) Bose's cutlery works of Muzaffarpur is not in a prosperous condition for insufficiency of funds.

Government assistance.

Q. 5.—In my humble opinion, therefore, the following modes of giving help by Government, would aid industries:—

(*a*) Money grants-in-aid, like those of the Education Department, given to private individuals, supporting their business.

(*b*) Loans on a very small interest —4 per cent. per annum—for the starting or upkeep of a business.

(*c*) Supply of machinery and plant on the hire-purchase system, for *cottage industries*.

(*d*) Guaranteed Government purchase of products for limited periods.

Q. 6.—So long as Government assistance is required, the business should be under Government control, under a Government supervising and auditing agency.

Pioneer factories.

Q. 7.—It would be very much helpful in the industrial improvement of India, if "pioneer factories" of small industries are opened by Government, and when profitable, such business made over to private capitalists by realizing the value of the existing machineries, building, land, etc.

Q. 9.—When a business becomes a profitable concern, there is no difficulry in getting assistance from the banks or capitalists. But in the beginning Government assistance is very necessary. No bank would advance money to a new firm without security.

Co-operative societies.

Q. 11.—I have personal experience of the Muzaffarpur Central Co-operative Bank, developing and assisting agriculture. The cultivator members of this bank get money help, seeds, manure, implements, bullocks, etc., as they require. They return the money or the price of the things supplied to them, by certain convenient instalments. The result is that the agriculturist members of the bank are gradually becoming better off and a joint reserve fund is gradually accumulating.

Q. 12.—Co-operative societies may help *cottage industries* of a common class of artisans Under the present Co-operative Act no individual person can get any loan from a Co-operative Bank. If a number of men, following a common industry or business, combine amongst themselves and form a Co-operative Society they can get loan from a Co-operative Bank on their joint security.

Besides agriculture, the co-operative system may help the following, among other, industries:—

(*a*) Dairy—by opening co-operative society amongst milkmen.

(*b*) Weaving—by opening a society amongst weavers.

(*c*) Tinwork—by opening a society amongst tinsmiths.

(*d*) Society of blacksmiths.

The organization of such societies would be under the Co-operative Act and the objects would be to get money help and to make a common cause for the improvement of a particular industry.

There are two very great difficulties in the working of the co-operative system :—(1) the people always want Government help in the working of the Co-operative Societies; and (2) there are a very few philanthropic honorary members who can give time and labour for its organization and up-keep.

The co-operative system may only give money help, but for the improvement of the industry, other help from experts is neces ary.

Q. 13.—In the present condition of industry in this country, there is no apprehension of Government aid competing with private enterprises.

Technical aid.

Q. 15.—I know of one instance only of Government aid given for scientific purposes in this province, that given to the Indigo Planters' Association. This produced appreciable effect, as this Association introduced Java and Sumatra varieties of indigo, and some improved method of indigo making.

Demonstration factories.

Q. 19.—Government demonstration factories of small industries will be very much helpful. These factories, when profitable, may be made over to private capitalists, as suggested in respect of "pioneer factories". The demonstration factories may be started in respect of the following industries :—

(*a*) Match factories (I think it is possible to start small match factories. Bamboo sticks or cocoanut sticks, would not require complicated machineries. If small tin boxes are used, one box would last for a long time.) (*b*) Pencil making, (*c*) Hosiery, (*d*) Laces and tapes, (*e*) Nibs and pens, (*f*) Pins and needles, (*g*) Tanning and leather articles, (*h*) Button making, (*i*) Cutlery, (*j*) Tin making and lanterns, (*k*) Engine and motor-driving and repairing, (*l*) Iron foundry, (*m*) Dyeing, (*n*) Paint making, (*o*) Oils, (*p*) Carpentry, (*q*) Paper making, (*r*) Glass making, etc., etc.

Q. 20.—Some kind of Government demonstration factory should be started in each division — of one or more of the above mentioned or other industries.

Research abroad.

Q. 21.—I know of the Pusa Research Institute, which is expected to do much good to agriculture and its allied industries. Pusa wheat is the remarkable result of wheat research in that Institute. The book on Entomology is a very helpful publication. Students can learn there — as short-course students — lac-culture, sericulture, bee-keeping, etc. Though the general public has not yet been able to know of its benefits, as the bulletins are not of general circulation, I think the institution will do real good to the country.

One of the reasons why Pusa Institute has not yet become very popular, is that it does not admit general students, and it does not offer any guaranteed prospects to its scholars.

Assistance in marketing products. Commercial museums.

Q. 28.—Museums, in my opinion, are very necessary for educative purposes. But in each museum, there should be some person to explain the usefulness of the exhibits. This want is very much felt in the Calcutta museum.

Q. 29.—Considering that museums are very necessary, for the improvement of agriculture, I invited the attention of Mr. Streatfield and Mr. Lyall, the then Commissioner and Collector of Muzaffarpur, on this matter, in the agricultural meetings, and they were pleased to take up the matter in right earnest, and the Agricultural Museum and Library was started in Muzaffarpur, and a very elegant building built for it. This museum may be extended for industrial purposes also. I think in each divisional headquarters, agricultural and industrial museums should be started.

In these museums, samples of agricultural and commercial products should be kept, and all sorts of examples and samples should be placed, and sample machineries planted, for setting examples to the public, e.g., (1) small sugar-making machine with bullock-gear, or oil-engine should be acting; (2) dyeing materials; (3) pencil-making machineries, etc.

There should also be a library of industrial books of reference. Some implements and machineries may be kept for giving to the public on hire system.

An enquiry office should be attached to each museum, supplying information to the public, about industrial, mercantile and agricultural matters.

Sales agencies.

Q. 30.—Sales agencies of cottage industries are very necessary. I know of many poor women of respectable caste, who can earn their livelihood by making articles of needle work, laces, wool work, etc., cannot find a place where they can send their articles for sale. There should be markets in important towns like Calcutta, Patna, etc., where articles of cottage industries may be kept for sale. These can be attached to the museums also.

Q. 31.—Museums are like permanent exhibitions. But exhibitions are of a wider utility. Exhibitions help the people in knowing their own industries and in comparing these with the industries of other parts of the country.

I think Government should encourage exhibitions, holding one in every divisional headquarters.

Q. 33.—These exhibitions should aim at being popular in character and at the same time bringing the buyers and sellers together.

Q. 37.—I think it would be very useful, if a list of imported articles brought from other parts of the world than India and Great Britain in use in Government Departments, be shown in the Commercial Museums; so that attempts may be made in India to compete for those articles. Whenever such articles are made in India, those should be taken by Government as may be necessary.

Q. 46.—*Witness here gave confidential evidence.*

This shows that by legislation, every firm should be compelled to take a certain number of apprentices of higher grade Indian students; and such students should be given some prospect of getting higher appointments, according to their qualifications.

Q. 47.—Industrial schools alone would not be popular, unless some prospects are shown to the students.

I know of the Agricultural College of Sabour, where there are permanent classes as well as short course classes for students. It was declared by the authorities that the students of the permanent as well as short course classes should not hope to get appointments, but they should themselves take to agriculture, and as a precaution against attempting for services, the students of short course classes were not even granted any certificate of their ability. The result was that only a small number of students joined the permanent classes and very few joined the short course classes.

When the Calcutta Medical College was opened, the prospect of guaranteed posts was placed before the students. Now those who join the Medical College are not anxious for posts.

In this manner, for agriculture and industry, some prospects of guaranteed posts, or other hopes should be given, to induce best students to join the institutions. Unless brilliant students join an institution, the object of starting the institution cannot be fulfilled.

There should be both apprentice system and industrial schools. Pioneer or demonstration factories may be combined with the industrial schools and museums. In demonstration or pioneer factories, as well as in private mills and firms, apprentices of all grades should be allowed admission.

Q. 50.—I think all matters of industry should be under the Department of Industries.

The Education Department may, on the advice of the Industrial Department, introduce some industrial books or open classes in schools and colleges.

The Education Department may make over students of special taste and aptitude and knowledge, to the Industrial Department for further education and equipment.

Official organizations.

In my humble opinion, there should be a Government Department of technical and scientific industry or industry generally, with a Director of Industries at the head, and an Advisory Board under the Director.

The Director of Industries should be a European or American business man and expert with special knowledge of industries. The Advisory Board should consist of half Indian and half European members, who are also business men and experts.

The Director of Industries as also the Board of Industries should have executive powers with budgetted funds.

For the funds of the departments and the institutions and factories, there should be either direct or indirect taxation on the traders and factory-owners of India, and on the articles of trade which are non-Indian and non-English.

Commercial intelligence.

I think like the agricultural bulletins of Bengal and the United Provinces, there should be scientific periodical publications, for public interest or of higher grade interest for scientific men. The American Journals, like *Scientific America*, give much insight on scientific subjects. So far as I think, Babu Basanti Charan Sinha of Muzaffarpur, got the idea of fruit-canning from the American Journals.

Railways.

Q. 98.—I have found that the Railway Companies often unnecessarily take "risk note forms" from the senders of goods, limiting the liability for safe delivery of articles. This causes much inconvenience to the tradesmen and gives rise to many litigations.

ORAL EVIDENCE, 25th NOVEMBER 1916.

Mr. C. E. Low.—You are a Director of the Muzaffarpur Central Co-operative Bank?—Yes.

When was that Bank started?—In 1912.

And previous to that were there co-operative societies there?—Before starting the bank, I and another gentleman started two small societies to learn the work.

What class of people have you?— Only cultivators.

At present the Central Bank finances only agricultural co-operative societies?—Yes.

Where do you get your money from?—From the provincial bank, and for immediate necessities the Benares Bank and fixed deposits.

Have you got a cash credit with the Benares Bank? —To the extent of Rs. 10,000.

Where is the provincial bank?—The Provincial Bank of Patna. We took a fixed loan of Rs. 25,000, part of which we have paid, and we have cash credit now for Rs. 10,000.

What is the share capital of the provincial bank?—I do not know.

Can you get as much advance as you want?—We have got plenty of money, more than we require for our transactions, and as fixed deposits are coming in we are refusing them.

What interest do you pay on fixed deposits?—Six to seven per cent—one year six, two years six and a half, and three years seven per cent. per annum.

You think you can get as much as you want at six per cent.?—We are getting money at six per cent. but not much. I do not think that if we lower the rate of interest we shall get as much money as we get now.

What class of people do your depositors come from?—Mostly from the Deputy Magistrates and zamindars and service-holders.

Do you think that that class of persons would invest money in an industrial bank and take shares in it?—I have every doubt, because that is quite a new thing, and unless people get some security I do not think they will advance money. In the Co-operative Bank we get some security in land. Though it is not the law it is thought that we have got a charge on the lands of the cultivators.

Have people the idea that Government exercises a certain amount of supervision over the Central Bank and would not allow it to go wrong?—I think so. The people have an idea that it is a bank backed up by Government.

Witness here gave confidential evidence.

Hon'ble Pandit M. M. Malaviya.—You say that every firm which is patronised by Government should be compelled by legislation to take a certain number of apprentices. Do you seriously think that it is necessary to undertake legislation? The Government could always bring pressure to bear upon the firm and could refuse to patronise it if it did not take some students recommended by the Government. Could it not?—It is often difficult to move Government. If a clause is added to the Indian Companies' Act, I think that will serve the purpose.

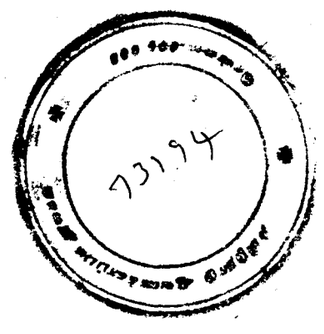
You could not introduce a clause which would bind a company in all circumstances to take any students recommended by the Government. The Government even then could only refuse to patronise any particular firm but your object would not be gained by it?—If a private student goes to a firm and does not get admission it becomes difficult for him to move the Government in these matters.

Would not your object be gained if the Government made it a rule that they would patronise only those firms which would take in such students as apprentices as might be recommended by the Government?—There may be some firms which may not require any Government patronage at all.

The Government cannot compel them in that case to take in students?—But if it be a part of the Indian Companies' Act?

That is a large order to make. You say that the railway companies often unnecessarily take risk note forms. Are you in favour of this risk note form being done away with and the companies being made responsible to safely deliver the goods that they undertake to carry?—Not altogether, because there may be insecure packing. In that case a risk note may be necessary.

Under reasonable conditions you would require that the railway companies should be responsible for the delivery of goods which they undertake to carry?—Yes.



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