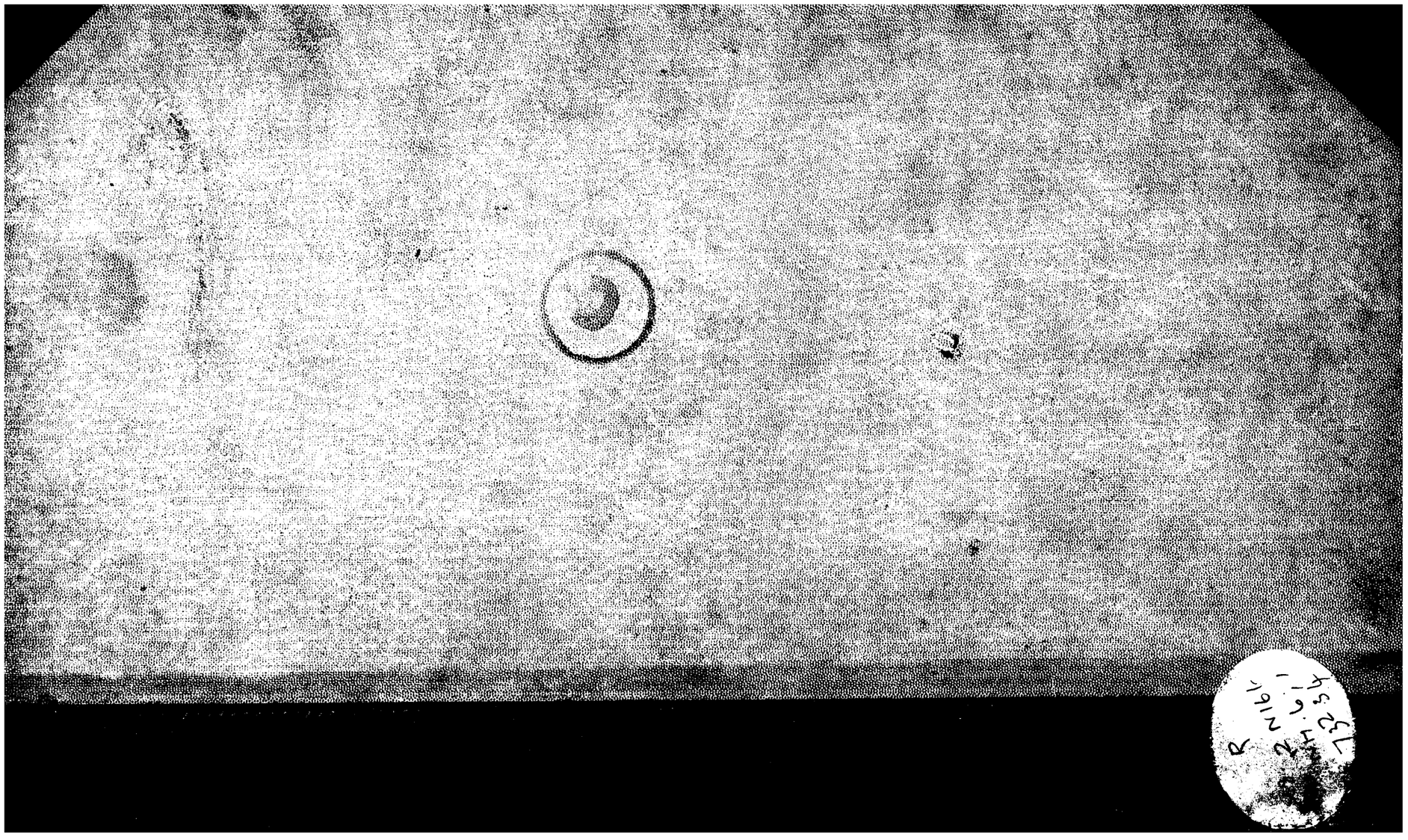


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QUESTIONS FOR THE ASSISTANCE OF WITNESSES.

I.—Financial aid to Industrial Enterprises.

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

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.

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

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.)

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

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

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.]

11. Do you know of any industries which have been developed or assisted by the formation of co-operative societies? **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 (*e.g.*, 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 technical 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 for general or 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 ?

Patent laws.

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

Mechanical engineers.

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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 ?

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 (1918)?

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 these 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?

Introductory Note.

This volume has been prepared for the confidential information of the Commission and of the Government of India, and is not available to the general public. It contains the evidence of those witnesses whose statements are confidential, either wholly or in part. In the latter case, a reference in the headings is made to those portions of their published evidence with which the confidential evidence should be read.

G. H. W. DAVIES,

Secretary, Indian Industrial Commission.

Evidence taken by the Indian Industrial Commission, 1916-18.

CAWNPORE.

WITNESS No. 9.

DR. E. G. HILL, D.Sc., *Principal and Professor of Chemistry, Muir Central College, Allahabad.*

Extract from ORAL EVIDENCE, 6TH NOVEMBER 1916, *vide* pages 58—64 of Volume I of the Minutes of Evidence.

* * * * * *

Sir D. J. Tata.— *Q.* You said that some of the people you sent to Bangalore returned. Do you mean that they returned without finishing their course ?—*A.* Apparently.

Q. Do you happen to know why ?—*A.* They could not get work done. The staff was busy in other directions. It was said that the Institute was not doing all that it might do as a teaching institution.

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WITNESS No. 13.

HON'BLE MR. H. R. C. HAILEY, C.I.E., *Director of Land Records and Agriculture, United Provinces.* *Hon'ble Mr. H. R. C. Hailey.*

Extract from WRITTEN EVIDENCE, *vide* page 87 of Volume I of the Minutes of Evidence.

* * * * * *

I have been closely concerned with the giving of financial aid to two sugar factories. Government assistance.
The first of these, *viz.*, at Pilibhit, was almost moribund when assistance was afforded it. The factory was badly laid out, and the machinery was insufficient and constantly giving trouble. The factory was inspected by the Sugar Engineer to Government, who found that new machinery was required and the factory had to be partly reconstructed. Financial assistance was given on the condition that the owner provided double the amount of financial aid given by Government and that the factory was reconstructed under the supervision of the Sugar Engineer. In point of fact the owner had to supply good deal more capital, but the factory has since worked steadily and has proved a success. The owner has now extended it considerably from profits.

In the second case a loan of five lakhs was made for starting the Tamkohi sugar factory on the security of landed property. Though the factory has had serious difficulties to contend with, these have been largely overcome, and, given tolerable seasons, should now prove a success.

I have also, while on the Board of Industries, been indirectly concerned with the granting of financial assistance to other enterprises, such as the Premier Oil Mills, Cawnpore. In other cases the assistance was mainly on a small scale.

It is not in my opinion possible to pronounce on the best method of giving Government assistance—so much depends on the nature of the industry and the means the entrepreneur has at his disposal. This has been very marked in the different applications which have come before the Board of Industries in these provinces. In some cases, such as new glass works, the assistance really required was in the nature of a skilled expert to teach the workmen ; while, when the management succeeded in turning out the manufactured article, what was wanted was something in the nature of guaranteed purchase. On the other hand, in the case of a sugar factory requiring a large amount of capital, initial monetary aid in the form of loans would be required. In the case of an industry which is in difficulties in its early days, a money grant or supply of machinery on the hire-purchase system might be most suitable. It does not seem to me either necessary or desirable to tie the local Governments down to any particular form of giving assistance. The really essential point is that the various Governments should have at their disposal a rather larger number of expert advisers, such as the Sugar Engineer in these provinces, who can advise on the projects put before them.

In any case, it seems to me essential that, where a loan is being granted for purposes which will involve the purchase of machinery, Government should have a voice in the matter in order to see that excessive sums are not being given for the plant, and that it is of a character likely to be suitable for this country. If this is not done, the chance of repayment of the loan may be small.

* * * * * *

Extract from ORAL EVIDENCE, 7TH NOVEMBER 1916.

* * * * * *

Sir F. H. Stewart.—*Q.* You give two instances in which Government aid was given to sugar factories. What form did it take?—*A.* The first was an out-and-out grant of 30,000 rupees on the condition that the factory provided Rs. 75,000.

Q. Was there any condition of repayment?—*A.* No.

Q. Would you consider that an out-and-out grant would be preferable to any of the other methods indicated in the list of questions?—*A.* In this case it was exactly what the factory wanted. It suited the particular circumstances of the factory.

Q. In the second case Government made a grant of five lakhs?—*A.* That is a mistake. I have asked that the words may be corrected to "a loan". It has been partly repaid.

Q. Is there any arrangement for Government control during the period of the loan?—*A.* No. There was a condition that they should train a certain number of men as sugar engineers and sugar boilers. But the control was left to them. Government reserved its right on certain conditions of taking over the whole place in order to recover the loan.

Q. What proportion of the capital was met by the firm?—*A.* I do not know if I am justified in giving the figures of a private firm. The total was above 10 lakhs and Government advanced more than half of it.

* * * * * *

WITNESS No. 15.

Mr. B. C. Burt. MR. B. C. BURT, *Deputy Director of Agriculture, Cawnpore.*

Extract from WRITTEN EVIDENCE, *vide* page 104 of Volume I of the Minutes of Evidence.

Other forms of Government aid to industries.

* * * * * *

Land policy. *Q.* 41. Under existing conditions of land tenure it seems impossible for an occupancy tenant legally to dispose of his occupancy right in a specified piece of land, and a proprietor cannot sell his ex-proprietary right in his *sir* land, in which he retains cultivating rights after selling his landlord's rights. As a result, a company purchasing an estate with the intention of starting, say, a sugar factory would still find itself hampered by a number of rights, which would prevent it from developing its property to advantage. There are certain obvious objections to making tenant's and ex-proprietary rights generally saleable, but it seems desirable that when tenancy laws are amended Government should reserve to itself power to sanction such sale for industrial purposes.

The present Land Acquisition Act allows the acquisition of land absolutely when required for Government purposes, and in this case there is no appeal except as to the amount of compensation to be paid. Under another section land can be acquired for an object which Government considers in the public interest but where the purchaser is not Government. In this case objections have to be heard to the actual acquisition as well as an appeal lying as to the amount of the award. It is possibly straining the latter section to a purpose for which it was not intended to utilise it for the acquisition of land for industrial purposes, and some amendment of the Act appears to be desirable in this respect to enable Government to sanction the application of the Act to the purchase of land for industrial purposes.

The main advantage of the Land Acquisition Act is that it permits all rights to be extinguished and admits of a number of small conflicting interests being adjusted.

Its disadvantages are that it is very drastic, and unless applied with great care may cause real hardship and that civil courts may make great enhancements in the price of the land on appeal. For this reason I have suggested that power should be taken under the Tenancy Act legally to compensate occupancy tenants and proprietors for their cultivating rights, as this might lead to more purchase by private agreement and a restricted application of an amended Acquisition Act.

Training of labour and supervision.

Q. 50. Whilst officiating as Director of Industries, I expressed the opinion that technical or industrial schools should be entirely under the Director of Industries and not under the Education Department, and that the Director of Industries should deal direct with Government in matters affecting technical education as in industrial matters. This opinion I still hold. Industrial education is inseparably connected with general industrial development, it is still in the experimental stage and constant care is necessary to prevent it settling into the wrong grooves. It is in my opinion unreasonable to expect a department that is charged with the general education of the province from primary education upwards, to devote the necessary attention to industrial education. Industrial education is already dealt with by the Industries Department of Government and not by the Education Department, and my proposal was that the Director of Industries should deal direct with Government and that the latter should refer matters of general policy to the Director of Public Instruction as their principal educational adviser when necessary.

Under the present system there is often delay in dealing with matters concerning technical schools, due in no small measure to the existence of an unnecessary post office. All matters of importance are considered by the advisory committees which exist for each technical school, and the Education Department is represented by the Director of Public Instruction or an educational officer on most of these. Once proposals have received mature consideration in committee, it is desirable that they should reach Government as early as possible. This is particularly the case in matters concerning the budget and other financial matters.

The above provisions should be ample to secure the necessary co-ordination between industrial education and the general educational system of the province, but in addition not only the Director of Public Instruction, but several other educational officers are members of the Board of Industries which presumably would discuss and advise Government on any material changes in policy in industrial education.

The Education Department's inspectors also inspect these industrial schools which teach general subjects; this is an arrangement which is of considerable advantage.

General official administration and organisation.

Q. 57. In the United Provinces there is now a whole-time Director of Industries, who deals direct with Government in the Industries Department, and an Advisory Board of Industries, the constitution and objects of which are defined in the Government resolution on the subject. Under the present scheme the Director of Industries is the executive officer of the Board. I see no advantage in investing the Board with executive functions and with the control of budgetted funds. As an Advisory Board it is competent to consider schemes and the amount of money necessary to carry them out, and can recommend Government to make an allotment for the purpose. But it seems clear that the final decision as to whether money can be allotted for a particular purpose must rest with Government and the responsibility for its proper expenditure with the Government officers concerned. It would seem unreasonable to expect Government to allot to a Board of Industries budgetted funds for expenditure on unspecified objects.

Q. 60. Local conditions and the industries to be investigated or assisted must necessarily decide as to whether a provincial Director of Industries should be an expert or a business man. I see few advantages to be gained from the appointment of non-expert officials.

WITNESS No. 17.

MR. THOMAS SMITH, *Managing Director, Muir Mills Co., Limited.* *Mr. Thomas Smith.*

Extract from ORAL EVIDENCE, 7TH NOVEMBER 1916, *vide* page 119 of Volume I of the Minutes of Evidence.

* * * * * *

President.—*Q.* Have you got any provision in your mill by which a man gets a bonus for good work?—*A.* He gets a bonus on his weekly and monthly attendance.

Q. Could you tell us the amount?—*A.* We pay six annas a week. Then we give him a rupee a month if he is present for the full month. He gets therefore Rs. 2-8. He can be absent for two days. One day costs him four annas unless he is found sick. Our trouble here is that a man who has worked for twenty days feels that he has got enough and he absents himself.

Q. When you do succeed in encouraging thrift, how could the workman take advantage of it?—*A.* They do not deposit with us, but there is the Post Office Savings Bank.

* * * * * *

WITNESS No. 27.

MR. A. B. SHAKESPEAR, C.I.E., *Messrs. Begg, Sutherland & Co., Cawnpore.* *Mr. A. B. Shakespear.*

WRITTEN EVIDENCE.

Capital. *Q.* 1.—I have had considerable experience extending over 22 years including an electrical enterprise and three sugar companies.

I have never experienced any difficulties, and in my opinion difficulties are rare so long as the enterprise is in an industrial group, which has had a fairly good record, and the time for floatation is judiciously chosen when the particular industry has had some years of prosperity at its back.

Of course much depends upon the reputation and record of the promoters, and this is much more the case in this country than in England. The large commercial houses who have been the founders of most of our major industries naturally have a call on capital, so that a venture put forward by them has a good backing before it is launched.

The difficulty is to attract English capital to Indian enterprises, and in my view the reason is to be found in the difficulties of buying and selling stock as compared with concerns which are quoted on the London Stock Exchange. It may be an American railroad stock or a mine in Mexico, but you can always call up your broker on the telephone, and he will usually

be able to sell your holding for you in 24 hours "at a price." If it was possible to have our industrial stocks quoted on the London market, we should find English capital more ready to invest in our joint stock enterprises.

Q. 2.—*Merchants, officials,* and *bank reserves* for certain classes of stocks such as debentures.

The mass of the people do not, except in rare cases, invest in industrial stocks.

Q. 3.—I think it doubtful that any of our major industries have escaped bad times when its machinery had to remain standing idle. Ill-considered extensions leading to over-production are a frequent cause, but naturally no industry is exempt from the inevitable ups and downs of trade.

Government assistance.

Q. 4.—My firm was entrusted with the establishment and management of the first cotton-seed oil factory in northern India.

Q. 5.—(1) *Money grants-in-aid.*—This method should be most sparingly resorted to, and then only when the public interests are involved, such as a tramway undertaking, an electric supply company, a railway, or to establish or develop a "key" industry, such as an important chemical product or some article of trade of national importance, but even then only where Government is satisfied that those interested in the promotion or development of the enterprise have exhausted *every* other means of raising money. I can state a case where a group of very well-to-do persons obtained a very large loan from a provincial Government on more advantageous terms than the money could have been raised in the open market to establish a concern which was of no national or even local importance, and where no improved or novel methods were to be demonstrated.

(2) *Bounties and subsidies.*—These should only be resorted to in cases where an industry of national importance requires help or to countervail a bounty or subsidy granted on some foreign article of trade.

(3) *Guaranteed dividends.*—This is a very useful form of assistance in such undertakings as railways, tramways, and electrical companies, where there is a long development period, but this form of help should be confined to enterprises of a definitely public service character such as the above. The guarantee should be at a moderate rate of interest not exceeding 4½ per cent and the period should not exceed five years.

(4) *Loans with or without interest.*—Only legitimate in quite exceptional cases. In most cases capital can be found if the scheme is a sound one and the public have confidence in the promoters.

(7) *Guaranteed Government purchase of products for limited periods.*—This is of great assistance to a young industry which has to expend a great deal of money on missionary work in establishing a market for its products. It is one of the least harmful methods of State help. It gives the public confidence in the concern or industry, and so long as the tax-payer's interests are properly safeguarded as to cost and quality, there is no injury done.

In all cases where financial help is given, Government should have full access to the accounts of the undertaking, and the right of inspection should also be provided for. Government should also prescribe that the appointment of auditors should be under its control and the submission of returns, as at present required by licensed undertakings, should also be prescribed.

Pioneer factories.

Q. 7.—They are very valuable for industrial development. But I would have it laid down as a principle that Government should act through commercial houses of reputation in the matter of management. I mean that it is better for Government to put the scheme in the hands of some approved agency for management and not work the enterprise themselves.

Q. 8.—I think where Government is satisfied of the soundness of the enterprise or process and capital cannot be attracted to it, there is no limit to the range of industries or processes which it is proper for Government to pioneer, always assuming that the public interest is being served by so doing.

Such factories should always be surrendered by Government when the development or missionary period has passed by.

I do not support the nationalisation of any industries except perhaps coal and valuable minerals, such as the tungsten ores, which I consider should be under State control.

Financing agencies.

Q. 9.—I do not think I can point to any industry in India which can be said to have been hampered by financial circumstances. Certain concerns in almost every industry are bound to be in a bad way, but examination will generally be found to prove that management or promotion conditions are to blame. There has either been over or under-capitalisation, or a too generous dividend paying policy has left the concern bare of reserves when the inevitable "rainy day" comes round.

Banking institutions, speaking generally, adopt a liberal-minded policy towards industrial finance, but entire groups of industrial concerns have been in financial straits owing to banking institutions getting into difficulties.

I am of opinion that it is of the greatest advantage to concerns to have at their back managing agents, such as the great commercial houses in Bombay and Calcutta.

Q. 10.—I think the need is to protect industries by more stringent banking laws. The banks have been the culprits in the cases I refer to.

Q. 14.—I would apply the test of the advantage of the community at large,

General.

In connection with State aid to industries of any kind, I hold that the guiding principle should be the advantage of the community or nation as a concrete body. It is the same with tariffs—to be justified they must be able to stand the test of whether they are doing more good than harm to the community as a concrete body.

There is no question that State aid as applied by Germany to certain of her industries has enormously advantaged her as a nation. I think this is also the case with the United States.

The sugar bounties in the case of Germany, Austria, and France were undoubtedly of benefit to the countries who granted them until they became excessive—then they became a burden. In France the tax-payer eventually came to be taxed so heavily to support the beetroot industry that sugar for domestic consumption was so dear that he could not afford to eat it.

Technical aid to industries.

Technical aid in general.

Q. 15.—I have had under observation for a number of years the measures taken by the Government of India for the development and expansion of the Indian sugar industry, and I have endeavoured on every opportunity to demonstrate how lamentably inadequate these have been, and how greatly the industry has suffered from the want of a proper policy of expansion and reforms. There has been, it appears to me, a want of co-ordination on the agricultural side, isolated officers have carried on spasmodic efforts and in some cases with very good results, but the industry has for the most part been at the mercy of the personal inclinations of provincial Directors, and I have seen no signs of any real efforts to bring India alongside her rivals in the matter of research and technical instruction.

It is really a matter for wonder that the industry has not been beaten out of the field long since, and it is a proof of its latent strength that it has been able to wage such an equal struggle against the powerful beetroot industry on the one side, and the efficiency and natural advantages of countries like Java and Mauritius on the other. There has never been a professional sugar-man in Government service since I came to India. I want to see a definite Government policy laid down after consultation with the heads of the industry, and funds voted for carrying on work both on the agricultural and technical sides on a scale proportionate to the importance of the industry. We want a staff of agriculturists experienced in sugar, engaged on our crop problems and at least one expert of approved attainments for the technical side who would of course have engineering knowledge. There is at present an official styled *the Sugar Engineer to the Government of India.* He should be got rid of at once.

Excellent work is being done by Dr. Barber in the south in the direction of establishing new types of canes, but he is working single-handed and his equipment should be strengthened and enlarged.

Q. 16.—Government has done a lot of good work in cotton, but the results have been hampered by want of system and want of funds. It is impossible to expect general agricultural officers to devote sufficient time to specialised studies. What is wanted is to have all-time experts on all our staples.

Q. 18.—If a concern calls in a Government expert, it must be prepared to have the results of his investigations made public.

Demonstration factories.

Q. 20.—I have for a long time thought that the manufacture of paints and varnishes had a great future before it, and I think a small factory might be established with advantage.

Research abroad.

Q. 21.—So far as my memory serves me, I have never had any occasion to apply to the Imperial Institute for any information ; nor am I aware that it has been of any substantial value to the industries of India.

Q. 22.—I think it most necessary that the Department of Commere and Industry should be kept closely in touch with all research work carried on in England connected with our industries. I am of opinion, however, that we should have our own research institute in India, and I would favour the establishment of a central scientific and technological institute for carrying on research work in this country. If this is situated in Calcutta, Bombay may be jealous ; and if it is situated in Bombay, Calcutta may be jealous ; so I would favour it being situated at Cawnpore, which is an important seat of industry and the scientists will be in close touch with a large body of commercial thought, including representatives of the cotton, leather, wool, sugar, electrical and flour industries. In many directions industrial technology and agriculture come into close contact, and I would suggest that a portion of the Agricultural College at Cawnpore be made available to the scientists of the technological institute. There must be ample room there for their accommodation.

Assistance in marketing products.

Exhibitions.

Q. 31.—My only experience in India is that of the Allahabad Exhibition, and I think there is no doubt that this had great educative value, especially on the agricultural side. It was an ambitious scheme, however, committing Government to a very large sum of money, and I would not like to recommend further exhibitions on such a scale. I think, however, when trade returns to something like natural conditions, that divisional exhibitions could undoubtedly be encouraged.

Trade representatives.

Q. 34.—I have always been in favour of the Consular Officers doing much more in the direction of the promotion of trade. There is no doubt that Germany developed the usefulness of her Consular Officers along these lines in an extraordinary degree, and that the development of her foreign trade was greatly advanced and fostered by the assistance which her industries secured from the work done by the German Consular Service. I think every Consular Officer should have as one of his qualifications a thorough commercial knowledge.

Q. 38.—The regulations regarding the purchase of Government stores have been greatly reformed during the last 15 years, and the Upper India Chamber of Commerce has been consistently agitating for more liberal treatment of the Indian manufacturer. There is still, however, a strong prejudice on behalf of Government consuming departments in favour of home purchases, and I am not satisfied that the spirit of the regulations is being in any way universally carried out. I think the attitude of mind of officials generally is that they only come to the Indian manufacturer as the last resource. The rules are still capable of modifications so as to bring them into line with modern industrial conditions in India. They were formulated at a time when the only parties from whom Government purchased were petty Indian contractors with no standing or capital, and the rules safeguarding Government against default are therefore very severe. Now-a-days Government is able to deal with large concerns possessed of reputation and capital, and some relaxing of the conditions seems desirable.

Other forms of Government aid to industries.

Land policy.

Q. 41.—I consider the present tenure laws are directly opposed to industrial development in the case of the sugar industry. The keynote of success amongst modern sugar concerns has been intensive cultivation and this is rendered practically impossible by the rights of occupancy which have been secured to the Indian cultivator. A sugar concern cannot acquire growing rights except at an altogether prohibitive cost and even for a factory of moderate dimensions it becomes difficult to secure its cane requirements within a smaller area than 150 square miles—whereas the total cultivation required to satisfy its needs might not exceed 4,000 acres.

It is a matter of common knowledge that the economic loss due to the methods by which the bulk of India's raw and refined sugar is produced is nothing short of calamitous.

I do not think that Government could consider any alteration in the present tenure laws without causing serious disturbance in agricultural conditions, but the cultivator might be greatly benefitted, the sugar industry greatly advanced and the revenues of the country greatly increased, if legislation were introduced making it compulsory for every cultivator within some specified distance to sell to a central sugar factory some fraction of his cane crop at market value for cash. I submit that the proposition smells of protection in an aggravated form, but the conditions are quite exceptional and it is a case of helping the ryot in spite of himself. Nowhere else in the world is there, I think, such avoidable economic loss going on as in the case of the Indian sugar industry.

The scheme would of course at the outset only apply to specified tracts where the cane crop was already fairly concentrated.

Proper precautions would have to be taken to ensure the sugar concern carrying out its part of the bargain, so that the cultivator was not left with the cane on his hands.

As is probably well known, a system has obtained in the indigo districts of Bihar for many years, which has the sanction of law, whereby a tenant was bound to raise for the landlord at cost price any crop he might select in three cottahs in every bigha of his holding. So long as it was not abused, this system worked well, as the cultivator was able to look to the indigo concern for money at a reasonable rate of interest (an indigo concern generally advanced against indigo at 9 per cent against the mahajan's 30 per cent) and indigo worked in well with his rotation programme.

Training of labour and supervision.

General.

Q. 44.—In all the industrial concerns with which I am connected, we are trying to improve the standard of efficiency of our labour force, that is to say, the management is endeavouring to bring about better results either as to production or the quality of the article made. The rates for labour have of course increased enormously during the last 15 years, and there is no doubt that, speaking generally, the quality of Indian made articles of trade have improved to a great extent of late years. Improved machinery has a lot to do with it, but the standard of work of the rank and file operative has also improved. Most concerns have schools for half-timers, and these undoubtedly are of value in improving the intelligence of the operative. I do not believe much good can be done by night schools or any form of instruction in non-working hours in the case of adults. When a labourer has done a day's work in an Indian factory, his mind and his body are generally too tired to receive any benefit from instruction.

Training of supervising and technical staff.

Q. 51.—The means for the training and improvement of overseers and managers are available in every well-organised factory in India. Our trouble in India is that the practical side of industry is not at present considered an honourable calling by any but a fraction of the section of the Indian community who should be attracted to our large industries, and

until there is more inclination on the part of the Indian student to "take his coat off," the advantages of technical education are bound to be to a great extent nullified.

Q. 54.—The regulations regarding the certification of engineers should be united Mechanical engineers throughout India and Burma. The regulations regarding the certification of boilers and prime-movers should also be made uniform.

General official administration and organisation.

Q. 56.—We have a Board of Industries constituted by Government with a Director of Industries as its executive officer. The arrangement is working satisfactorily.

Q. 60.—A Director of Industries should in my opinion be a man of business and include in his qualifications thorough general training in business knowledge. If he has any knowledge of engineering or commercial chemistry, so much the better. He must be well endowed with tact, or he will sooner or later lose most of his value in his relations with those in charge of industrial concerns.

Q. 61.—The scheme for a Board of Industries assumes, I understand, the creation of an Industrial Department of the Provincial Government, and the most satisfactory position for the Director of Industries would be that he should be the Secretary to Government in the Industrial Department, but he should only be empowered to act in concert with the Board of Industries.

Organisation of technical and scientific departments of Government.

Imperial Department.

Q. 64.—I have long considered it very necessary that there should be a Ministry of Agriculture, the head of the department being a Member of the Imperial Executive Council. At present the Department of Agriculture is an auxiliary to the Revenue Department, and there is the ever-present danger of agriculture questions becoming subordinate to revenue questions.

Study of foreign methods.

Q. 77.—Every possible encouragement in the shape of pay and allowances for journey expenses should be given to Government experts to visit other countries and keep abreast with the research work of their department all over the world.

Government organisation for the collection and distribution of commercial intelligence.

Statistics.

Q. 82.—Speaking generally, I think commercial statistics are presented in a convenient form and meet the requirements of trade and commerce.

Industrial and trade journals.

Q. 84.—I think the Indian Trade Journal serves a useful purpose.

Other forms of Government action and organisation.

Q. 96.—I am strongly in favour of the compulsory registration of partnerships and also of all agents holding full powers.

Railways

Q. 98.—I should like to see an extension of the through journey telescopic principle of freight charging to all our important staples. So far as I know, it has worked satisfactorily in the case of coal freights.

ORAL EVIDENCE, 9TH NOVEMBER 1916.

President.—*Q.* I understand that you would like to have your evidence regarded as confidential?—*A.* Yes, please.

Q. Has most of your Indian experience been spent in these provinces?—*A.* Yes, I came out to the indigo industry, then went to Calcutta for eighteen months to Messrs. Begg, Dunlop & Co., and then I joined their branch here. I have been here ever since.

Q. You think that if Indian shares could be dealt with more freely and quoted on the London market, there would be an encouragement to put more money into Indian industrial enterprises?—*A.* Yes, we should have a broader market.

Q. There is no such thing as a Stock Exchange in this country?—*A.* There is the Calcutta share Exchange.

Q. But that is not a Stock Exchange that would register shares and have them quoted at official rates?—*A.* There is not the same control of course.

Q. There is no official control?—*A.* Not the degree of control that the London Stock Exchange Committee have.

Q. What scheme would you suggest in order that Indian shares might be dealt with freely on the London Market?—*A.* I think this would have to be arranged through the London Stock Exchange. If we could obtain permission for their machinery being widened so as to admit the inclusion of Indian stocks, there is no reason why we should not have just as broad a market for Indian stocks in London as foreign stocks now enjoy.

Q. Do you know what the system is by which foreign shares, such as Mexican mines or American breweries become admitted to the London Stock Exchange?—*A.* I don't know, but I

presume they must satisfy the Committee with regard to certain conditions as to their constitution. I don't quite know what examination a company has to pass before it is admitted.

Q. In case we don't get any other evidence on this point, would you make it a point of finding out about the regulations, and let us know in the form of a supplementary note?—*A.* I am managing a company which is registered London on the Stock Exchange, and I can enquire through our London House.*

Q. You say, with reference to the way in which Government might assist, that you can "state a case where a group of very well-to-do persons obtained a very large loan from the provincial Government on more advantageous terms than the money could have been raised in the open market to establish a concern which was of no national or even local importance, and where no improved or novel methods were to be demonstrated." Are you free to tell us the name of the concern?—*A.* I only wanted it quoted as a preventative in the future. I do not want to go into the past, because I was very closely connected with the enterprise in its early stages.

Q. Does it deal with sugar manufacture?—*A.* Yes.

Q. What was the amount of the loan?—*A.* £50,000.

Q. Most industries, I suppose, require some form of technical, if not scientific, advice, before one is able to say whether an industry is commercially feasible or not?—*A.* Yes, we are very much in need of it in this country.

Q. And therefore, before Government would be justified in making a grant of this kind, it is only right that an industry should be tested from the technical and scientific point of view by experts?—*A.* Certainly.

Q. Have the Government any kind of experts of the kind that could test, for instance, this sugar enterprise?—*A.* No.

Q. Or, say, the value of a new tannery?—*A.* Not in these provinces.

Q. I am speaking of these provinces. Is it safe, therefore, to adopt any of these methods of financing without much more Government machinery for technical examination?—*A.* From a commercial point of view Government might get assistance. But I don't think there is any effective machinery at the command of Government for testing a project on the technical side.

Q. We will deal later with the question of what kind of Government machinery would be necessary. We will now just consider the financial aspects of industrial development. You don't approve of Government having a greater control, any more intimate control, than the audit of accounts?—*A.* And the submission of returns, I think I said.

Q. You don't believe in Government appointing Directors?—*A.* Who are you going to appoint? You will have to have special officers.

Q. You might nominate some business man?—*A.* Yes, that might meet the case.

Q. The Government would be morally responsible?—*A.* Government ought to be able to see that the concern does not get too much out of hand, but I think there would be a tendency to jealousy if you had a Government Director on the Board.

Q. Supposing we had a Government Director, would there not be a tendency on the part of the company to feel that they were more or less under the control of that Director?—*A.* I really have not thought out what the position of the Government Director would be. He would presumably be a Director of several Government-aided companies.

Q. He would not be a professional Director. No matter how you did it, whether he was a Government official, or a financial expert, or a business man nominated by Government, would there be a tendency for that company to feel that they would have to accept the opinion of that Government Director, rather than the opinion of other members of the Board?—*A.* Yes. There might certainly be a tendency to lean on him too much.

Q. In that case any failure would come back to Government, *i.e.*, the Government would feel morally responsible for the failure?—*A.* Yes. I don't believe in molly-coddling concerns too much, on the management side.

Hon'ble Sir Fazulbhoy Currimbhoy. *Q.*—You say in your written statement that large commercial houses have a call on capital; do you refer to European houses?—*A.* Not exclusively—any commercial house with a reputation for good management, European or Indian.

Q. Then about attracting English capital, don't you think that on account of the war English capital would not be available, and that Indian capital would therefore be attracted?—*A.* I was not thinking altogether of war times.

Q. Don't you think that in the interests of India, it would be more beneficial that Indian capital should be invested?—*A.* Yes, it would be more beneficial, if the capital were freely forthcoming.

Q. What is your experience about Government pioneering industries; has it been successful in pioneering industries here?—*A.* I have only had experience of one concern. We started and managed for Government a small cotton-seed oil factory.

* Note not received when going to Press.

Q. And it was successful?—*A.* We stopped just as we got to the end of the unsuccessful period.

Q. You did not commence the successful period?—*A.* No, just then an order came out from the Secretary of State that the concern was to be sold.

Q. If the Government were to give machinery on the deferred payment system, would it encourage industries in this country?—*A.* To new concerns?

Q. The Government would purchase for them and give them, and arrange to take a certain amount per year.—*A.* Are you going to apply that to everybody, so that I can ask for ten lakhs of rupees on deferred terms.

Q. No, to approved people.—*A.* I think it so difficult to control a system of that kind, because there will be a point where one man would say, "I want it," and Government would say, "You can get the money yourself and have no right to come to Government for assistance."

Q. *Hon'ble Pandit M. M. Malaviya.*—You say that you have never experienced any difficulty in the raising of capital. Is that so far as European capital is concerned?—*A.* Yes, that is my own personal experience. We have also a large amount of Indian capital in our sugar concerns.

Q. And you have had no difficulty in raising it?—*A.* No, we have been fortunate enough not to have any difficulty.

Q. In Cawnpore is Indian capital forthcoming easily?—*A.* I have not had an opportunity of going through the share lists of other concerns, but I think there must be a lot of Indian capital in the concerns here. The cotton mill I manage is almost a family concern, and there is no Indian capital in that. I refer to the Elgin Mills.

Q. And the Woollen Mills?—*A.* I think they have been rather strict in their admission of Indians. There is always one difficulty and that is the question of succession. On occasions we have the greatest difficulty in the case of Indian shareholders dying and claimants to their shares. Some companies are so strict that they let claimants for transfers go to court for rectification of the register.

Q. Does not the difficulty of succession arise in the case of Europeans also?—*A.* There are different laws, aren't there?

Q. If an Indian obtains a certificate of succession, is not that as good as that in the case of a European?—*A.* Quite so, but we have had difficulties, especially in the case of minors and guardians in respect of the proprietorship of shares and the registration of names.

Q. If a minor obtains a certificate of succession from the court through his guardian, then your difficulties must end?—*A.* Yes. It has been a matter of considerable difficulty I know.

Q. Mr. Silver has told us that there were reasons why Indians were discouraged by European firms here from taking shares, and he also mentioned the question of succession. Is that the only reason?—*A.* I don't know of any other reason.

Q. You say that "the political situation is always a factor in considering the investment of British capital in India." Since when have you found this to be so?—*A.* For some years past there has been a disturbed political atmosphere in certain parts of the country.

Q. To what time do you go back—in the last few years?—*A.* Some 8 or 10 years.

Q. Before that you experienced no difficulty about Indian capital?—*A.* There has always been difficulty in raising Indian capital for industrial enterprises. I think the political position in India would have an effect on foreign capital. For instance, Mexico is in a disturbed state at the present time and the inflow of foreign capital must be affected.

President.—*Q.* So would the outflow?—*A.* Therefore, I think, that a political disturbance would affect the inflow of capital from outside.

Hon'ble Pandit M. M. Malaviya.—*Q.* Do you think that it would have a good effect if half the capital were subscribed by Indians?—*A.* Certainly it would give confidence in the enterprise to Indians.

Q. Do you think if that was made a condition in every new concern that was started, it would inspire confidence?—*A.* I should not like to say; I have no experience.

Q. I am asking your opinion; would it inspire confidence?—*A.* I would not like to say, if there were two equally attractive prospectuses side by side, one to be subscribed to half by Indians and half by Britishers, and one for all British capital which would have more prospects of success. My remark was merely general.

Q. You say, with reference to money grants-in-aid, "This method should be most sparingly resorted to, and then only when the public interests are involved," and also that "even then only where Government is satisfied that those interested in the promotion or development of the enterprise have exhausted *every* other means of raising money." "Every other means" where? In the country or outside?—*A.* Every means at their disposal, *anywhere*. I think they should try to get the capital before they go to Government.

Q. When they fail everywhere that they can possibly try, then only should they ask Government to help?—*A.* Yes, unless of course it is anything of national importance.

Q. What do you mean by that?—*A.* Any of our staple industries.

Q. Is not the growth of every industry a matter of national importance?—*A.* Yes, but in a modified form. For instance, the last witness mentioned a button factory; I don't think that would be a matter of national importance.

Q. Supposing the value of any particular import comes to a large figure, would it not be desirable for the Government to encourage the manufacture of the article imported if we raise the material for it?—*A.* Yes, such as dyes. I would certainly place them in the category of industries of national importance.

Q. And what about the hides which we export to other countries?—*A.* In that case it is a question of course whether you are going to get your money for a raw article or a manufactured article.

Q. If Government were satisfied that it was desirable in the industrial interests of the country that the hides should be worked up?—*A.* That is a very vexed question. I am not in the leather trade. It is said that we cannot work them up in this country as well as they can in foreign countries.

Q. The working up of the hides may be difficult, but if you can utilise them in this country without working them up to the same high pitch as they do in foreign countries, would it not be a matter of national importance that the hide should be manufactured here?—*A.* As a matter of fact I am in favour of export duties on hides.

Q. Will you also be in favour of Government offering some assistance to that industry?—*A.* Yes, I think so.

Q. Then your use of the word "every" before "other means of raising money" in your written evidence is too wide?—*A.* I think we all ought to try our utmost and raise capital ourselves before we go to Government.

Q. You say that "The guarantee should be at a moderate rate of interest not exceeding 4½ per cent, and the period should not exceed 5 years." Are you positive about that period, or would you extend it to 10 years?—*A.* I was thinking of tramway and similar undertakings where 5 years would probably cover the development period. Generally you should be able to work up your traffic in 5 years.

Q. In the case of other industries, wouldn't a longer period be desirable? You would not be against it where it may be necessary?—*A.* Not if there were good grounds for extending it.

Q. In view of the possibility of developments in various directions, don't you think the establishment of a big industrial bank in every province would be of great assistance in financing industrial enterprises?—*A.* I do not know what an industrial bank really means.

Q. A bank that would finance industrial undertakings only.

(The President here interposed and said that the witness was not familiar with the working of industrial banks, and it would not be of any importance to ask him.)

Witness.—*A.* I would not be of any service to you in that respect.

Sir F. H. Stewart.—*Q.* You say that your firm was entrusted with the establishment and management of the first cotton-seed oil factory in India?—*A.* I think I ought to say "in upper India."

Q. By "establishment" you mean your firm were in it from the beginning?—*A.* It was mainly my scheme.

Q. What form did the Government assistance take?—*A.* They bought the plant, advanced money for the building, we provided the land and managed it on Rs. 500 a month.

Q. They found you the plant?—*A.* Yes.

Q. How was it disposed of, privately or by auction?—*A.* By auction. I tried to get my firm to buy it, but they would not. It has been much improved since and is now a very flourishing concern.

Q. With reference to your suggestion in answer to question 3, would not those be companies *e.g.* tramways, electric light companies, etc., that would be likely to require extension of capital from time to time?—*A.* What I had in mind was a Municipal Board or District Board guarantee. We had a scheme some years ago for a light railway from the Jumna to here, but the Great Indian Peninsula Railway was jealous of it and laid a broad gauge line. We got the District Board in that case to guarantee us 4½ per cent. I think our road tramway would have been a success.

Q. You think a guarantee of 4½ per cent for five years would be adequate?—*A.* Perhaps not now, but it was thought so then. I don't know what return banks would now expect to get on their invested reserves.

Q. Just refer to the question of Government pioneer factories. I understand your answer to mean that private firms should be managers from the beginning?—*A.* Yes. I think that if Government is going to create an agency for managing all these enterprises, that it would be outside their scope, and they would make a mess of it. Let the big firms in Bombay and Calcutta, who have the management machinery ready to hand, undertake the management of such concerns from the start.

Q. Subject to this if a clear case was made out, you would say, "Let Government give any assistance necessary as to land, finance, technical advice, etc."?—*A.* Yes.

Hon'ble Sir R. N. Mookerjee.—*Q.* You say you never experienced any difficulty in raising capital so long as the enterprise is in a prosperous industrial group. What about new industries?—*A.* I think in such cases the public rather look to the people who sign the prospectus and are on the Board.

Q. There has been difficulty up to now?—*A.* Yes. I understand so.

Q. With reference to the case mentioned by you regarding the advance by Government of a large sum of money and a contribution of Rs. 500 a month for management, Government could not have suffered such heavy loss if Government gave guarantee, say, 5 per cent for five or ten years on condition that Government will be recouped with what it had paid by way of guarantee when the concern will pay more than 5 per cent?—*A.* I suppose that they could not have broken their contract.

Q. The development of a new industry by giving a guarantee would be a much easier task for Government, and the Secretary of State could not in such case interfere and order Government to auction the whole concern?—*A.* I don't like the idea of guaranteeing a return on share capital very much, except in special cases.

Q. You say in the case of guaranteed dividends, that this form of help should be confined to enterprises of this character such as railways, tramways and electrical companies, but they are not the very industries of the country such as the Government is desirous to develop.—*A.* They are surely very important.

Q. They are in a manner, but they do not come under the category of the development of an industry.—*A.* What is the point?

Q. The reference is to your remarks under "Guaranteed dividends."—*A.* My point is that industries are far sturdier when developed without Government assistance. As a rule a tramway has a fairly steady income from its traffic, and unless there is some calamity like an earthquake, our revenue is pretty well secured, and therefore it is a more suitable enterprise for Government to assist.

Q. But the question is in regard to industries.—*A.* I am afraid of ill controlled expansion and Government throwing money about, because it makes promotion so careless.

Q. It is not money grant in lump sum from Government; it is only Government giving a guarantee to create confidence in the investing public?—*A.* I see.

Q. You will readily put your own money if Government gives you a guarantee, and it will also enable you to raise the required capital?—*A.* You want to know if I should approve of this idea being extended?

Q. Yes; it is a very important question. You say that when every other means has failed, then only should the method of money grants be resorted to.—*A.* I think that ought to be rather the test to keep our industrial atmosphere healthy. Let us strive as hard as we can and then turn to Government as a last resource.

Q. As a business man, don't you think if I tried to float a company by issuing a prospectus and failed, and then I go to Government, and the public know that I have failed, will the Government and the public have any confidence in the enterprise?—*A.* No, it is like going to one market and trying to raise money, and then shifting to another market.

Q. It would be difficult to obtain the guarantee if I failed.—*A.* I think that if Government is going to open the door to all sorts of schemes, there will be a great risk of more harm being done than good.

Q. The matter in every case will have to go before some Board to be discussed, and unless the Government is satisfied that it is in a growing condition with good prospects, Government will not give them any help.—*A.* I see your point.

Dr. E. Hopkinson.—*Q.* In speaking of capital, do you draw a distinction between British capital in India, and British capital brought out to India?—*A.* You mean which would one sooner see attracted to India?

Q. I mean, which have you attracted?—*A.* British capital in India.

Q. Derived from profits or savings realised in the country?—*A.* Yes, that is the money we have drawn on, except the capital in our Electric Company which was entirely British capital raised on the London market.

Q. So that I may draw this deduction that industrial enterprises can be carried out with capital either from Indian sources or from British sources in India?—*A.* That has been my experience so far.

Q. Do you not think that it would be a great advantage to industrial concerns in India if there were a recognised Stock Exchange in Calcutta or Bombay?—*A.* Certainly. I think the share markets want controlling out here; undoubtedly the Calcutta one does. I don't know much about the Bombay one.

Q. Would you say that industrial enterprise in India actually suffered by the want of a recognised Stock Exchange?—*A.* Certainly.

Q. Do you think that the existence of a recognised Stock Exchange would also materially help capital being brought out from England?—*A.* Yes, certainly, if it was known that there was the same control there is at home.

Q. You don't advocate the appointment of a Government Director; you consider it would unnecessarily interfere with the management of commercial matters, and apparently you think that auditors under Government supervision would provide all safeguards necessary?—*A.* Yes, I think so on the financial side.

Q. Has it ever occurred to you that any one in the position of a Director may stop a false policy at its initiation, whereas an auditor judges only from results when the objectionable policy has already been entered upon?—*A.* Yes, but I did not recognise it until now.

Q. You think that it is a point of some importance?—*A.* Yes.

Q. Have you any knowledge of any business in which Government Directors have acted?—*A.* No, I have experience of Government audit, because our electric undertaking is a licensed undertaking, and we have to submit most minute accounts to Government, and our accounts are audited by Government.

Q. Have you had, in the course of business, anything to do with British dyes?—*A.* Our Cotton mill is a shareholder.

Q. Has it given you confidence in this case in that there are Government Directors?—*A.* We merely subscribed to be on the list of customers. We did not think so much of the investment as of having a call on the supply of dyes at reasonable rates.

Q. But you thought that the fact of there being a Government Director on the Board ensured that policy being carried out?—*A.* Yes.

Q. In the last section you refer to industries in Germany. I hesitate to ask you because the question is indefinite and sentimental, both very objectionable qualities. In Germany to my own knowledge the Government have given unlimited moral support and sympathy, apart from actual aid, to all sorts of industrial enterprises, both to the enterprise itself and to the persons connected therewith. It has been an atmosphere of encouragement and support. Speaking from your long experience of India, would you say that such an atmosphere existed between the Government of India and the India Office and the industrial and commercial element in the country?—*A.* No.

Q. It has not existed?—*A.* It has not yet been accepted as the British ideal for developing industries.

Q. Is there any indication of such an atmosphere tending to grow up?—*A.* I think Government takes a much greater interest in industries now than when I first came to India—immeasurably greater.

Q. Is there greater sympathy?—*A.* Undoubtedly it is growing.

Q. And you don't hesitate to say that it will continue to grow?—*A.* I should say certainly it will.

Q. You attribute some measure of backwardness to a want of it?—*A.* Yes, I think it wants stimulating badly.

Mr. A. Chatterton.—*Q.* In your reply to Sir Fazulbhoy you objected to the indefiniteness of the amounts that Government might be called upon to supply. Would you object to some scheme of that kind limited so as only to meet the requirements of small people—*A.* The agricultural classes?

Q. The agricultural classes and the small artisans?—*A.* Yes, I think such a bank as is contemplated by you could advantageously undertake such a class of business so long as it is limited to small amounts.

Q. You would grant *takkavi* loans or sell machinery to people on the hire-purchase system as is done in Mysore?—*A.* In such cases, I presume you not only give him money, but also give him good advice and keep him out of the hands of people who might not be very scrupulous as to what they sold him. In that case Government is doing double good, and so long as it is confined to that class of assistance it is all right.

Q. You think that Government selling machinery helps people to get a good class of machinery?—*A.* Yes, if Government has some one to judge if the machinery is suitable.

Q. In regard to the oil mill which you pioneered for Government, in that case the terms under which you took the work up involved Government in the risks of the enterprise, but the operations were under your control?—*A.* We managed it entirely.

Q. And you took the risk of loss?—*A.* No, we took no risk at all.

Q. Then you say that you are in favour of pioneer enterprises by Government, provided the scheme was put in the hands of some approved agency for management?—*A.* I meant in preference to Government doing the business management themselves.

Q. Don't you think that difficulties might arise regarding the adjustment of expenditure of Government funds by private individuals, where every day new questions might crop up as to what policy should be pursued?—*A.* I think if the Government is satisfied that the people they select are competent to manage, and that if they still retain technical control, there should be no difficulty. For ordinary business management, such as the buying of raw material and the sale of products, I think it would be better if Government could find people to undertake it.

Q. In many cases these pioneer enterprises start on an exceedingly small scale and gradually grow?—*A.* If so they would probably be too small to attract effective private management. If they are very small, then Government must provide management machinery. I was not thinking of enterprises on a very small scale. I think if Government has got the machinery ready, it might be used in that case, as it would not pay a firm of reputation to take up the management of such small enterprises.

Q. Supposing we want to pioneer the manufacture of a vegetable dye stuff, we can manufacture the vegetable dye stuff on a small scale, spending perhaps Rs. 500 or 600. We find it a failure and drop it, or find that at a certain point it is desirable to put more money into it. We go on step by step. You might find a private firm who would take an interest in the matter, but in most cases you would find a difficulty in getting private firms to take it up?—*A.* There would certainly be difficulty in the earlier stages when it is in an experimental condition.

Q. You would modify your opinion to that extent?—*A.* Yes, where it is too small at the outset.

Q. In a pioneer industry, development work goes on for a very long period afterwards even after it has become commercially successful?—*A.* You might start with a small industry and begin to earn profits almost at the outset, but it wants development, wants more capital, and that might go on for a series of years.

Q. Would you draw any hard-and-fast line as to when Government should withdraw?—*A.* No, you must consider each enterprise on its merits.

Q. Would you leave it to a Board of Industries to determine when this settlement should come to an end?—*A.* Yes, Government would have to determine when it was out of leading strings.

President—*Q.* I think you said that the rate of interest on guaranteed dividends might now be regarded as over 4½ per cent on account of the higher money rates?—*A.* Yes.

Q. Does it necessarily follow that that guarantee dividend should be at exactly the same rate as the money rate ruling for the time being?—*A.* It was not in those days. That was the minimum rate at which banks would at that time look at that class of investment. It was about the same rate at which Municipal bodies could then raise loans in the open market.

Q. Government will want some indication from us as to what would be a fair way of deciding what amount of dividend would attract capital. Can you give us some idea?—*A.* If one got ½ per cent below the bank rate, that would be very favourable. Those are the best terms an industrial concern can get.

Q. You must remember it is a guaranteed rate, not the limit that a company might earn. Don't you think that it might be still lower?—*A.* Possibly a little lower rate might attract capital.

Dr. E. Hopkinson.—*Q.* Can you tell us approximately how much below bank rate the Presidency Banks allow upon deposits?—*A.* I don't know.

Q. What would they give on a deposit?—*A.* I think the Bank of Bengal rate is 3¾ per cent for twelve months, but of course the rate is not a constant one.

Q. Take a current account, what would they allow on credit balance?—*A.* On a floating balance, I believe, 2 per cent.

President.—*Q.* Would that not be a fair figure to consider, because if the rates did not attract business they would raise them. Would it not be sufficient for us to stick to the rate a Presidency Bank would give you on a fixed deposit?

Sir F. H. Stewart.—*A.* It varies with the different seasons of the year.

Hon'ble Sir Fazulbhoy Currimbhoy.—*A.* The annual bank rate comes to 5¼.

Hon'ble Sir R. N. Mookerjee.—*A.* On an average we calculate 6 per cent.

President.—*Q.* Would you like us to take the average for the fixed deposit rate in respect to the previous year, or the average bank rate for the previous year less 1 per cent?—*A.* I don't know which would be the most applicable.

Q. They would correspond approximately?—*A.* There would not be any great difference.

Q. How would it appear to you if we took the average yield on Government paper throughout the year?—*A.* That is of course liable to considerable fluctuations but it would not be a bad standard, if it is the 3½ per cent you mean.

President.—*Q.* Will you refer to your answer to question 10? You say, "I think the need is to protect industries by more stringent banking laws." Do you think it necessary to prescribe some definition of what a bank is?—*A.* Yes. Our chamber sent up a request some months ago for greater control of banking institutions.

Q. With reference to bankers, should there be prescribed qualifications for a banker, as you have for a doctor or a ship-master or a mine manager?—*A.* No, I don't think you can carry it that far in India. We commenced with nothing very severe, at first, but it was a form of control which would have prevented the banks ever getting into such a condition as certain banks have.

Q. Would not a great deal of control be avoided of a vexatious kind, if you prescribed the technical qualifications for a Banker?—*A.* A sort of Charter of Banking, like that of chartered accountants, would be useful.

Q. Like the qualifications prescribed at home for members of the Institute of Bankers?—*A.* Yes, I think that might be attemped.

Hon'ble Pandit M. M. Malaviya.—Q. In the case of Indian banking firms, such as Mahajans, have you not found that they have very good banking knowledge and experience, and that they carry on their business successfully?—*A.* Yes they are remarkably astute people.

Q. And they do business on a large scale?—*A.* Of course on a very large scale.

Q. You think that the prescribing of a banker's qualifications would be an advantage. Suppose you had a College of Commerce, that would give bankers the necessary training, do you think that it would be an advantage?—*A.* Yes, a Charter of Banking. I would not carry the idea down to private banking enterprises.

President. I don't think you understood the Pandit's question. If a College of Commerce were started, it would enable pupils in the country to obtain the qualifications for a banker.

Hon'ble Pandit M. M. Malaviya.—Q. You have said that the old class of bankers, the Mahajans, are skilled enough to do business. What I ask you is if would-be managers of public banks were trained in a College or Institute of Commerce which would give them the necessary training and certificate, would not that be a great advantage?—*A.* Yes.

Q. You want apparently a large body of sugar experts?—*A.* Two, I think, on the Agricultural side, and one on the Technological side.

Q. Would that be enough for the whole of India?—*A.* Yes to start with.

Q. Do you think the problems in connection with sugar would entail a fairly large staff of Government experts to do research work, as well as advising Government about policy?—*A.* Yes.

Q. Can you give us a rough idea of the number of men that could be employed for the next twenty years, in connection with the chemical, technical, sugar, and engineering work?—*A.* All I want is a start to be made, the staff could be increased as the work increases.

Q. At present is Dr. Barber the only Sugar Expert in the country?—*A.* Mr. Clark has done a lot of good work in these provinces on sugar.

Q. Your idea is that these sugar experts should not be drawn aside to make experiments on paddy or other agricultural products?—*A.* No, I think we should specialise in all our products.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. As regards the loan of experts by Government, you say a company must be prepared to have the results of the experts' investigations made public. Do you think that a firm who pays for the advice of an expert would like to give up their secrets? Would they take an expert on that condition?—*A.* I rather look upon him as a public servant. I think that is his first duty, and therefore any discoveries he might make in the discharge of his duties should be made available to all similar industries.

Q. And about this Technological College; you say it should be established in Cawnpore. Don't you think that it should have a place where the climate would suit? You want it at some industrial centre?—*A.* I have no doubt that you could find room for one each in Bombay and Calcutta. It ought to be at some centre of industry. I would not put it down in wilderness.

Hon'ble Pandit M. M. Malaviya.—Q. The climatic conditions of Cawnpore are not unfavourable to the establishment of such an institute?—*A.* No, it is very hot in the summer no doubt, but I don't think the conditions are unfavourable.

Q. With regard to the staff that you wish to engage for sugar, don't you think that appointments for a period of five years would serve your purpose?—*A.* I don't think the man I have in mind could be got for more than five years. He would be adviser at the head, and would try and lay a policy to work on, and in five years his work might be done.

Q. You think you could get a man of the kind you want for that period on reasonable terms?—*A.* To get the best man you would have to pay a high price.

Q. You think that in view of the importance of the industry, we ought to be prepared to pay whatever is necessary to get the best advice and assistance?—*A.* Yes, the very best advice.

President.—Q. Would the sugar manufacturers in the country be prepared to meet the levy?—*A.* Yes, I think so; at least my concerns would.

Dr. E. Hopkinson.—Q. Assuming that Cawnpore is the centre of India, do you think there would really be much practical disadvantage if the central research institution was at a distance?—*A.* I only said Cawnpore, because I wanted it to be here. I don't think it is a good thing to have a body of experts situated at a distance from industrial openings. I would like to have them either in Bombay or Calcutta, and Madras perhaps, at Cawnpore they would be in touch with a great body of commercial thought. I have in mind the Pusa Institute where they are very remote from practical agriculturists.

Hon'ble Pandit M. M. Malaviya.—Q. Delhi?—*A.* Delhi has not got the number of industries that we have here.

Dr. E. Hopkinson.—Q. What I want to get at is whether in your opinion there would be much practical difficulty if the institute were situated far from any industrial centre?—*A.* It would greatly depend upon the work of the men themselves. Supposing an expert was engaged in wool it would be a convenience to have a woollen mill at his door; similarly in the case of leather, cotton, and sugar.

Q. No doubt that applies to the industrial expert; it does not apply to the chemist?—*A.* No; he may, I suppose, not wish to be bothered with outside consultations if he is engaged on deep research work.

Q. Could you not imagine an entirely successful institution which was located at any convenient central place where the laboratories were established, which was the headquarters of a corps of experts who went out to different parts of the country?—*A.* With demonstration appliances there?

Q. Yes; as far as laboratories are concerned?—*A.* I should prefer the other circumstances from what I know, but I have no personal experience of such an institution as you have in mind. It was an opinion that we held years ago that it should be located here. I am only reiterating that now.

Q. You look at it from the point of view of Cawnpore and the United Provinces rather than of the whole of India?—*A.* Yes; perhaps I do.

Q. Has not the Agricultural Department already carried out purely agricultural research work most successfully? Have they not shown how sugar can be grown, and how the quality of cotton can be improved as regards the selection of seed, the character of the soil, manual labour, and climatic conditions?—*A.* They have done a tremendous lot of good work, but it has been, to a great extent, with regard to those two staples, spasmodic. It has been left, to a great extent, to the whim of the man, how long each has carried on his researches. I know a case here where a man took up cotton and did very good work on it, and shortly after left Government service. There was no one to carry on the work after him, and years elapsed before Mr. Leake took an interest in cotton and began to forge ahead again. For the last twenty years they have been growing sugarcane at the local Government Farm to no good purpose. We have a collection of opinions scattered about the country, without any kind of co-ordinative policy.

Q. Supposing you were yourself to cultivate sugarcane in a particular part of the country could you obtain from the Agricultural Department now all the information necessary to enable you to cultivate it satisfactorily?—*A.* The actual cultivation methods?

Q. Yes.—*A.* If it was a type of cane that they had tried and proved information about cultivation methods would undoubtedly be available to me. I don't mean to suggest for a moment that they do not study problems or that they give incorrect information; I am saying that it is not enough and that they have not gone deep enough into the subject.

Q. There is a still a great deal to be done with regard to cultivation methods?—*A.* In sugarcane undoubtedly.

Q. And in cotton?—*A.* In cotton too; we are still very much in the dark in these parts about cotton.

Mr. A. Chatterton.—Q. You say in regard to the appointment of a sugar expert that your firm would be glad to subscribe to the cost of bringing out such a man?—*A.* Yes; we would be prepared to accept a levy on production.

Q. What are the particular problems that you want solved here; sugar manufactures generally?—*A.* An enormous range of problems. We want the best clarification process for certain types of cane that has not been proved as yet. We are now engaged on private research work to know if the process we are using, and which is very costly, cannot be modified. There is the question of the proper type of mills, and the proper type of crushing rollers, for certain classes of cane. Nearly all milling plant is designed for large canes, and is not very suitable for our small canes. There is also the question of the manufacture of our raw sugars, so as to save the tremendous losses that are now incurred in the manufacture of India's two and a quarter millions of tons of raw sugar.

Q. By 'raw sugar' I suppose you mean *gur*?—*A.* Yes; that is the work which Mr. Hulme, the Government Sugar Engineer, has been specially engaged on.

Q. In regard to the Indian sugar problem you want the experience of other parts of the world brought here?—*A.* We don't want experts from other countries to come with cast-iron ideas to do this and to do that in India, but from the experience of other parts of the world we want to know how to improve our methods.

Q. That is one side of the question. The other side is in the hands of the Agricultural Department and that is going on. There is a third side and that is the economic difficulties which the cultivators of cane experience in growing and marketing their cane. Does that also want investigation?—*A.* That would be one of the problems which would be tackled, *i.e.*, whether we cannot make this raw sugar just as palatable to the Indian public as it is now made by their crude methods and save the sugar losses at the same time.

Q. Is it a very important matter to carry on experimental work in connection with the manufacture of *gur*?—*A.* Most important; the sugar is really a secondary consideration for

India because you cannot imagine any product so valuable to India as her raw sugar, and why cannot we get the 15 per cent of sugar which is now absolutely lost.

Q. Has anything been done in this province by Mr. Hulme or anyone else to introduce into the country amongst the villagers improved methods of working, apart from the Hadi process which has turned out a failure? Apart from that, has anything been done here to develop the cultivation of cane by introducing better methods of dealing with it?—*A.* Mr. Hulme has been engaged on this problem for five years. He was specially engaged for that purpose to go into the matter of improving the manufacture of raw sugar by small plant which would be within the reach of the Indian capitalist. I don't know that he has accomplished anything in this direction of any value.

Q. Does not the price of *gur* fluctuate between wider ranges than the price of manufactured sugar?—*A.* Do you mean the eating *gurs*? These are liable to enormous fluctuations. Last year some of them, I believe, were sold in the Bombay Presidency at Rs. 15 and Rs. 16 per maund, a higher price than that obtained for refined sugar.

Q. They equally go down to very low prices at other times?—*A.* They never fall to the level of refining *gur* which I have known to go down to Re 1-8 per maund.

Q. Are you able to form an opinion as to the causes of these violent fluctuations in price?—*A.* Of course, as you know, *gur* does not keep well and this is partly responsible.

Q. That is not the point. I refer to his present methods of manufacture.—*A.* Some cultivators make a pure *gur* without any large percentage of invert sugar. It should be possible to make a *gur* which will keep.

Q. At present the *ryot* gets no assistance to hold back his *gur* owing to the fact that it is so liable to deterioration?—*A.* No; banks would be chary of advancing against it.

Q. So that if the *ryot* were taught to manufacture a higher class of *gur* he would be in a better position to finance his crop?—*A.* Certainly.

Q. Do you know if in an extremely favourable year here the *ryots* had great difficulty in crushing their cane and manufacturing *gur*?—*A.* I have known cane standing in the field in June and fed to bullocks because the cultivators could not harvest it.

Q. Then the provision of mechanical power to drive mills on a small scale would probably greatly assist the development of the *gur* industry by enabling them to remove their cane when it was ripe?—*A.* Yes; certainly, and it would also be the means of saving his cattle. This is a most important question. It is said that a bullock only lasts two years when used for driving a cane mill.

President.—*Q.* Do you think it possible for sugar manufacturers to combine and make a start by getting out their own sugar experts?—*A.* We have combined, but not in that direction. We have an Association in this country. Not all the producers are associated with it, but most of the important ones are. I suppose that it will come to that if Government will not help us.

Hon'ble Pandit M. M. Malaviya.—*Q.* So far as you know have any attempts been made to experiment with canes grown in other countries like Java and Mauritius?—*A.* We have got a cane now doing very well in parts of the United Provinces, J. No. 28; which is a hybrid cane and which we are growing under the same conditions as it is grown in Java, but with slightly narrower rows. So far the experiment has been a very successful one.

President.—*Q.* Will you look at your answer to question 34? You have not there distinguished between the point that was noticed in the question; should we have special paid representatives who would look after Indian interests as distinct from English or British industries?—*A.* Yes; I see. I am sorry.

Q. Your Chamber of Commerce is opposed entirely to paid representatives. Probably you would like to consider that point again and send us a supplementary note?—*A.* Yes; I will do so*.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Do you know that Indian trade with foreign countries, such as the Levant, etc., is increasing and, therefore, India should have its own Consular Service? I hope in considering the previous point you will consider this point too.—*A.* Yes; I will do so*.

Q. You say that in the Bihar indigo districts you have certain legislation, and you wish for the sugar industry the legislation to be on that line?—*A.* Yes; they have got a system there called the *tinkottia* system.

Q. But supposing that in a part of India where there are not many big landlords (and as you know sugar has got very scattered districts) don't you think that Government should have the Land Acquisition Act to acquire the land for the people? Supposing a big company comes out with a large capital to invest in the sugar industry, and they want to compete with Java; they want from Government five or ten thousand acres; the land is held by many people in small lots; would it not be an advantage that Government should acquire this land under the Land Acquisition Act?—*A.* I don't think that I would go so far as to dispossess a man of his holding. My only suggestion is that you should force him to sell his produce at the full market price.

* Not received at the time of going to Press.

Q. Supposing you started the industry with a capital of 20 lakhs and when the sugar is grown in that place the man says, "I will not sell it".—*A.* I want him to be *made* to sell it.

Q. How can you, except under legislation?—*A.* I want new legislation. I want him to be forced to sell by law only instead of being forced to sell at the cost price of the crop, I would pay him the full market price which might be settled by a *panchayat*.

Hon'ble Pandit M. M. Malaviya.—*Q.* Would you also compel the sugar manufacturer by law to pay a part of his profits to the *ryots*?—*A.* The *ryot* would reap a handsome profit by selling his cane at market price.

Q. But suppose he is not willing to do so, and as you compel him by law to cultivate the cane and sell it at a certain price, would it not be fair if you also compel the manufacturer to pay him a part of his profits?—*A.* You might bind the factory to sell the *gur* back to the cultivator for his own consumption.

Q. That does not meet my point?—*A.* No; I don't think it would.

Q. Don't you think that you could work out what is necessary for promoting this industry by a system of co-operation between the cultivator of cane and the sugar manufacturer?—*A.* But cultivators are very conservative, though we have made some progress in this direction.

Q. Does the progress you have made incline you to think that you might achieve greater results in that direction?—*A.* No.

Q. Have you tried to educate the cultivator?—*A.* Yes: we talk to him.

Q. By the circulation of pamphlets?—*A.* No; we ride round the villages and talk to him. He is learning, I think, but our progress is very slow.

Q. And you think that if he got a little more information, and were convinced that by co-operating with you in supplying you with the cane on such terms as would be agreed upon, he could earn a share of the profits, do you think he would be induced to come into the scheme?—*A.* That would, of course, be an added inducement.

Q. And it would be fairer on the whole than using legislative powers?—*A.* No; I think this perfectly fair.

Q. I am sorry I cannot agree with you.—*A.* I don't think many people would!

Q. You say this system of the tenant being bound to labour for his landlord at cost price works well so long as it is not abused?—*A.* Yes.

Q. You know about the abuses that result?—*A.* Yes; landlords tried in certain cases to get the cash instead of the crop.

Q. You would not like that experiment repeated?—*A.* No; but there is a vast difference between cost price and market value.

Sir F. H. Stewart.—*Q.* This *tinkottia* system is part of the Bengal Act and is still in force in Bihar?—*A.* Yes.

Q. And you wish it introduced with retrospective effect in other parts of India?—*A.* No; it would not be the same legislation.

Q. If you as a newcomer came to the people already established in a place and said: "I am going to start a big factory and want you to supply me with the stuff for my factory", Would that be fair?—*A.* It would not be a case of labour, but of produce. I think it would be perfectly fair for you are going to do a tremendous amount of good to the cultivator by so doing. I am, of course, referring only to sugarcane in sugarcane districts.

Dr. E. Hopkinson.—*Q.* I am not sure whether I understand the word "intensive" which you use in regard to the manufacture of sugar.—*A.* Close together, concentrated.

President.—*Q.* Would it be a profitable thing for the *ryot* who is thus forced to grow sugar?—*A.* Most profitable. Of course, it can only be done in certain tracts where the crop has been established. I want to force the cultivator not to go through the present uneconomic process wasting his time and wasting a lot of sugar in making a product which a factory could make as well and much more cheaply.

Q. With reference to your answer to question 44: "I do not believe much good can be done by night schools or any form of instruction in non-working hours in the case of adults," don't you think if you had night schools it would be possible to give an opportunity to the man who is exceptionally energetic or unusually intelligent to go further and qualify for an overseer's or a foreman's post?—*A.* I don't know if it would be a success. Do you mean a European?

Q. No; Indian.—*A.* The ideal thing would be to allow so many hours out of working hours for self-instruction, but I don't know if that could be done.

Q. Would it be possible on a small scale in an elementary stage and then go on and have more advanced classes for men who are overseers?—*A.* There would be no harm in making a trial with it.

Q. You can form no idea as to whether the trial would be successful?—*A.* No; I think in the summer it would be impossible.

Q. Do you think that most employers would be willing to let off a certain number of men a certain number of hours a day to attend to the schools on the understanding that only

picked men are given this privilege?—*A.* Yes; but also on the understanding that the man does not go away from you as soon as he had improved himself a little.

Q. There is no system of control that you can think of except the bonus system? *A.* None at all; except a Provident Fund which has the greatest hold over the men.

Hon'ble Pandit M. M. Malaviya.—*Q.* You say, in answer to question 64: "I have long considered it very necessary that there should be a Ministry of Agriculture". You do not think that the present arrangement of a Member in Charge of Revenue and Agriculture is satisfactory?—*A.* I would like to see agriculture with its own administrative head. I think questions must arise where the Revenue Member has got to decide against either agriculture or revenue interests when the requirements of agriculture come into conflict with those of revenue. For instance, the development of certain crops might not appeal to the Revenue Department.

Q. How can the interests of two departments of State clash with each other?—*A.* I am rather thinking of agriculture in its technical sense.

Q. Don't you think that the existence of a Director of Agriculture under Provincial Governments meets the requirement of the case?—*A.* No; I don't think so.

Q. Will not the Provincial head of the Agricultural Department be in touch with provincial problems more than the Imperial Member of Agriculture?—*A.* The Minister of Agriculture would be there to control policy. There are indications that a lot of agricultural jealousy exists in the country.

Q. Between provinces?—*A.* Yes; each man trying to work out some line of his own.

Q. We have got a Director of Agriculture in our province. In what respect does that member fail to promote the interests of agriculture within the province in which you think that the Imperial Member of Agriculture will promote the interests of agriculture in that province?—*A.* I cannot call to mind any specific cases where it failed.

Q. Don't you think then that your whole object can be attained if the Member of the Provincial Government who is in charge of agriculture looked after the interests of agriculture as you wish him to do?—*A.* We want somebody in the Imperial Council to speak for the claims of agriculture.

Q. You don't think the Provincial Governments fight well enough for agriculture?—*A.* No; I don't think so.

Q. In case there is an Imperial Member for agriculture, you would want him to be one who had had several years' experience of the agricultural industry?—A. No; he should be an official. I don't think you require to have an expert holding a portfolio in the Government of India.

Q. You cannot conceive of a Member who was an expert being placed in charge of a portfolio?—*A.* The Minister would have his agricultural experts to advise him, but he would be in charge of the general policy of agriculture.

Q. Is there not a danger when a non-expert is in charge of such a department that the real interests of the department might suffer?—*A.* We are the only country in the world, I imagine, without a Ministry of Agriculture. England and America have got a Minister at the head of agriculture, who is independent of revenue interests.

Q. A man who is an expert in agriculture?—*A.* No.

Q. What is the system in America?—*A.* I fancy there is an official at the head of their Agricultural Department.

Q. Without special experience of the subject?—*A.* I think he is assisted by expert agricultural advisers, but I don't think he is an agricultural expert himself.

Sir F. H. Stewart.—*Q.* Do you think there should be a separate Imperial Department of Industry?—*A.* Separate from the Commerce and Industry Department?

Q. No; separate from the Provincial Department.—*A.* In Provincial Governments?

Q. No; Imperial, Government of India.—*A.* That would mean another Member?

Q. Do you think that industrial questions are receiving sufficient and satisfactory attention under the Department of Commerce and Industry?—*A.* No; I don't, but I don't know whether that is because there is not a separate department.

Q. Would you put industry with agriculture?—*A.* Yes; I think that would be better.

Q. Do you think if the Oudh and Rohilkhand Railway were made over to the East Indian Railway that would be a good thing for the Province?—*A.* I have never thought it out.

Q. Do you know whether the question has been taken up by your Chamber of Commerce?—*A.* No; not directly. We have always regarded the Oudh and Rohilkhand Railway as a competing route, and played one railway off against the other, but I don't think the Oudh and Rohilkhand was really a serious competitor. I think it would be an excellent idea.

Q. You have not been into the question?—*A.* No.

WITNESS No. 23.

MR. T. GAVIN JONES, *Managing Director, Empire Engineering Co., Ltd., Cawnpore.*

Extract from ORAL EVIDENCE dated the 9th November 1916, *vide* page 241 of Volume I of the Minutes Evidence.

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President.—*Q.* With reference to your remarks under "Hydro-electric Power Surveys", will you please say when was that hydro-electric scheme?—*A.* It was 10 years ago.

Q. Do you think that there has been since then a change for the better in Government's attitude towards such enterprises?—*A.* I do not think so; the man who was principally responsible for crushing the scheme was Sir William Meyer and he is still there.

Q. I am afraid you are not provided with a full view of what was behind in arriving at that conclusion. You do not see the Government files?—*A.* It was done at a meeting in Simla. It was a question of 3 pies per unit difference in the rate between what Government were willing to pay for power and the Syndicate willing to supply at. A meeting of the officials of the Army Department had been called by order of Lord Kitchener. Sir William Meyer was then the Financial Secretary to the Army Department. A representative of the Syndicate had come out specially to settle the matter and was present. Sir William Meyer said at the meeting: "Since you cannot put through the scheme without our support you must come to our terms." This closed the meeting and the remark was cabled to London and the immediate reply of the Syndicate was to close negotiations and abandon the scheme. So, there is no question of files or of secret Government conclaves. Lord Kitchener favoured the scheme and asked us to come to terms with his experts on the details. Sir William Meyer undoubtedly deliberately crushed the scheme. The causes of this obstructive attitude were:—1. Ignorance of modern electrical practice; 2. A penny wise and pound foolish policy of not desiring to wire the barracks and 3. Trying to be too clever and drive too hard a bargain. How pleased the Army Department would be to be able to buy electrical power in each station at 2½ annas per unit for fans and lights, instead of paying 6 annas to 8 annas as they now do. And they could have had it if the Department had had some business department to advise them in an ordinary business matter.

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WITNESS No. 44.

MR. H. R. T. S. PERROTT, I.C.S., *Deputy Commissioner of the Santal Parganas.*

Extract from WRITTEN EVIDENCE, *vide* page 338 of Volume I of the Minutes of Evidence.

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NOTE ON SABE.

The *sabe* grass grows on the slopes of the Northern Hills of the Damin Government Estate in the Santal Parganas. The area under *sabe* is 138,287 acres. The number of Paharia families dependent up on the industry is about 3,000. The origin of the grass is wrapt in some mystery. Probably the grass was indigenous in these hills. It was at first used for rope-making. When its value as a raw material for paper-making was discovered about 30 years ago certain Mahajans of Sahebganj took up the industry and systematically cultivated the *sabe* grass till the whole of the Northern hills of the district became covered with it. The grass has now replaced not only jungle, but also a good deal of the area formerly under *bhadoi* and *rabi* crops, so that the Paharia has become very dependent up on the crop. Formerly the local Mahajans of Sahebganj were allowed to have unrestricted access to the *sabe* hills. The result was that the Paharias got head-over-ears in debt to their Mahajans and became in course of time, to all intents and purposes, their bond slaves; the Mahajans only allowing the Paharias the bare amount necessary for their subsistence. In 1909 Government stepped in to remedy this state of affairs, and ousted the local Mahajans. Government controlled the sale of the crop and adopted the rôle of intermediary between the paper mills contractors and the Paharias, the Paharias themselves doing the weeding of the crop with advances made by Government. Government sold the crop to the contractors at a fixed price per maund and adjusted the accounts at the end of the year. The result of the first year's experiment was not encouraging. The system was, however, continued for three years. The result was a net deficit of Rs. 17,552, due from the Paharias to Government, which had subsequently to be recovered. The Paharias proved incapable of weeding the crop. They would neither do it themselves, nor could they control coolies properly. The result was that the local Mahajans were again allowed to come into the business subject to certain restrictions laid down by Government. These restrictions have been slightly varied from time to time. The main features of the existing system which came into effect in 1915-16 are as follows:—

The Paharias are left free to enter into contracts with the local Mahajans on the following terms:—A register of licensed Mahajans is to be maintained, licenses being

entirely at the disposal of the Deputy Commissioner. The agreement which can only be made between a Paharia and a licensed Mahajan must be made in a bond in a prescribed form which is for one year. This provides for allowing the local Mahajans to cultivate the *sabe* on a certain *sabe* field measuring so much, in settlement plot numbers so and so, the Mahajans stipulating to pay in return rupees so much. The payment is to be made in such instalments as the Deputy Commissioner may order in the presence of the Sub-divisional Officer of Rajmahal or some other gazetted officer. The Mahajan is to weed and cut and remove the crop. The name of any Mahajan may be removed from the register by the Deputy Commissioner for any kind of dishonest dealings. Government takes a royalty of one anna in the maund. The practice has been to levy this royalty at the time the grass is put on the train so that the royalty can be computed on the railway freight figures.

The local Mahajans do all that is necessary for the cultivation of the crop. The crop requires weeding throughout the rains and resowing in bare places. Apparently the grass, once sown, has a life of about 30 years. The Mahajans cut the grass in November and December and bring it down to Sahebganj, where it is stacked. It is then taken over by the paper mills contractor. He presses it, and puts it on the train after paying the royalty and rails it to Calcutta, landing it at the mills. There are three paper mills on this side of India. They are the Titaghur, Kankinara, and Bengal Paper Mills. There is an arrangement between the Titaghur and the Bengal Paper Mills by which the latter obtains its *sabe* through the former; I believe the Kankinara Mill does not use *sabe*. There is thus only one purchaser for the *sabe* grass, *viz.*, the Titaghur Paper Mills. These mills also get *sabe* grass from Nepal and from Moyurbhanj. The quality of this *sabe* is inferior to that of the Sahebganj *sabe*, which is, I understand, the best raw material in India for making high grade paper.

The output of Sahebganj *sabe* has fallen from over four lakhs of maunds in 1907 to less than three lakhs of maunds last year, the reason probably being that under the former system, which appertained from 1912-13 up to 1914-15, inclusive, the Mahajans deposited with Government yearly a sum based on the preceding year's output for the whole of the *sabe* fields. There was thus no particular inducement afforded to the Mahajans to improve the cultivation. The price paid at present by the mills for the grass landed at the mills is Re 1-4-6 per maund. The price paid by the mills contractors to the local Mahajans varies from 9 to 12 annas per maund at Sahebganj. Last year prices were high, ranging from 10 to 12½ annas per maund owing to exceptional circumstances. In 1914-15 the price ranged from 9½ to 10½ annas per maund. The following figures give approximately the way in which the price is distributed :—

	Rs. a. p.
Average price paid by the contractor to the Mahajans	0 10 6
Pressing	0 0 4
Cleaning	0 0 6
Storing	0 0 1
Coal and labour	0 0 4
Equivalent for "refraction", or shortage of weight through impurities	0 0 9
Royalty	0 1 0
Railway freight	0 3 6
Contractor's profit	0 3 6
TOTAL	1 4 6

This represents the usual state of things up to 1915-16. The Paharia gets from one to two to three annas a maund usually for this crop though it is not now sold by the maund but by lease of the field for one year. The Paharia does nothing to the grass. It is to be noted that the profit of the contractor, who really does very little, amounts in ordinary years to about Rs. 70,000. The system is absolutely monopolistic in character, in that the Titaghur Mills are the only purchasers. There is no other market for the grass at present. The mills can practically fix whatever ultimate price they like for the grass, and the contractor can fix whatever price he likes for the grass at Sahebganj, the only limit being, if the present system is to be preserved, that the Paharias must get enough to eat and drink.

The year 1915-16 proved an exceptional year for the industry owing to the fact that one Rai Biseswar Lal Halwasiya Bahadur came into competition with the regular mills contractor as a purchaser of grass from the local Mahajans. The result was that the price of the grass both to the latter and to the Paharias was higher than usual. The result, however, was a great *impasse* owing to the fact that the mills, having just made a five years' contract with their contractor, Babu Ramji Das, refused to purchase the grass from Rai Biseswar Lal Halwasiya, who had secured nearly the whole year's crop. The dispute became acute in April 1916. I did my best to settle the dispute, but was unable to do so, the attitude of Messrs. Heilgers & Co., the Managing Agents of the Titaghur Mills, being that they wish to thrust the loss of about Rs. 50,000, which they say they have incurred through having had to make arrangements to get grass from other places, on to the shoulders of the Rai Bahadur. The grass is still lying at Sahebganj and Messrs. Heilgers & Co., still refuse to purchase it and are now threatening to make arrangements to get the whole of their raw material elsewhere unless Government can see its way to agree to secure them a five years' monopoly of the

grass. The future of the industry appears to be at stake. The matter is a serious one because, if the industry is allowed to go out, not only will a source of excellent raw material be lost, but the poor Paharias will be put to very great trouble in the transition period, and will probably require Government help.

I think there are four courses open to us. They are as follows :—

(1) that Government should set up a mill at Sahebganj to make its own paper;

(2) that Government should offer inducements to some private firm to set up a paper mill at Sahebganj (the simplest form of inducement would probably be to guarantee purchases of paper for so many years); and

(3) that Government should recognize the fact that the present conditions are monopolistic in character and sanction a five years' arrangement on the following lines :—

(*a*) the existing system of free contract as between the local licensed Mahajans and the Paharias to continue, but the term to be increased from one to five years;

(*b*) the mills to enter into a five years' contract with the licensed local Mahajans on the following terms :—

(*i*) the mills to be bound to take yearly all the grass on the existing *sabe* area during the term of the contract;

(*ii*) the Mahajans not to sell to any one else for the period of the contract; and

(*iii*) the price received by the Mahajans to be a fixed price per maund to be arranged;

(4) that Government should do its best to open certain new markets for the grass either in Europe, Australia, America, or Japan.

The mills, the local Mahajans, and the Paharias all want proposal No. 3. In my opinion, proposals Nos. 1 and 2 are far better. Proposal No. 4 is rendered difficult by reason of heavy freights. As regards proposals Nos. 1 and 2 the following facts should be noted. Sahebganj is eminently well situated for the site of a paper mill for the following reasons :—

(*a*) A plentiful supply of raw material is available at the door. The present output of the *sabe* fields is about 3 lakhs of maunds. This could easily be increased to 4 lakhs of maunds by careful treatment of the present *sabe* fields. I find from the settlement record that the *sabe* area could be increased from 7 to 10 times the present area. This would mean a total annual output of something like 3½ million maunds. In order to show what these figures mean I may state that I am given to understand that in 1914-15 the Titaghur and Bengal Mills consumed about 6 or 7 lakhs of maunds. I understand that they contemplate a consumption of about one million maunds during the current year and a further increase next year.

(*b*) There is a plentiful supply of cheap local labour.

(*c*) Good rail and river transport are both available.

(*d*) The place is more favourably situated than Calcutta as regards the up-country market.

(*e*) There is plenty of Government land available.

Extract from ORAL EVIDENCE, dated 17th November 1916.

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Sir F. H. Stewart.—*Q.* You say plenty of Government land is available for *sabe* grass?—*A.* I think there is great deal of Government land in the province, but I was talking in my note of a particular locality. There is a Government estate of 1,300 acres.

Q.—Is your *sabe* grass pressed before transport?—Yes. *A.*

WITNESS No. 50.

MR. JOHN WHITE, *Messrs. Christie White & Co., Merchants and Managing Agents, Calcutta.* *Mr. John White.*

Extract from WRITTEN EVIDENCE, *vide* page 381 of Volume I of the Minutes of Evidence.

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In Shahabad there are enormous deposits of excellent limestone which, with proper railway facilities and a more liberal freight policy, could be considerably developed for the manufacture of lime and cement. I do not mean to advocate an extension of the present railway to tap unopened country under present conditions, and while the question of railway freights may not come within the scope of the enquiry it is necessary to refer to it here

Necessary railway extensions.

in giving my views as to the possibilities of expansion of the limestone industry, the ultimate result of which would be:—

1. to the benefit of the district generally as a result of the impetus to the trade which would inevitably follow. Moreover, an extension of the railway and an increase in the traffic will mean more employment to local labour; and
2. to the advantage of Government as their revenue from royalties would be substantially increased.

Under existing conditions the users of the railway are unable to take advantage of their geographical position and, unless an expansion of the business is effected which can only be done by a cheapening of the commodity, it will serve no good purpose to extend the present railway, or to tap other lime properties, as the present output meets the demand which is limited to a comparatively small area due to high maufacturing charges, 33 *per cent of which goes in light railway freight in carrying the raw material a distance of 21 miles* from the quarries to the lime-kilns.

The lime industry is more or less established on a modest scale, the average yearly despatches being in the vicinity of 60,000 tons. There is a growing tendency to build better types of houses necessitating the greater use of lime, and a demand for lime has arisen since the opening of the Bihar limestone fields, which did not formerly exist, due to the closer proximity of the lime works and lower railway freights. With a still further cheapening of the commodity I am of opinion that a very much greater demand will arise for lime both for building purposes and as a fertilizing agent.

The cement industry is not new to India and the results of the working of cement factories in other parts of India are, I understand, satisfactory. There is, in my opinion, a good future for up-to-date cement works at Dehri-on-Sone in Shahabad. The quality of the limestone, from tests made by practical cement manufacturers, has been found most suitable. The representative of the Portland Cement (Associated) Company informed me that the results of his tests were very good, and the only drawback was the excessive charges for conveying the raw material over the existing railway to Dehri-on-Sone, a distance of 21 miles, to where he suggested erecting the works. The war has postponed the establishment of this most important industry in Bihar and it will be a great loss to the Province if its development is retarded on account of a short-sighted policy of the railway administration.

In the tea-growing districts there is a growing demand for crushed limestone for fertilizing purposes, which could also, under favourable conditions, be developed, given proper railway facilities. *Sabe* grass, I understand, grows in abundance to the south of the present railway terminus, and this would also find a ready sale in the paper mills. The manager of a well-known paper mill a few days ago informed me that the yearly requirements of *sabe* grass in the mills controlled by him is 12 lakhs of maunds, while he is able to secure only 3 lakhs of maunds yearly, the shortage being made up by wood pulp imported from Sweden.

There is, I consider, a good case for investigation as to whether the replacement of the existing narrow gauge railway by a broad gauge line (an extension of the East Indian Railway) is desirable or not. The working costs of light railways are admittedly much higher than those of broad gauge lines and, if a survey of the district be made with a view to determining the probable volume of traffic, and the results of this survey are favourable and show a clear case for an extension of the broad gauge system, it will certainly add materially to the wealth of the province if the extension is made.

WITNESS No. 56.

MR. C. M. HUTCHINSON, *Imperial Agricultural Bacteriologist, Pusa.*

Mr. C. M. Hutchinson. Extract from ORAL EVIDENCE, dated 22nd November 1916, *vide* page 406 of Volume I of the Minutes of Evidence.

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President.—*Q.* *Re* results arrived at by scientific men at Home on certain scientific problems referred to them not having been beneficial I should like you to describe a specific case if you think that is a fair example.—*A.* A fair example would be the analysis of actual tea with regard to the process of manufacture carried out by research institutions at Home.

Q. Where was it carried out?—*A.* The Imperial Institute. The results of that analysis were shown to me by the firm, and the method of the analysis was one which would be known to any chemist who had studied tea-chemistry as hopelessly out-of-date, and consequently the results would be of no value for that reason. That is a specific case. I come to a different kind. A scheme of manuring for a company in Assam was made not by their own scientific officers in India, but by agricultural chemists in London, and it was submitted to me for criticism. I considered that I would be justified in refusing to criticize the work of another agricultural chemist, but the objection was overruled and we held a consultation of the chemists and myself, and I was able to point out that the assumption that the rainfall in India and Assam was greatest in the cold weather on which the recommendations for manuring were based was wrong.

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WITNESS No. 67.

MR. A. HOWARD, *Imperial Economic Botanist, Pusa.*

ORAL EVIDENCE, 24th November 1916—FOR WRITTEN EVIDENCE, *vide* page 481 of Volume I of the Minutes of Evidence.

President.—*Q.* You have investigated fruit culture in Baluchistan?—*A.* Yes.

Q. You say: "No fruit trader could possibly have spared the time and money necessary" for the investigations you refer to, in packing his fruit properly and in sending it to the market?—*A.* Yes; I adhere to that opinion.

Q. You have improved methods of marketing apparently?—*A.* Yes.

Q. But do you think that the work comes naturally within your sphere as Imperial Economic Botanist, or were you driven to it merely because nobody else had taken any interest in it?—*A.* I have always understood economic botany to mean plant industry, and so include a knowledge of agriculture and a knowledge of the plant. I have always taken practical agriculture and botany together. Any success that I have had is due to the fact that I have not looked at the subject from a narrow point of view.

Q. You gave us some interesting results of your work in connection with the improvement of cultivation, that is to say, taking advantage of retaining the silt and aerating the soil with a view to increasing the available nitrogens? Have you no one at Pusa to take up these purely soil questions?—*A.* I do not agree in the last that this is purely a soil question. I became interested in this matter by finding that aeration is a limiting factor in growth. I am looking at the problem from the physiological point of view. The chemical aspect is being taken up by the chemists. When I come to a question in which the chemist can help me I hand over these matters to him.

Q. That seems to be feasible where soil problems applicable to many kinds of plants occur, and Pusa is in a position to tackle such problems. But does it not appear to you advisable that we should have some chemist who is capable of taking up such soil studies?—*A.* As I have said before, I consider that every member of the Agricultural Department, whether he is a chemist, a botanist, or whatever else ought to know agriculture. I consider a knowledge of agriculture in its practical aspects is essential for all investigators in agriculture.

Q. A knowledge of agriculture is very useful to everybody. But research work of this kind must take up a good deal of time, your time; is very precious in the matter of economic botany?—*A.* I perceive the drift of your remarks. But I am looking at the soil questions as a question of root development and the purely chemical and purely soil questions are already being investigated by chemists If I could get any branch of my work adequately taken up by any other man I should only be too glad to do that. My point is that an investigation into an industry is useless unless the investigator knows the industry very well.

Q. You say that an investigation in pure science led to what has turned out to be a new system of agriculture. But has it not been long known that aeration of the soil increases the production of available nitrates?—*A.* A new system of agriculture with regard to the alluvium of India, but not a new system of agriculture taking the world's point of view.

Q. Don't you think that it would be a benefit if somebody else could take up the work so far as you have pursued it and go on with it? To turn it to effect even in the Pusa District would require a topographical survey to show how the soils were distributed?—*A.* I have asked for that to be done.

Q. It becomes the business of a soil specialist, rather than of an economic botanist? Don't you think that you should have at Pusa a soil specialist?—*A.* Yes; I think so. I have written to some of the leading people at Home saying that the Gangetic alluvium presents soil problems more interesting than any in the world, and that we are badly in need of a soil specialist.

Q. Did you write through the Agricultural Department?—*A.* No; in private correspondence. I have simply said that there are such problems.

Q. You have never placed that matter before the Agricultural Adviser?—*A.* Not in writing, but in conversation.

Q. Would it not be well now to put your idea in writing and hand it over to the Agricultural Adviser, so that it may be carried further and turned to practical value, so that it may not disturb you in your economic botanical work?—*A.* I have no objection whatever. Our chemist's post is only filled by an acting man, and that is one of the reasons why I have not made any official reference. Until the new man comes and discloses his line it seems to me difficult to put the thing in writing.

Q. You say that all research work should be done in India itself where local conditions can be studied on the spot. Can you give us a specific illustration of work done in London which was incomplete, or because of its incompleteness misleading with regard to its application to Indian conditions?—*A.* I refer generally to the sort of reports issued by the Imperial Institute.

Q. You do not remember specific instances?—*A.* Certain wheats were sent for testing. The reports on them had no reference to the way in which the wheats were grown. It was a mere fragment as it were. I object to the Imperial Institute for the fragmentary nature of the investigation done there, which I consider will give the Government quite a wrong idea of what an economic investigation ought to be.

Q. So far as they give the best information that was obtainable at the time, and so long as they are not misleading, they might be helpful?—*A.* They never help me. I follow their publications very carefully. I have never got any instruction from them or any help from them.

Q.—There are some problems which occur rarely, possibly one in a province now and then. For those provinces it may not be worth while, in the present state of the development of India, to maintain a staff and a laboratory in full working order. These problems, or some of them, are similar in kind to the problems in other parts of the Empire. Don't you think that for problems of that kind the maintenance of an institution in London would be a benefit to this country as well as the other parts of the Empire? To give an illustration, take the case of rare earths. They occur rarely in India, but if in India we maintain a laboratory for the analysis of rare earth minerals it might take some weeks to prepare the standard solutions and only a few days to make the analysis. Such problems occur rarely in India, and equally rarely in other parts of the Empire. Don't you think that it is better to maintain in some central place a laboratory that can deal with rare problems of this kind?—*A.* The answer to that is this: that if there were no laboratories in England I should say that the question might be considered. There are, however, many university laboratories in England, and if Government gave help to them by subvention to have that work done it could be done without putting up a building for it.

Q. Do you think that even for problems of the kind I have mentioned there are already a sufficient number of institutions at Home?—*A* Yes; if the questions are properly put by the Secretaries of State for India and for the Colonies I think the work can be done without an institution by the large laboratories which already exist, and it would be a great advantage if that were done at the universities, because often they want problems for students to investigate and so on, and it would be a good thing if the universities were in direct touch with Government departments like the India Office and the Colonial Office.

Q Have not most of these problems suitable specialists engaged on them in England, as in the case of rare earths?—*A.* I would pay the specialists a fee for the work. A similar case arose in regard to Indian wheat. I send samples to be examined by Mr. Humphries, and we pay him so much for each sample tested and for his report. He does the work for the Government of India and that has been going on for many years. I think we can get in this way far better reports than from the Imperial Institute. We try to find in each case the right man in Great Britain for the work, and we deal with him direct, and it has been of great assistance to me to do so. If I sent such a matter to a Central Institute I should be cut off from direct contact with the trade expert and should not have learnt many things which have been of great use to me.

Q. You say that once the right man is found and provided with the necessary means everything else would follow. But the question is whether the Imperial Institute or any other similar institution is necessary?—*A.* It is not at all necessary. If the Imperial Institute were closed to-morrow it would make no difference at all to agricultural work in India. I believe in the research being done in India and, in India getting the best men for that work.

Q. When you send your samples to a special man or, in the case of Messrs. Ralli Brothers, where they lend you their organization free of charge and place your Pusa No. 4 and No. 12 wheat on the wheat market, is there not some danger of the system being abused?—*A.* Yes; unless one takes the greatest care in selecting the firm and the men. I consider that a firm like Messrs. Ralli Brothers have played the game with Government and with me in every respect. I have great confidence in what they say. I think that if due care is taken in the enquiries, so to speak, that system works quite well.

Q. You say in your written evidence that a mixture of both types of wheat would not fetch a higher price. Do you mean that one ton of X type costing ₹20 and one ton of Y type costing ₹10 would not necessarily give you two tons at ₹15 a ton? The two tons may sell at ₹10 or even less than that?—*A.* Yes.

Q. The grading of the wheat or other produce enables the seller to get a better price?—*A.* Yes; tobacco people say that sometimes they get a good sample from India, and in another year the standard is not maintained and that the quality falls off. We cannot place an order in India at the present time for a class of tobacco of a particular kind and be certain of getting that article continuously. Unless this is remedied India cannot take a proper place among the producers of raw material.

Q. You say that all research work should be done directly under the Government of India, and the work of applying the results should be under the local Government?—*A.* Yes; my objection to having research work done under provincial direction and under the Government of India is that we often have too many men dealing with the same thing which often leads to differences of opinion. I think that centralized research work (not necessarily in one place but under one direction and organization) would be an improvement.

For example, in the case of rewards for work done, I think it would be a great advantage if they were all dealt with by one director. I think it would work better from the administrative point of view.

Q. You are also of opinion that those engaged in research work should not be distracted by teaching. Do you mean only elementary class teaching?—*A.* I mean college teaching and lecturing.

Q. You would not object to a system by which research workers are also expected to train young men, possibly post-graduate young men, who undertake further research work?—*A.* I agree to that provided the young men have been properly trained when they come and have the qualifications necessary for the work. It is the duty of each research man to give such training. Beyond this, it is not legitimate for Government to put pressure on them to do other teaching work. At Pusa the system of training young men to do research work is being considered now, and we have just sent in our proposals and we are going to take the best graduates from the provincial agricultural colleges and science colleges of India and train them in research work for appointment in the Agricultural Department on terms like the Europeans. I think that that is a legitimate part of our work, but in asking us to do that work we should not be flooded with a large number of men. We can only do with a limited number.

Q. You think that a good deal more might be done by getting suitable men for temporary service in India. My experience has been the reverse. I should like to know whether you have got any examples in mind?—*A.* I merely say that we have some difficulty in getting efficient men. There is a possibility that people might come here for ten years, and I believe that is the system in Java. The Dutch Government send out men for short periods and that system has been successful.

Q. It is perhaps worth considering from this point of view. If a man comes out for four or five years that does not give him much time to lay out a scheme of investigation and to follow his results to a practical issue. There is also danger in that the men would push on their own particular ideas for the time being and then quit the country. Don't you think that it would be an advantage to get young men who would make it their life's work?—*A.* I think there might be advantage in both. I do not mean to say that there should be no permanent staff; we should have that too. I should like to see both working together. On the soil question it may be a good thing for a man to come for five years.

Q. Cannot you get for your permanent staff sufficient leave in the way of study leave to keep the information uptodate?—*A.* It is very difficult. The rules are very difficult, and one has to go to some institution to go through a course.

Q. You have made a certain number of experiments with regard to the cause of wilt in indigo, and you are satisfied that water-logging is the real cause. Have you followed the tests made in the different indigo factories?—*A.* I have seen a good many of them.

Q. Are you satisfied that these results are conclusive, or do you think that they failed to meet the real point?—*A.* I put my views on indigo in great detail in my third report which has been just published. Of course, the botanical constitution of the plant which came from Java originally was not the same as we have got now. It has altered through the conditions of seed formation and so on in Bihar itself, and it has become a deeper-rooted plant. Under these conditions it suffers very much from water-logging and want of air. The planters used to leave the old crop for seed, and it began to flower in the month of September or October. All the flowers of that period of the early plants never set seed because the climatic conditions are against seed-setting. The consequence was that later plants predominated. We have at Pusa shallow-rooted types of indigo which have successfully withstood wilt, and side by side the ordinary indigo is now beginning to die of wilt. It is very difficult to discuss one aspect of the indigo problem without going into the whole matter of the cultivation of this crop. Taking the whole thing together I stand by the position as published in the third report, and I am perfectly certain that my ideas on this point will prevail.

Q. You think that water-logging is the real cause of wilt?—*A.* Water-logging results, of course, in displacement of the air. That takes place very much more quickly on the light lands than on the stiff lands. That is a point, of course, which is forgotten. It is only when all the air in the pore spaces is removed and stagnant water takes its place that the growth of the plant stops, especially in the high land. This explains many of the results.

Q. But then you get over these troubles by putting broken potsherds into the soil?—*A.* Only for the seed crop. Of course, many of these matters are misunderstood and misapplied.

Q. Is it true there are two causes that weaken the constitution of the plant and render it liable to wilt, one being water-logging and the other the absence of phosphate in the soil?—*A.* I do not agree with the phosphate theory. When I started taking up land 11½ years ago it was the first question put to me by the Director, Mr. Coventry. He said that Bihar soils were very deficient in phosphate. I grew a few crops, and I grew very large crops under proper management. I experimented with wheat, and though there was no manure, there was no diminution at all in the fertility. We tried on an estate two years ago to see the effect of phosphate on indigo and whether the manure would stop wilt twenty acres on one side and twenty acres on the other. The result was negative. Both went out with wilt. Although the phosphate stimulated growth in the beginning, the effect passed

off during the hot weather, and both plots gave practically the same amount of indigo. We have got the best crops of indigo seed from highlying well-aerated soils. The availability of phosphates in the Bihar soil is a question of aeration. Phosphates are made available by the fungi and bacteria in the soil. When properly aerated practically all soils in North Bihar have sufficient phosphates. If the soil is water-logged and the aeration is bad the natural agents which make phosphates cannot act, and the application of phosphates will give a certain amount of result. I prefer not to look at the question superficially merely from the point of view of the application of phosphate. I am going deeper into the subject and am considering aeration in all its aspects. When this is done the phosphate question does not arise.

Q. Have you put these matters before Mr. Davis?—*A.* My note on this point went in yesterday. He has not had time to consider it. I have given there my experience, and I have dealt with the shortcomings of the methods of analysis. The methods of analysis for determining available phosphate are useless with soils containing thirty per cent of finely divided calcium carbonate, and give fallacious results.

Q. One would like to know whether it is correct or not that the opening up of the land makes the phosphate in the soil more available to the plant?—*A.* Increase of aeration of the soil will increase the depth by which the roots will benefit, and it will give a larger area of collection. It will also, by giving more air to the bacteria and fungi, produce more phosphate. In the Gangetic alluvium we are dealing with soil conditions absolutely different from anything in Europe. We have got soils many miles thick. We have subsoils which are the same all the way down.

Q. Assuming that theory is correct how do you account for the fact that land which has been water-logged has given good crops and high ground, without any chance of water-logging and with a perfect access of air, has suffered badly from wilt?—*A.* I have obtained that result myself. Water-logging takes place very much more rapidly on the high open soils than on the low stiff land. In the low land the plant will often live in water for a long time because it is living in water culture and all those low lands are rich in nitrates. On the high lands, however, the nitrates are lost very rapidly by leaching and when the root nodules are destroyed wilt begins. There is natural starvation on the high land but on the low land there is water culture.

Q. The water on the high land will run away and so permit air to be introduced into the soil. It would not remain long enough for anything like water-logging?—*A.* The rivers rise during the monsoon. The land becomes charged with water and the subsoil water rises sometimes to three feet from the surface and remains there for a long period, sometimes for six weeks, when the whole of the natural drainage is stopped. I can give a very good instance of that. There is less wilt this year than during the previous year. We had a small monsoon at the beginning and only for about one week the natural drainage was blocked. The river was up for one week and then fell again. The downward movement of water began again and soil aeration became possible. In the previous year stagnation went on for quite a long time, and we had a bad attack of wilt. When the rivers rise the wells follow suit and in time the natural drainage stops. In these matters a large number of facts must be taken together and investigated. One has got to take a full biological picture of the whole conditions of Bihar and, when that is done, I am perfectly certain that my views will stand the test of time. I have not been disturbed in the least by the counterviews that have been put forward.

Q. The fact that impresses the planter is that indigo grown in water-logged soil and indigo grown in soil free from water-logging give results quite the reverse of what may be expected?—*A.* This water-logging takes place *after* the crop has been in the ground, and the indigo has grown quite normally. If they were to sow indigo in water-logged land it would not grow.

Q. Do you think that these experiments have been followed in sufficient detail to make them a crucial test?—*A.* I do not think the planters can possibly understand such complicated physiological questions and appreciate all the conditions of the case.

Q. Have you actually visited the plants and seen them?—*A.* I have. Some of their difficulties are due to the fact that they are dealing with indigo very susceptible to wilt. If they were growing improved selected varieties the problem would be very much simplified.

Q. How would you be able to produce the improved kinds?—*A.* We have done so. I can show you 20 acres in the field now.

Q. Would that be ready for the planters this year?—*A.* We have a large stock of seed for distribution now.

Q. Are the planters following your system of treating the land instead of using phosphates?—*A.* They get all the reports, and I have demonstrated them on a large scale.

Q. I understand they spend much money on artificial manures? *A.* Not for indigo.

Q. Is it on the land on which indigo has been grown?—*A.* No; we tried an experiment with superphosphate on 20 acres at Dholi to see what the result would be. It had no effect in stopping indigo wilt. On this estate superphosphate is sometimes applied to the oat crop at the rate of one maund (82 lbs.) per bigha (9-10ths of an acre).

Mr. C. E. Low.—*Q.* You say that research should be concentrated and should be taken out of the purview of the provincial departments. You still, I presume, would have agricultural chemists and botanists in some at any rate of the provinces. What would be the functions of these men? Would they concentrate their work on teaching?—*A.* Under the present organization?

Q. Under the proposed organization?—*A.* The Imperial research men would not all be in one place.

Q. An agricultural chemist would be teaching agricultural chemistry in the provincial college, and he would presumably, under the arrangement, have nothing else but teaching?—*A.* Under the proposed arrangement I would suggest only two agricultural colleges for India, when many of the present Provincial men would be taken up by the Imperial Government under the new arrangement.

Q. You would have only two colleges for the production of licentiates in agriculture?—*A.* One, say, for Northern India and one for Southern India. If there were one in Northern India and one somewhere in the centre of India the difficulty of distance would not be very great. The two colleges properly filled would give us all the men we want.

Q. Are two colleges sufficient for a country like India which lives on agriculture?—*A.* An agricultural college is not necessary for improving agriculture. It is only necessary for giving us such staff as we require. In the United Provinces many of the men who are doing the best work are not graduates at all.

Q. These men were taught to demonstrate particular things?—*A.* They are concentrated as far as possible on particular things.

Q. It is not likely that these men will easily rise beyond demonstrating those things they were taught to demonstrate?—*A.* Of course, it would depend on the men.

Q. What type of men do you contemplate? Educated or semi-educated?—*A.* Some are educated.

Q. Turning to another question, that of the improvement of wheat, can you give us an idea of the extra cash yield per acre from Pusa No. 12 in the United Provinces, both from the increased outturn and from the improved quality?—*A.* Rs. 12 and Rs. 3. They are the average returns from almost every district.

Q. The increase over the local?—*A.* Yes.

Q. What is the fruit area in the Quetta valley?—*A.* I could not tell you straight off.

Q. Have you any figures about exports?—*A.* Those are given by the N. W. Railway. I can give you an idea which would be better than figures. Two trains a day leave Quetta filled with fruit during the season.

Q. How far are the results obtained in Quetta applicable to other fruit-growing areas in the hills?—*A.* They are applicable, but not in every case; sometimes they want a little adaptation.

Q. What proportion of the year do you spend in Quetta?—*A.* From the first week in May to the last week in September.

Q. Do you consider that represents in fair proportion the relative importance of the work done in Pusa and in Quetta?—*A.* My work there is not only work on fruit, but the principal part of it is water-saving on wheat and other crops, with reference to the waste of irrigation water which is now taking place in India. The results obtained apply to India.

Q. When following up any line, such as indigo or any other line of research, you come across what you consider a non-botanical subject. Do you inform the Agricultural Adviser or the officer who is supposed to be in charge of that subject, or how is the decision come to as to what is to be done about it?—*A.* The question has not really come up. They never trouble me about these things.

Q. I want to know whether you trouble them?—*A.* My contention is that you cannot separate agriculture from economic botany. I expect that a good many of our subjects will be followed up by other men and, in fact, that has been done. In many cases points come up which I hand over to other men.

Q. Have you tried to get any crop on to the market through the Imperial Institute? I do not allude to mere scientific investigation or analysis.—*A.* I wanted to find a man with knowledge of certain aspects of oil-seed work. So I made inquiries in England and found the very man we wanted. I have never used the Imperial Institute for such purposes, and it would not occur to me to do so.

Q. You have not actually tried through the Imperial Institute?—*A.* My objection to the Imperial Institute is that I prefer to do my own work and to get the credit for it.

Q. Speaking of Messrs. Ralli Brothers you have no reason to believe that they are not giving full value for the special qualities of wheat which you are sending Home through them?—*A.* The wheat is bought in the open market and it is quite an open transaction.

Q. My reason was that you might remember when Government were attempting to grow Egyptian cotton in Sind Rallis', it was said, took advantage of the absence of competition at the auctions and bought it up at lowest prices?—*A.* In order to get this wheat for the experimental shipment we had to pay the cultivator a premium for it and Messrs. Ralli Brothers had to pay bazaar rates for it. There was no question of a Government transaction.

Q. There are similar firms, British or French, who are equally large people in the export of wheat trade from India?—*A.* Yes; I show them samples. They know what is going on.

Q. I have omitted to ask one question about the provincial agricultural chemist. When a general principle has been worked out in the central institution there are often a number of small investigations which have to be made, and which can be made by the local investigator?—*A.* The Deputy Directors should do such things. They could tackle any agricultural modifications of a large problem. The Deputy Directors have taken up such matters with modifications (and very sensible and useful modifications) to suit their particular tracts. I think some of the Deputy Directors we have in many provinces are exceedingly good men.

Q. In the case of modifications relating to agriculture it may be, but in respect of chemical considerations?—*A.* Supposing any question of manurial treatment turned up which is a new thing a Deputy Director, such as we have in our department, would certainly be quite up to making the necessary modifications.

Q. Are there not a large number of isolated botanical posts in the various departments in India?—*A.* There are posts in the Agricultural Department, the Forest Department, the Botanical Survey, and I think in one or two places in Bombay as well. As regards the necessity of meeting and exchanging views with such men the Indian Science Congress has been started with this idea. I attended the last meeting at Lucknow, and we had botanical men and forest men, and from the discussions which took place I derived a considerable amount of benefit

Q. Is it not ordinarily the case that two botanists in different parts of India sometimes follow the same line of research?—*A.* That is impossible by the system of programmes of the Boards of Agriculture.

Q. I am not talking of the Agricultural Department. Take the Forest Department, for instance?—*A.* I understand.

Q. The two departments are not overlapping in any way?—*A.* No; on the contrary. they are helping each other very much. The danger of overlapping in scientific work in India is very greatly exaggerated. It is a very good thing to have new points of view.

Q. But it is at a considerable cost? Do you not think that that money might be better spent on a different organization?—*A.* I have never known cases in India where overlapping has led to the waste of public money.

Hon'ble Pandit M. M. Malaviya.—*Q.* You think that two men working at a problem might be a check on, and help the work of, each other?—*A.* One cannot do these things too often in many cases. I should welcome at the present time any investigator who would come to Bihar and work independently on the problems of soil aeration. It would be of the greatest value to me because the results would add force to my recommendations.

Q. In this very case you mention you find Mr. Davis taking a contrary view and you think that it is an advantage that he should be able to tell you what he thinks and you should be able to check your own experiment?—*A.* I think that opposition is the most stimulating thing that I have ever experienced.

Q. About teaching, you say that the research worker would suffer in his work if he did a little teaching?—*A.* What we want is good teaching and good research, and I think that any attempt to mix these would be a mistake.

Q. You say: "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?" Do you think that this branch of the work, the improvement of crops, requires such a kind of research that a little teaching will injure the research work?—*A.* I do; if it were pressed upon me I would rather leave the country than attempt to combine research work in plant industry and ordinary college teaching.

Q. The extraction of more indigo from the leaves to get a larger yield of indigo by improved processes of manufacture is one thing, but a mere improvement of the crops by the methods that you employ to show how it can be effected is a different kind of work, is it not?—*A.* Yes.

Q. Do you think that for both kinds of work it would be a disadvantage to have to do a little teaching work?—*A.* The only teaching I would give to the investigator to do is the teaching of one or two post-graduate students by initiating them into the methods and helping them at the beginning of their career. Beyond that I would not go. If you want teaching get men to teach and do nothing else.

Q. Would you not insist upon the other scientific men who are engaged in teaching also doing a little research work?—*A.* Yes; in pure science. If a man is going to be a teacher and is paid for teaching then teaching must be his main work and calling.

Q. Plus the training of research students?—*A.* The question does not ordinarily arise.

Q. I understood you to say, in answer to a question of the President, that you were in favour of some students being trained as research students under experts?—*A.* Under investigators; I would take a few men who have had suitable training and possess the necessary qualifications for research and help them at the beginning of their work. For teaching in a college I would have men to whom teaching is their main calling and, after

doing that, if they do a little private research work on their own account so much the better.

Q. You say that you do not think that agricultural colleges are necessary to improve agriculture?—*A.* They are certainly not necessary. Agriculture, I might explain, is an art. It depends upon the personal fitness and aptitude of the man. Many of the best agriculturists in Europe know no science at all, and I do not think that teaching them or their sons science would help at all. Science is an instrument by which new knowledge can be applied to industries for producing results which the people engaged in those industries can use. If you wish to put a thin veneer of science over the population of India in the hope that this would make them better for anything then I disagree.

Q. We are not talking of the population of India. We are talking of giving college education to a few men who would be better than the general mass of cultivators. Take, for instance, agriculture in its various aspects—the supply of seeds, the application of manures. some knowledge of agricultural chemistry, some of agricultural engineering for the purpose of drainage, etc., and some knowledge of marketing also and generally of rural economy—are not all these subjects important enough to form a proper course for those who are going to take a leading part in promoting agriculture?— . I see what you mean. Much of that sort of work could be done in the schools if the schools in the rural districts were suited for the purpose.

Q. You will require a very high class of schools if they are to do this work. Will you not?—*A.* Excellent schools. I would not create an agricultural college for that.

Q. You want the institution to be high enough to give good technical and scientific instruction in agriculture? It is not for the cultivator, but for men above him—zamindars and practical farmers for instance, for graduates who want to become practical farmers?—*A.* If the boy has had a proper education in the school I would not send him to an agricultural college at all because at the school, if the school be a good one, he will learn all that is required. There is nothing to be gained, in my opinion, by giving science to people in small doses.

Q. Have you seen the agricultural college at Lyallpur?—*A.* Yes.

Q. Also the college at Poona?—*A.* No.

Q. Have you seen the agricultural college at Cawnpore?—*A.* Yes.

Q. You do not think that a man who has something to do with agriculture would be benefited by the training imparted at the agricultural college at Poona whether he be a zamindar or a poor man's son who has never had an acre of land?—*A.* They would do far better by being put to work early—not with their own hands—but work in connection with the estate. I may say that the best farmers in England never send their sons to an agricultural college, and in that I think they are right because their observations and the work they would do during this period stand them in far better stead than a training at an agricultural college. So much depends in agriculture upon experience, upon insight, and upon things like that which are almost beyond science, which they learn by being in contact with the subject itself.

Q. You think, then, the colleges in India might well not have been?—*A.* When our Agricultural Department was started in India we started with five agricultural colleges and I regard these five colleges as millstones round our necks.

Q. Have you studied the system of agricultural education which is prevalent in America?—*A.* Only from literature.

Q. Do you think that they have been useful in promoting agricultural industry in America?—*A.* The circumstances in India and in America are different.

Q. Have they in your opinion, been successful in promoting agriculture?—*A.* The question is an unfair one if I may say so. We are dealing in India with an old civilization and with traditional experience over a period of many thousands of years. But in America the population was let loose as it were into a new country. It is quite possible that in such circumstances when there was no traditional experience to go on that a certain amount of agricultural teaching might be of some use.

Q. You are making certain investigations and researches and you think that these are for the benefit of the agricultural industry in India?—*A.* Yes.

Q. And you want the results of your research to be communicated to those who are to deal with agriculture?—*A.* Yes; by the method of demonstration.

Q. Do you think that that should be communicated only by the method of demonstration?—*A.* Largely, in the present state of India.

Q. Not entirely?—*A.* No; the schools I have been speaking of would know about our work.

Q. What standard of instruction would you impart in these schools? Would you expect the men to be able to understand our scientific processes and methods?—*A.* I should expect them to understand our simply written bulletins.

Q. You think by reading bulletins people will be able to derive the full benefit of your investigations?—*A.* Not the full benefit. But they will have an idea of the work. The rest they will get by demonstration work. It will be done by Indians.

Q. Of what standard?—*A.* It is found in practice that men who are the least educated are often the best demonstrators. Demonstration is an art which depends upon knowing the cultivator and, in many cases, we find that sepoys who have been in the army are very good for this sort of work.

Q. For improving agriculture in India you would require at the top men who would do all the important research work and at the next stage men of the soldier class who would go and demonstrate the results of your investigation?—*A.* The district staff of the Deputy Directors would come in between. The Deputy Director is the circle officer in charge of demonstration work. He may be an Indian or an Englishman. He has a circle and looks after the demonstration work.

Q. Would you leave the soldier to control the demonstration himself?—*A.* No.

Q. He will be controlled by the Deputy Director?— . Not directly by him, but by his staff.

Q. Would you want these men to have any education?— . Some are educated and come from colleges. But the college men are not always the best of these men.

Q. What do you think it is due to? *Wrong courses or bad instruction* or bad *stamina* in the students?—*A.* There is nothing wrong with the man, but a great deal wrong with the education.

Q. Is the course a wrong one?—*A.* The whole system of education in India is entirely wrong in my opinion.

Q. In what way?—*A.* It is the difference between *kacha* and *pacca*.

Q. Do you mean that there is not sufficient agricultural education given to Indians who go up to these colleges?—*A.* Indian education suffers from the drawback that the standards are too low. Too many men, who have no real qualifications as it were, get into colleges.

Q. Do I understand that you are in favour of a network of agricultural schools in the districts in the provinces?—*A.* I would not put up any more buildings. I would try to get those existing into working order. I would spend a great deal on brains, and nothing on bricks.

Q. Would you have a course of a distinctly agricultural character, or would you add agricultural subjects to the general curriculum?—*A.* I should probably alter the whole curriculum. I should raise the standard of education throughout.

Q. Do you think that a good knowledge of English is essential for agricultural education?—*A.* For the class I understand you are speaking of, say, a superior zamindar who is going to be a leader in rural affairs. We have gone into all these points and in the report of the committee which sat at Pusa the question of the best education for the leaders in rural affairs—the man to whom you refer—we have gone into, and I should have to refresh my memory as to details, but the general idea was to do a great deal in the schools for these people.

Q. You do not feel the necessity for any intermediate institution between the school and the research institute?—*A.* No.

President.—*Q.* Do you suggest that agricultural colleges are conducted on bad lines?—*A.* Yes; I base my condemnation on experience. I was a professor in one of the agricultural colleges in England before I came out to India. So far as I can make out from my association with the leading farmers and agricultural people in England there is a distinct feeling against agricultural colleges. We had 100 students and among them farmers' sons would be about twelve. Agricultural colleges exist because the schools to which farmers' sons go are not very good.

Q. What kind of students meet there?—*A.* A miscellaneous collection. One of our great difficulties in teaching was that the students had been brought up in towns and knew nothing about agriculture.

Q. With five or six months in the college and the rest of the year on the farm he would not be a better farmer for the college training?—*A.* I would agree as far as it refers to general education: I disagree as regards farming. I would, of course, have farmers' sons well educated.

Q. In school you cannot teach agricultural science or any other science?—*A.* If boys learn science in the school—elementary science—they certainly do not learn agriculture as an art at the college. They learn chemistry, botany, and things like that. I do not think that if teaching were given in these subjects that would make them better farmers. The art of agriculture does not depend so much upon science as upon aptitude for farming.

Q. They ought to be better farmers if they are taught properly and with the teaching in the college they would have also practical experience which would not allow them to drift away from practical farming. In Canada the classes in agricultural colleges are composed only of farmers' sons?—*A.* In a place like Canada where you have got a new population and new conditions, and where there is no traditional knowledge, and where these colleges are run on very practical lines, they may do some good.

Q. You say that the colleges here are not run on sufficiently practical lines?—*A.* I rather take it that the circumstances of the country do not render these colleges so necessary in England as they may be in Canada and America.

Q. In the matter of manuring and turning to account new discoveries in wheat and in various other ways chemical problems arise. Would it not be useful to have some knowledge of science together with the principles of agriculture, to have the discoveries of men who have done research work translated into actual practice?—*A.* I have worked with hop growers and with planters, and many of these men have natural gifts as it were, for an agricultural calling, and they were most keen on our results and followed them with the greatest intelligence. I have not found that a want of knowledge of science on the part of a farmer, provided he is a real farmer, ever stopped his association with scientific work or his keenness in taking up the results of their work.

Hon'ble Pandit M. M. Malaviya.—*Q.* Have you studied the advance made in the agricultural industry in Japan during the last thirty years?—*A.* Such papers as are written in the European languages I have read, and I have read a good many books on Japanese and Chinese agriculture.

Q. Have you noted their system of agricultural education both in schools and colleges?—*A.* I do not know anything about this. I have followed only the work done by the Japanese investigators.

Q. Have you studied the progress which Germany has made within the last 40 or 50 years in agriculture?—*A.* I have.

Q. Have you studied the constitution of the higher technical schools for agriculture in Germany?—*A.* No.

Q. Are you aware that agriculture is a subject for a degree in most of the modern Universities of England, Germany and America?—*A.* I have been through the course myself.

Q. And yet you do not think that a system of education culminating in a degree in agriculture will be beneficial to the cause of agricultural development in India. I would ask you to think of the class of men who go to, and benefit by the instruction in, the Universities in Japan, Germany, England and America, and to say whether if you had a corresponding class of men in this country, assuming they are educated on the right lines, agricultural development would have a great future before it?—*A.* For investigators certainly. An agricultural investigator, if he is a farmer's son is all the better, simply because he learns so much at home.

Q. Do none of the farmers' sons go to agricultural colleges?—*A.* I would send the farmer's son to the University if he is to be made into an investigator. I have never known an investigator turned out by an agricultural college with only that training. I would give the future investigator the very best training in pure science that the universities could give him. Science is the instrument and the man who is going to use that instrument must understand it as well as the thing he is to improve—in this case agriculture.

Q. How many years' experience have you had now in Pusa of the use of No. 12?—*A.* Five years.

Q. Are you quite satisfied with the results so that you think that you ought to encourage the replacing of the other kinds of wheat by this Pusa No. 12?—*A.* Yes, in the United Provinces.

Q. You have no misgivings of any possible disappointment coming in after a few years, of the yield not being as plentiful as you have been getting now?—*A.* We must keep the wheat pure. We must not get it mixed with other kinds. Provided the distribution is adequately controlled, I have no doubt.

Q. Suppose it gets mixed?—*A.* It is then no longer Pusa No. 12.

Q. Even then you do not apprehend any serious loss?—*A.* Not if our system of seed distribution is adequate.

Q. Have you experimented with a mixture of Pusa No. 12 and some other kind of wheat?—*A.* Many times. We have to pay a great deal of attention to the question of mixture. We have never got an advantage that would outweigh the disadvantage of mixing wheats from the trade point of view.

Q. So far as the yield is concerned, you do not think there is any apprehension that after a few years this mixture will lead to unsatisfactory results?—*A.* It would, because it would no longer be the same. It would change so much.

Q. Are you satisfied that all the soils on which wheat is grown in the United Provinces are suitable?—*A.* Those on the south side of the Jumna are not always suitable for No. 12. They are trying No. 4 there. On the alluvium both on the Doab, and between the Ganges and the hills, a very large number of experiments were made on the cultivators' fields and the Agricultural Department is satisfied that they are doing the right thing in distributing Pusa 12. It is not a question of one test but thousands of tests.

Q. Are you equally satisfied as regards the soils of any other province, about your No. 12?—*A.* It is spreading in the western Punjab satisfactorily. It is spreading in a part of the Central Provinces, but I do not think that it will spread very much further. It is doing

very well on the Chenab, but it is not so striking a success on the Chenab for other reasons—owing to over-irrigation. The United Provinces will be the home of this wheat.

Q. Is it because of better irrigation in the United Provinces?—*A.* It is due to the more open texture of the soil. The alluvium there is sufficiently open so that under irrigation aeration is not destroyed. Pusa No. 12 is a deep-rooted wheat. In the Punjab this wheat is often over-watered and does not thrive under these conditions. This is one of the reasons why I have taken up water-saving experiments on wheat at Quetta and in the Punjab. We have to check this over-irrigation in North-Western India before we can improve the wheat crop. This is one of the greatest things in agriculture that can be done for India.

WITNESS No. 77.

Babu Jnanendra Mohan Dutta.

BABU JNANENDRA MOHAN DUTTA, *Pleader, Director, Muzaffarpur Central Co-operative Bank, Muzaffarpur.*

Extract from WRITTEN EVIDENCE—*Vide* pages 525-528 of Volume I of the Minutes of Evidence.

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Capital.

I hear that Mr. Shafee, Barrister-at-law of this place, had been to England to learn tanning, and did acquire practical knowledge on this subject there, but as he could not get funds for starting a business, he got his admission into an Inn and came back as a Barrister.

Training of labour and supervision.

Q 46.—I have heard of one gentleman, Mr. K. Saikia, an Assamese, who obtained State scholarship for learning paper industry in Europe. On account of the outbreak of the war, he had to come back to India, hoping that he can learn the industry from the different Indian paper mills. He tried almost every mill in India, but he could not get admission anywhere. Ranigunj Paper Mills & Co. also refused him admission. But as the said Paper Mills & Co. supply paper to Government, Government threatened them with the discontinuance of the contract, unless the said student was allowed admission as an apprentice there. At last Mr. Saikia was admitted in the Ranigunj Paper Mills as an apprentice. He has now learnt the industry very well and, in addition to the Government scholarship is getting an allowance from the company, and is about to get an offer from the said company of a very responsible post.

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.

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Extract from ORAL EVIDENCE, dated 25th November 1916.

Mr. C. E. Low.—*Q.* You say that Mr. Shafee went to England to learn tanning. Did he go at his own expense?—*A.* He got his expenses from his father.

Q. He tried to get funds out here or where?—*A.* He did not try here, but seeing that many of his friends could not do anything in that line, he became diffident and joined the bar.

Q. You speak of Mr. K. Saikia who was refused admission to any paper mill in India, but as the Ranigunj Paper Mills & Co., were contractors to the Government, pressure was brought to bear on them to admit him. Do I understand that the Paper Mill is now contented with him and desire to retain him?—*A.* That is my information, that they are now going to give him some responsible post.

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WITNESS No. 89.

Babu M. N. Ghose.

BABU M. N. GHOSE, *Manager, The Jessore Comb, Button and Mat Manufacturing Co., Ltd.*

Extract from WRITTEN EVIDENCE—*Vide* pages 90 and 93 of Volume II of the Minutes of Evidence.

* * * * * * * * *

It is high time for the Government to take some special precautions against the Japanese manufacturers, who, it is feared, will become in future more formidable to compete with than the German and Austrian manufacturers. Under the circumstances to make our industrial movement a success, the whole of the British Empire including Colonies and Dependencies should, I may suggest, form an industrial unit manufacturing all the necessary articles within the Empire so that we may not have to depend on other nations for our requirements.

As we are now at war with the leading industrial nations of the world, *viz.*, Germany and Austria, this is the right time to build up a high wall of tariff against all imports. The Japanese must be checked thus by indirect means, or it will be very difficult to get rid of them. I had been three years in Japan, living in private families and mixing intimately with the people there, and what I have been able to gather about them is very unfavourable for

India. As a nation, the people are selfish to the backbone and they are ambitious beyond expectations. I made a special study of their character and have delineated it in three of my Bengali books. I shall be glad to answer any question regarding the aims and aspirations of that wonderful nation, should the Commission like to hear me in *camera*.

Extract from ORAL EVIDENCE, dated 29th November 1916.

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Mr. C. E. Low.—*Q.* You say that you have been in a position to form certain views regarding Japanese policy as affecting India. What matters do you particularly allude to?—*A.* While in Japan in studying their character, I very often asked them how they became such a great nation and what was their aim in the future. They said almost unanimously that they wanted to be a great power in Asia just as England is in the West. They say that they are similarly situated, that their climatic conditions are the same and that their conditions of life were similar to those of the English people; and they further say that they must have the mastery over the Eastern waters. They are sending a lot of people to China. They mix with the people there, naturalise and pass for Chinese and when any sort of bad blood between Japan and China will come to pass, then these people are instructed to help Japan.

Q. Do you think they are doing anything of the same kind in India?—*A.* I have known of some Japanese who have taken maps from India and have toured throughout India passing for students. They are really great scholars and they have copied maps and have collected a number of secrets from the people. The Japanese are very good painters and they can take drawings of a place if they simply pass through the place. From their childhood they are trained in drawing and making of snapshots, and wherever these people go they must have some scrap of paper and pencil in their pockets. Even the girls of 12 and 13 years have the aspiration to advance their country's cause.

Q. Had you any personal conversation with any Japanese who had been in India about their trade policy?—*A.* Whenever I met any Japanese whether male or female with whom I had the advantage of mixing, they always said that they must take India, Burma and so on. Such is the general feeling.

Q. What steps have they taken to qualify them to fulfil this rather high ambition?—*A.* They are showing it now. They have taken Korea. They are now asking for Sumatra and Java. Their policy is now one of expansion.

Q. How are these subsidies given by the Japanese Government, by a grant or so much per article or in what way?—*A.* Whenever a factory loses, the Government makes good the losses.

Q. Is that done by Government or through a guild of the manufacturers?—*A.* By the Government direct.

Q. Do you think the button-makers in Japan get any subsidy from Government?—*A.* I do not know about the particular case, but I know it is the general policy of the Japanese Government. I can only guess that from the nature of their conversations with me, when the war broke out they sent a Commission or a Commercial Mission to enquire into the possibilities of capturing trade in India. There the people and the Government are closely identified. The interest of the people is the same as that of the Government.

Q. Did you hear anything of the Japanese Mission that came to India in 1914-15?—*A.* They came here. I read in the papers.

Q. Can you speak Japanese?—*A.* Yes. I was there for three years. I cannot write Japanese. I can write it in the English character.

Q. Did the Mission come to Jessore to make any enquiries?—*A.* One Japanese came to find out what we were doing.

Q. Why did he come to Jessore in particular?—*A.* To see what sort of things were available there.

Q. Did he come there because he knew you were there?—*A.* Yes.

Q. Was he a member of this Commercial Mission?—*A.* He did not belong to the Commercial Mission, but so far as I could see he seemed to belong to some Commercial staff.

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WITNESS No. 98.

Mr. J. M. Casey

MR. J. M. CASEY, *Planter and Managing Proprietor, Nildongri Sisal Hemp Estate, Sambalpur.*

Extract from WRITTEN EVIDENCE—*Vide* pages 135—139 of Volume II of the Minutes of Evidence.

* * * * * * *

Government assistance.

In my experience, agents whom one has to employ for the sale and general carrying on of one's business, do not lay themselves out to help and foster new industries. They are, as a general rule, not anxious to take up the agencies of such, their commission at the start being small, they don't seem to consider it worth their while to interest themselves and help to work up these enterprises; on the other hand, their commission and other charges take off

considerably from the profits of concerns just starting, and yet agents are indispensable in business, unless Government come forward and help in the matter of finances and the disposal of crops. This, I believe, is what was extensively done in German East Africa for the Sisal industry, hence the great progress made in this industry, as the figures I have quoted will go to show.

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Extract from ORAL EVIDENCE, dated 1st December 1916.

Witness—I marketed my fibre through a firm in Calcutta. They did not seem to know sufficiently about its value, and did not give me any information.

I found difficulty in getting outside help in the matter of financing and starting this Sisal hemp industry. The firms did not know anything about it, and terms were inclined to be hard. I offered my crop as security; of course I only went when I had something to show. I offered my crop for three years. Even with that security they would not give me financial help on what I considered reasonable terms.

In marketing the fibre we would be able to work up to something like jute marks. Agents in Calcutta did not seem to be very willing to take this fibre up; anyway they burnt their fingers before when it was new to them. I do not know what their reasons are generally; they do not seem to take up new industries, and I should say that they have not much push.

Other people are taking up this industry. I heard yesterday that Messrs. Shaw Wallace were taking it up on the Ranchi side.

I have already put in for 1,000 acres of more land. The forest is not very thick. Generally, in these reserve forests they do not allow grazing, so I conclude it is not very valuable. My chief difficulty is that the Forest Department object; they do not like giving up any portion of their land.

I sell this fibre to the Ganges Rope Works.

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WITNESS No. 99.

Mr. Chas. Olden. MR. CHAS. OLDEN, *Superintendent, the Cape Copper Co., Ltd., Rakha Hills Mines, District Singhbhum, Chota Nagpur.*

WRITTEN EVIDENCE.

Reference libraries. Q. 79.—A scientific and technical library might be opened at a central establishment.

Railway freights. Q. 98.—No preferential rates granted by the Bengal-Nagpur Railway to the Cape Copper Co., Ltd., on the machinery and plant imported for treating copper ores.

Recommendation.—(*a*) Preferential rates should be given to mining companies or firms engaged in opening up new mines or mineral industries, such as copper mines, copper mills, furnaces and refineries.

(*b*) All plant and machinery intended for the above should be admitted duty-free at port of arrival.

The Cape Copper Co., Ltd., has expended upon the purchase and importation of new plant and machinery, the following sums, irrespective of erection charges, bricks, cement, lime, etc., and the equipment is not nearly completed as yet:—

		Rs.	A.	P.
1914-16	1. Cost of new machinery and plant	7,79,310	13	0
	2. Duty paid on the above	13,844	0	9
	3. Railway freight	19,605	10	0
		8,12,760	7	9

Railway extension. (*c*) Stores and supplies directly connected with such plant and machinery should be admitted duty-free for say, 10 years.

Q. 99.—Government might accord facilities for the extension of the Bengal-Nagpur Railway line by a branch from—

(*a*) Saspur Siding to the site of our Copper Concentrating Works and Smelter, a distance of about 1 mile to 1¼ mile.

Prior to the war, negotiations were in hand with this object in view.

ESTIMATE.

	Rs.	A.	P.	Rs.	A.	P.
Cape Copper Co., Ltd.	19,827	0	0			
Bengal-Nagpur Railway	37,086	0	0			
				56,913	0	0
Or if loading and unloading platforms are added, the proportion payable by the Cape Copper Co., Ltd., to be increased by				11,425	0	0
				68,338	0	0

(*b*) Railway station facilities urgently needed at Saspur, 3½ miles from Galudih. All the before-mentioned plant and machinery, and all current supplies are taken to Galudih, Bengal-Nagpur Railway, and shunted to Saspur, thereby causing unnecessary delays, and retardation of constructional and current work.

(*c*) Station accommodation should be provided at Saspur also, in view of the important fact that Galudih station depends for almost all its business upon the Cape Copper Company's freight and passenger traffic.

The mails also stop there to take water, but this could be arranged with equal facility at Saspur, thereby adding greatly to the convenience of the staff, Government official-visitors, commercial representatives, etc.

A small, but totally inadequate siding was provided some five years ago at Saspur, of which the Cape Copper Company, paid its proportion of cost.

(*d*) Government assistance might reasonably be extended to this company to effect the objects referred to, in consideration of the importance of the copper industry in India.

Shipping freights. Q. 101.—So far as this company is concerned, our shipments of copper ore ceased shortly after the war commenced owing to high rates of freight between India and our South Wales Smelting Works.

Prior to the war, the rates quoted for the shipment of copper ores were excessive.

Government might assist by regulating freights, or by giving preferential shipping rates to European markets to companies opening up new mining industries.

There appears to be a tendency on the part of ship owners to put up prices unnecessarily and this will have the direct effect of retarding the development of mining and other industries in India.

Mining and prospecting rules. Q. 103.—Prospecting rules appear to be inadequate, inasmuch as holders of prospecting licenses may "sit upon" their prospecting areas, at least in this district, indefinitely, there being no adequate regulations to compel prospectors to work upon the area granted to them.

ORAL EVIDENCE, 1st December 1914.

Mr. C. E. Low.—Q. In answer to question 99 you say "Prior to the war negotiations were in hand with this object in view, but both sides hesitate to bear their respective costs." What is the reason for that. Do you know that there is always a regular arrangement in respect of the cost of sidings?—*A.* My point is that more active assistance should be rendered to mining companies for the opening up of the industries, and that the Government should apply some sort of pressure to see that existing obstacles are removed. It will help greatly to the convenience of the industries themselves.

Q. Do you think that pioneer companies deserve special terms?—*A.* I do not say that. My point is that the railway company ought to take a reasonable view of the matter and help industries. In our case there is an industry which would be helped if we had sidings.

Q. In answer to question 103 you say that the prospecting rules are inadequate in respect of compelling prospectors to work. Are you aware of the Government regulations for the grant of prospecting licenses which compel a man to do the work?—*A.* I think that these rules should be enforced. I know that in the Commonwealth a man who took 24 acres for instance had to keep one miner for 3 acres of land held.

Q. Is assessment work not a byword among miners?—*A.* Not in the Commonwealth of Australia. I am speaking here of the prospecting rules being inadequate. I know several instances in which prospecting licenses have been granted by the High Court in Calcutta to persons who had not the least intention of working. Such a state of thing tends to retard the development of mining in the district.

Q. Under the Government of India Rules, with which all Local Governments are bound to comply, the license is given in the first instance for one year. Do you consider that too long a period?—*A.* I do not think so. But I think that work must be begun within 6 months from the date of the license. There is the condition in Australia that within six months so many men must be put on and kept at work; the number so required averaged one miner per each 3 acres of area granted. In the district of which I am speaking there is not such a condition at all. There is no obligation to work.

Q. The term is of course for one year, and it can be renewed if the collector of the district is satisfied that a renewal is necessary to enable the licensee to make exploration?—*A.* I do not know whether it applies in all parts of India. It does not apply in Dhalbhoom.

Q. It does apply to all local Governments, and their officers are supposed to act in accordance with the rules.—*A.* It does not obtain in the district I am speaking of. There the prospecting licenses are given by the High Court.

Q. That is another matter. You are now speaking of zemindaries where the owners have the mineral rights, and where Government have nothing to do with the mineral rights.

In the case you speak of, the lands are under the Official Receiver and they are administered by the Court. For instance, the High Court could give licenses or leases on any terms it liked, and there is no reason why they should not follow the Government rules on the subject.—*A.* There are no definite rules. This makes for retardation of the progress of the district. In the case of the district I refer to, the matter is in the hands of the Official Receiver who administers the mineral part of the district. The Deputy Commissioner administers the surface areas. There are no rules or regulations.

Q. That is a very special case you are concerned with. It is an estate under receivership. Is it your experience that mining people suffer from a multiplicity of Government Inspectors?—*A.* We do.

Q. Is it not the case that under the Indian Mines Act the operation of the Indian factory law is specially excluded?—*A.* I was not aware of that.

Q. Do you consider that the regulations under the Indian Mines Act are sufficient to govern the mining industry?—*A.* I had an amusing instance. The Chief Inspector of Mines had been to our Mines, and had made a suggestion in regard to a matter of importance in connection with his official visit. I called a clerk and dictated a letter to the Under-ground manager saying that I was instructed by the Chief Inspector to say so and so. The Chief Inspector reminded me that he had no authority to order anything as there are no regulations governing copper mining in India.

Q. I think you are alluding to the fact that there are certain special rules with respect to mica and also with respect to coal mines. But there are none for copper.—*A.* I spent some days with Dr. Simpson when he was Acting Chief Inspector of Mines in trying to formulate a series of rules and regulations governing copper mines. There may be some regulations, but they are very vague as applying to copper. The Chief Inspector of Mines comes to our district and claims jurisdiction over the mine, which is very proper, and also over the machinery, light railways, etc. On the other hand, we have the Inspector of Electricity under the Indian Electricity Act, as also the Factory Inspector and others. It is obviously impossible to follow the instructions of each one of several Inspectors all claiming jurisdiction over the same plant and machinery. The Inspector of Mines is a very much better man for dealing with these matters than the Factory Inspector.

Hon'ble Pandit M. M. Malaviya.—*Q.* Is your capital wholly European, or partly Indian and partly European?—*A.* All European.

Q. What was the quantity of copper that you turned out last year?—*A.* None at all. We have sent home some parcels of ore for experimental purposes.

Q. You say that shortly after the war commenced copper ore ceased to be shipped owing to the high rates of freight?—*A.* The last shipment consisted of very high grade ore which was for experimental purposes only, to decide which was the correct method of treatment. Freight went up from 30*s.* to £5.

Q. You shipped it only for purposes of experiment?—*A.* Yes.

Sir F. H. Stewart.—*Q.* With regard to the prospecting rules, I understand that your point is that Tom, Dick and Harry apply for licenses with an idea of keeping other people out?—*A.* Rather to make people buy out their interest.

Q. Do you think that Government should take care before issuing the license to see that the applicants are financially able to carry out the prospecting?—*A,* That would be the most suitable thing to do. Government should insist on the people showing that they have the ability and the financial strength to carry out the prospecting rules. Prospecting licenses should not be granted to persons otherwise.

Q. This has been your experience of what is done in Australia?—*A.* Yes.

Q. With regard to mining would you take away the control from private individuals, and vest it in the State?—*A.* I have always been in favour of the minerals being under State control. It obviates a great deal of unnecessary restriction on the one hand and great waste on the other.

Q. About mining rules for copper you think that special rules ought to be provided?—*A.* No. I do not say that. All metal mines might come under the same rules.

Q. And you would leave the administration of these rules in the hands of the Inspector of Mines?—*A.* Yes.

Q. With reference to your remark that frieght has gone up from 30 shillings to £5 there are also other articles the freight on which has gone even more?—*A.* I do not wish to imply anything extraordinary in the way of shipping ores.

Q. In normal times the freight would have a marked effect?—*A.* I think it would. The proper rate would be somewhere about 30 shillings a ton. That would give copper mines a change.

Q. What do you ship?—*A.* The best selected ore.

Q. Do you case it?—*A.* We sort it out and send it in bulk. We do not pack it. Copper ore as compared with iron ore or manganese is very much more valuable. Here we are labouring under a very serious disadvantage. Shippers in Calcutta do not know what to charge for wharfage on copper ore. Copper is not in the lists at all. For finding the charge

they turn over the rules, and when they do not find anything, they simply say we charge you so many times the rate as compared with any other mineral upon the schedules.

Q Do you get on very well with the Bengal-Nagpur Railway?—*A.* We are very good friends. In my opinion preferential rates should be given on the transportation of mining machinery.

Q. Duty free?—*A.* Yes. That is with a view to foster the industries until they begin to produce.

Sir D. J. Tata.—*Q.* With respect to the prospecting rules, I take it that you mean that a prospecting license should not be given to anybody except a *bonâ fide* manufacturer?—*A.* I think he should be compelled to state why he wants a license, At present it is very common for one man to take a license and later on transfer it to others. That defeats the end we have in view.

Q. You mean to say that nobody should be allowed to apply for a license with a view to holding up the raw material against another individual who is working it or selling his rights to him at a considerable profit?—*A.* That is my point.

Q. You say that Government might assist by regulating freights or by giving preferential shipping rates to European markets. How exactly should Government interfere?—*A.* They might legislate to prevent freight from going up beyond a certain stage. The point may be worth consideration.

Q. I think that the matter would adjust itself in normal times?—*A.* Quite so.

Mr. A. Chatterton.—*Q.* What ores of copper are you dealing with?—*A.* Chalcopyrite.

Q. Is there enough sulphur to make it worth while to establish a sulphuric acid plant?—*A.* That is a point which we are very seriously considering. My opinion is that we shall get from 3 to 3½ per cent of SO_2 in our furnace gases, and that will not be good enough. It must be at least 5 per cent.

Q. When will you be able to ascertain that?—*A.* By the end of December.

Q. Is it a fact that you have about 375,000 tons of ore in sight?—*A.* That was reported at the end of last year.

Q. Are there prospects of millions of tons in these fields?—*A.* We have not yet gone below 1,130 feet, and have no knowledge of the probable total tonnage in the district of Singhbhum. It is not possible to say how deep we can go. The supplies of ore depend upon the depth, to which it will pay to carry the workings.

Q. Do you contemplate making fine copper?—*A.* All grades of copper.

Q. Do you use electrical processes?—*A.* At present we have an electrical refinery in South Wales. I do not think we shall put up an electrical refinery here at present. We intend to produce all grades of copper up to "Best Selected".

Additional Written Evidence.

(*Submitted after oral examination.*)

The Government of India might assist the Cape Copper Co., Ltd., by requisitioning the Imperial Government for the transference to our Mines of men skilled in copper concentration and copper smelting work.

My directors have been unable hitherto to secure competent men to send out to us, consequently the Company's Mills are not able to work efficiently, and the smelter not at all, until such men can be engaged. All skilled men for the work mentioned have been retained by the Imperial Government for munitions and other Government works, and the copper industry in India, of which we are the pioneers, is suffering from inability to produce metallic copper until smelter men can be secured.

The Government of India may assist us in a matter which may appear to be trivial, but which causes some departmental friction, together with retardation of operations, *viz.*:—

The overlapping of departmental inspections in regard to our Mines and works. For instance, we are subject to inspections by—

(1) The Department of Mines for India,
(2) The Inspectors under the Indian Electricity Act,
(3) The Inspectors of Factories, and
(4) Others.

While not desiring to repudiate our responsibility in connection with any of these departments, it is obviously impossible to carry out the recommendations and instructions of each of the Inspectors concerned whose recommendations may be diametrically opposed to each other.

Coal.—In view of the embargo placed on the 6th December 1916 by the Government of India upon our supplies of first-class coal for power purposes, is the Committee able to

interest itself in getting the embargo removed so far as the Cape Copper Co., Ltd., is concerned? It will have a most disastrous result if our supplies of coal are withheld, and our Mines flooded, as such an eventuality would absolutely close down this establishment, and would render us inoperative, and unable to assist either the Indian Government or the Imperial Government in their demands for metallic copper.

WITNESS No. 100.

Mr. W. L. Carey and Mr. J. Thomson. THE TITAGHUR PAPER MILLS CO., LTD., *represented by* MR. W. L. CAREY AND MR. J. THOMSON.

WRITTEN EVIDENCE.

Paper industry. For the convenience of the Members of the Indian Industrial Commission we summarise the notes already given by us to Sir Thomas Holland and the Commerce and Industry Department.

The modern Indian paper industry may be said to have existed for the past 40 years. The pioneers were the Bally Paper Mills Co., followed by the Titaghur Paper Mills Co., The Upper India Couper Paper Mills Co., The Bengal Paper Mills Co., The Rea Paper Mills, Poona, and The Imperial Paper Mills Co. Of these the Bally and the Imperial Mills have been acquired by the Titaghur Mills.

In the earlier period the mills were prosperous and paid good dividends, but since 1894 the record has been one of steady declension of prosperity, until prior to the war the condition of the industry was giving grave concern to those responsible for carrying it on. At the time of starting the Imperial Paper Mills in 1894 there was a certain amount of overproduction, but this condition has passed away, and the annual consumption of paper in India far exceeds the capacity of the existing mills to supply. That the natural expansion of the industry which might have been expected did not take place is attributable to the severity of foreign competition and the conditions of it. Germany, Austria, Norway and Sweden all used India as a "dumping" ground. This was made possible by the systems of State aid in the form of railway and steamer rebates, or cash subsidies given by these countries to their manufacturers and exporters, and there is little doubt that after the war similar conditions will again prevail with the added competition of subsidised imports of Japanese paper, unless some steps are taken to meet the position. If this is not done, it can only be a matter of a few years thereafter before the industry dies out entirely. Fair competition the industry can meet, with sufficient success at least to allow of the present output of Indian mills realising a living margin of profit. This will enable them to continue on their present lines of developing Indian sources of supply and reduced costs of manufacture, and in this manner the consumer will be no worse off, or at least not appreciably so, and this valuable industry and its allied industries will be saved and given a chance to develop on fresh lines.

The allied industries spoken of include grass and fibre-growing—collection, handling, and pulping;

China clay works;

Rosin producing;

Dyes, colours, ochres, etc.;

Lime works;

Coal;

Rag and old gunny collection and handling;

Chemical works.

All of these benefit enormously by the paper industry and some of them entirely depend upon it, and all, if paper-making can be protected from unfair methods of competition and put in a healthy condition, will largely develop to the great advantage of the country.

Already these incipient collateral industries provide for a large amount of labour, which will greatly increase as they open out. (Figures in support will be found in our first three notes previously handed in.)

That the paper-making industry is a valuable one, given a fair chance, is certain and we are sure the Government would view with concern its demise.

Considerable assistance to the paper-making industry could be given by:—

(*a*) A system of railway rebates from the mills to up-country markets on finished paper, and from districts to the mills on fibres and raw materials of all sorts. It should be made impossible for importers of paper to share in rebates on manufactured paper. This can be done by giving special rates from the mills stations, while despatches from Calcutta, Bombay and Karachi stations are fixed on a higher scale. Or, better still, mills may be charged the usual rates at first and an annual rebate given based on the number of ton miles of coal, materials, and finished paper which the mills give to the railway.

(*b*) By freeing as far as possible chemicals and machine stores from import duties (Felts, wires, beater bars, etc.)

(*c*) That Government should agree to take from the Indian mills at reasonable rates all such grades of paper as the mills are in a position to produce satisfactorily. Owing to the war a number of high priced qualities formerly imported have had to be substituted by Indian made paper. The inference is that more Indian made paper would be good enough for Government use always. Prior to the war there was a movement to obtain a considerable quantity of paper formerly made in India from Europe to save money. This could only have been done by taking Scandinavian or German made paper, and we maintain that this is economically wrong. These tendencies should be permanently put a stop to.

(*d*) By a protective duty: We know this does not come within the scope of this enquiry, but we are convinced that without a reasonable amount of protection there is little chance of success for Indian industries which come into competition with powerful subsidised foreign competition.

(*e*) By Government granting concessions on easy terms for the development of grass and fibre areas at present unexploited, and by charging minimum royalties on fibres now in use.

(*f*) A much expedited method of Government payments should be devised whereby mills obtain prompt settlement of their bills. Importations from the United Kingdom on Government account are paid against bills of lading, so that home suppliers obtain practically cash payment. In Calcutta and Madras receipted challans are demanded, and as the mills despatch about half the requirements on account of the Controller direct to officers, the present system in effect works out to from three to six months credit. If payment could be made against railway receipts, it would result in an advantage to the paper industry of from half to three quarters of a lakh of rupees per annum saving in interest. Any disputes as to quality could be adjusted in the ordinary course of business.

The Indian mills having been persistently undersold by foreign competitors in the markets, the Indian paper-making industry would have ceased to exist long ago if it had been deprived of the support given to it by Government. We here acknowledge our indebtedness to the Controller of Stationery, India, and the Superintendent of Stationery, Madras, for the steady continuance of contracts placed by them. If we might venture a criticism it is that more liberality might be shown in the matter of price. The Indian mills are strictly held to rates equal to or below those at which equivalent qualities of home manufacture can be got.

ORAL EVIDENCE, 4th December 1916.

President.—*Q.* You have brought with you your Technical Experts?—*A.* Yes, Messrs. Bryce and Warburton.

Q. The principal thing we want, in addition to the information sent in in the note and what we saw at Titaghur, is some idea as to the kind of technical training that is required for the paper industry generally. That will enable us to advise Government as to what may be required in the way of technical and scientific advice in India. We cannot advise Government to back an industry, or even to neglect an industry without having some officials who can be relied on to advise Government on the purely technical side, and if those who have come here will tell us of the kind of training that is given and is necessary for the paper industry, we shall be very glad to hear. Is it necessary to have any special chemical training?—*A.* Yes.

Q. What kind of apprenticeship do you go through at home?—*A.* We generally serve in the laboratory department for a certain number of years.

Q. Do you begin in the laboratory?—*A.* Yes, generally.

Q. At analytical work?—*A.* Yes.

Q. Then pass on to the works themselves?—*A.* Yes, for a practical knowledge of the working of the mill.

Q. Do you specialise in chemistry as independent from the management?—*A.* No, we just specialise in paper manufacturing.

Q. That means that a chemist might also be available to be works manager?—*A.* Yes.

Q. He is what you would call a Chemical Engineer?—*A.* Yes.

Dr. E. Hopkinson.—*Q.* I think you say in your evidence that the Indian Paper Mills have been going through a bad time during the last few years. Do you attribute it to competition from Germany, Austria, Norway and Sweden?—*A.* Yes.

Q. Is it not a fact that the English trade has been going through an equally bad time?—*A.* Yes.

Q. And is it not really due to the introduction of wood pulp for paper-making?—*A.* That may be so at home.

Q. The reason I am asking is that you suggest certain things which the Government of India might do to assist the paper business; but what I want to point out is that the paper industry generally has been depressed for some years. I take it that you agree that it is due to the introduction of wood pulp?—*A.* Well, to some extent. Of course wood pulp had to come, due to scarcity of esparto grass. This had a great deal to do with the introduction by Scandinavia of wood pulp into Britain; also the scarcity of rags and other raw materials. You mean that makers using wood pulp were able to compete more satisfactorily with other paper makers?

Q. Quite so; it is not a question of "dumping," but of their being able to produce cheaper than either the United Kingdom or India?—*A.* That is true, but we had the added disability of being a "dumping" ground also.

Q. Then you go on to suggest certain remedies which I take it would be very partial remedies.

President.—*Q.* Shall we find out what the financial effect of dumping would be? What is against dumping? For instance, there is the freight on paper pulp at home, and a small amount of import duty before the war. I should like to know what effect the tariffs have. How would that add to the price of wood pulp when delivered here?

Dr. E. Hopkinson.—*Q.* It would clear the ground if you could approximately divide the cost of, say, a ton of paper between the original material, grass or pulp, whatever it may be, the cost of labour and the cost of chemicals; then freight?—*A.* You mean of imported papers.

Q. No, your own paper?—*A.* We have it here, worked out in percentages:—

Chemicals imported	16·05 per cent.
Country chemicals	2·70 „ „
Imported raw materials	22·42 „ „
Country raw materials	14·15 „ „
Railway freight on country materials	3·27 „ „
Cost of coal	5·88 „ „
Railway freight on coal	3·81 „ „
Import duties	·91 „ „
Mill staff (including all labour in the Mills)	11·97 „ „
Various other charges	18·84 „ „

President.—Q. The "other charges" constitute a big item—18·84 per cent?—*A.* This includes Calcutta offices, fire insurance, income-tax, dispensary, brokers, interest, dustoorie. Interest is a very heavy charge, that is what you might call selling and finance charges.

Q. So that import duty is a small item relatively?—*A.* Yes.

Q. Is that war time duty or pre-war?—*A.* All pre-war charges; we are not dealing with the war at all; it would be twice as much again.

Dr. E. Hopkinson.—*Q.* I suppose you cannot give a comparison of this with any English mill?—*A.* We have been discussing that. It is very difficult to know what other people are doing, especially Continental Mills. I should not care to give an opinion as to what home mills' charges are, because we have nothing definite to go on.

Q. Take the cost of power as 10 per cent is that a reasonable charge compared to English mills, or would you consider you are handicapped by such a charge?—*A.* So many paper mills, especially Continental Mills, are run electrically.

President.—*Q.* Your coal is comparatively cheap?—*A.* Yes, but one uses much of it. May I point out that the coal is used partially for digesting raw materials.

Dr. E. Hopkinson.—*Q.* The coal so used would be a considerable amount?—*A.* Yes.

Q. It is true then that the Swedish and Austrian mills have gone ahead on account of using wood pulp, and having water power. That naturally leads to the question—whether you have ever considered or worked out the question of the possibility of wood pulp in India.—*A.* We have gone into it very fully indeed, with the help of Government.

Q. Can you tell us generally what were the results of your investigations?—*A.* Speaking generally, they are almost entirely against the possibility of wood pulp in this country.

Q. And why?—*A.* The last pronouncement I saw in the papers was from the Ceylon Government. They said there was a quantity of trees in this country which would be suitable, but that they were too scattered.

President.—*Q.* That does not apply to bamboos?—*A.* No.

Q. Would it necessarily apply to the proposition of using some Himalayan wood?—*A.* We have got the best advice on that subject, and I think I am quite correct in saying that it is not recommended as feasible, at least not under present conditions.

Q. You could not compete with grass?—*A.* No, we do not think so. I think my evidence would be better supplemented by Mr. Thomson.

(*Mr. Thomson.*)—By wood pulp you are mostly referring to spruce woods in the Himalayas?

Q. I do not know sufficient of the subject, but spruce woods are used because they are easily obtained, but I don't know whether it is the only one or the most suitable one.—*A.* I think you may take it as correct that none of the soft woods found on the plains of India are of any use at all. There is a large quantity of trees in the Himalayas, *e.g.*, pine wood, which ought to be suitable for wood pulp. The great objection is the difficulty and cost of getting them out. Another thing is that instead of being wood throughout, they are often hollow in the centre.

President.—*Q.* We are going into the cost of extraction and hope that something will be done in regard to the question of reducing cost of extraction all round by strengthening the Forest Department.

Dr. E. Hopkinson.—*Q.* Do you refer to extraction from the forest—not floating down the river?—*A.* Most of these trees would not float. You would have to tar the ends of them. They would get water-logged or sink.

President.—*Q.* Does not deodar get water-logged?—*A.* Something like that; even if you tar the ends they would be jammed against the rocks.

Q. Mr. Pearson knows that too, but the information is not much good without turning it into account, so we have before us his recommendation that the Forest Department should be strengthened by the appointment of Engineers. That is the question we are considering, and we hope that Government will make it possible for wood to be extracted from the Forests either more cheaply, or declare it cannot be done.—*A.* If they can get it, of course it would be a wonderful thing for us. I am speaking from a selfish point of view at the moment.

Dr. E. Hopkinson.—*Q.* Do the Japanese import wood pulp now?—*A.* Yes, our last information from the Department of Commerce and Industry here was that they are importing a large quantity. That is also in the Trade Reports, and I understand that they are building mills in Saghalien and elsewhere.

Q. Where do they import from?—*A.* From Scandinavia, but what proportion of their requirements I could not tell you. We have no definite information yet. There have been prospectuses issued by Mills in Saghalien. Mr. Lindsay has given us that information. We are always in touch with him.

Q. Have you felt the competition of Canadian wood pulp?—*A.* Not yet. That is one of the problems we shall probably have to face after the war. The whole wood pulp question will be altered, I think.

Q. To come back to the power question, you are entirely electrically equipped, as we saw the other day. Have you worked out what the cost is of the electrical power you are using?—*A.* We worked it out at 3·8 pies per unit.

Q. There is not much to find fault with there?—*A.* No.

Q. And your water supply is abundant and satisfactory?—*A.* We have the Hooghly of course, but it is costly.

Q. Is the cost of filtration a high item?—*A.* Yes, pretty high.

Q. You suggest that the Government should purchase at reasonable rates such grades of paper as you are able to produce satisfactorily. Do you suggest that Government ought to pay more than the market rate, in supporting indigenous industries?—*A.* Our position is that where quotations from Indian mills are not appreciably higher, they should be accepted by Government, and that we should not be compelled to reduce our rates below the prices at which thay can supply from England, in order that the Controller may be able to say to Government that he is buying cheaper.

President.—*Q.* That is fairly close to the spirit of the Government rules, that where the quality is good enough and the price approximately satisfactory, the preference should be given to the stuff made in India.

Dr. E. Hopkinson.—*Q.* You don't go further than that?—*A.* That is really what we are claiming, *viz.* that we should be supported as far as possible.

Q. I think you say that the Controller of Stationery has played up to the indigenous industries very satisfactorily?—*A.* Except in one or two cases. They insist upon getting rates forcibly down. We do not insist that there should be a large percentage of orders, but that the percentage should be reasonable, and that we should not be asked to cut our rates down to English prices.

Sir D. J. Tata.—*Q.* You don't mind your rates being equal to English rates?—*A.* No, we don't object; we object to being paid lower, and want to be sure that we are subject to fair business conditions in competition with English quotations. The Controller calls for English quotations, and we have to accept his word for it that it is all right. Take the case of Madras calling for tenders. The Indian mills' quotations for Madras are nearly three months in hand before the English quotations come out; and we do not consider that it is at all fair to quote in pre-war days in October and have the contract accepted only in April, in order that they may get quotations from home. We contend that in a case like that, all quotations should be simultaneous, and that quotations that are not in, should be ruled out.

President.—*Q.* From the point of view of India, I would say, "Here are my quotations, can you do better or as well?" I would use the people at home as a catspaw, not Titaghur.

Dr. E. Hopkinson.—*Q.* Are the conditions of tenders exactly the same; are all charges included?—*A.* I am afraid we cannot tell you that.

Q. No instances have come to your knowledge where the conditions of the tenders have not been exactly the same?—*A.* No, everything goes through the India Office, and we have no knowledge of it at all.

President.—*Q.* Are you correct in saying that you get your tenders in first and then tenders are called for from home afterwards?—*A.* They are written for at the same time, but we know the time that they come into Madras. I am speaking of Madras principally here. I may say something more. We suggest that when our rates were a little bit higher that we were giving Government good value in return, and the fact that we have to give long credit, keep stocks for them, and are closer at hand, so that they are able to get supplies at a moment's notice, ought to count in our favour.

Q. You have to hold stocks; is that a condition of the tender?—*A.* Not actually, but in practice we do. If we did not hold stocks, Government would have to do so.

Q. Coming to the question of chemicals, which amount to nearly 20 per cent of the cost, have you sufferred from actual shortage of any particular chemical?—*A.* You mean now, due to the war?

Q. Before the war, first of all?—*A.* Not to my personal knowledge; practically not.

Q. Of course during the war you have suffered a good deal?—*A.* We have very often been from hand to mouth.

Q. Do you consider that you, as paper manufacturers, are placed at a disadvantage, because many of the chemicals on which you rely are not manufactured in the country?—*A.* Oh, greatly.

Q. So that an indigenous supply of, say, caustic soda and bleaching powder, and sulphuric acid would be of great advantage?—*A.* It would be of considerable assistance to the industry in the case of caustic soda and chlorine and dyes. Rosin of course is entirely bought in the country now, and we use a fair amount.

Q. I suppose caustic soda is important?—*A.* Yes, quite as important.

Q. How does the rosin you get now compare with the imported rosin, making allowance for quality?—*A.* Taking pre-war prices up to last year, it was favourable. This year Government put up the price against us, and as against pre-war prices it is unfavourable, but compared to what we could buy from outside it is very favourable. Government have raised the price of rosin nearly 30 per cent.

Q. Do you think that that is more than what they would be justified by the increased cost of manufacture?—*A.* They are making a war profit.

Dr. E. Hopkinson.—*Q.* With regard to your scientific staff, are they entirely British?—*A.* Entirely British.

Q. Have you made any attempt to find qualified Indians to undertake part of that work? *A.* I am afraid not.

Q. You doubted whether you would be successful if you did?—*A.* We are not qualified to say, as we have not tried.

Q. Obviously, your men have mostly had experience in paper mills?—*A.* All of them. One of the disabilities of the paper trade here is that you must have home-trained men as foremen.

President.—*Q.* How many Europeans have you in the mills?—*A.* About 25.

Q. You never see any opportunity of replacing them by Indians?—*A.* We have as a matter of fact three Eurasians, but they are more or less looking after despatching of manufactured articles and the receiving of raw materials. They cannot get trained out here to make them, for instance, beater men.

Q. I suppose if you came across Indians who would work up to standard, you would be very glad to have them?—*A.* Certainly. The difficulty is to get educated men with the desire to learn the trade. When they have education, they prefer to get into the office.

Q. Is the work pretty strenuous?—*A.* Yes, conditions are hard, temperature is high, and the work is constant.

Q. What about your chemical laboratories; have you been able to make use of Indians there?—*A.* Not so far. Of course everything except the actual supervision work is done by Indians. It is only the actual supervising staff who are Europeans? I mean in the mill itself.

Q. I mean you have not got anybody who would correspond to a foreman at home among your Indian staff?—*A.* No, the supervision is entirely European.

Hon'ble Sir R. N. Mookerjee.—*Q.* Have you ever looked for them; have you ever tried them?—*A. President.*—I don't quite know how you would look for the right man; you would find him by coming across him accidentally.

Hon'ble Sir R. N. Mookerjee.—*Q.* If they advertised in the papers or applied to any institute? In regard to chemistry, they are quite capable of taking charge. There is a man now in Pusa; and there are others in the Sibpur Engineering College.

President.—*Q.* For chemistry you should be able to get an Indian?—*A.* It is a specialised training for the paper maker: that is the only difficulty. There is no reason of course, why we should not be able to get men.

Sir D. J. Tata.—*Q.* Have you tried to train any of your workmen to hold jobs of a superior nature?—*A.* Yes, we do, but they seem to get into a certain stage of knowledge of the trade and go back. Some of them make fairly good machine men, but in regard to beating and milling, it is difficult to get them to take an interest in it.

Q. Will you be surprised to learn that under conditions equally arduous, with greater temperatures to work in, Indians have already been found in a very short time to replace skilled labour from America, and Sir Thomas can vouch for one or two instances where common Indian workmen on 6 annas a day are now doing the work of assistant melters in steel works, doing the work that white men on Rs. 350 used to do, with equal satisfaction. There are two men who are earning Rs. 5 to 6 a day, who came on originally at 8 annas a day, who have been trained as melters and trained to do the work of men on Rs. 450, giving complete satisfaction, and are handling red hot steel bars and things, and the quantity and quality of the output has increased, simply because we have laid ourselves out to train Indian workmen with the distinct view of supplanting all skilled labour as far as possible, except in the very highest posts where great skill and technical knowledge is required. An attempt to make even common coolies, who could not read nor write, into skilled workmen has been found successful.—*A.* That is a very pleasant hearing. Of course the fact that that was a new industry in India may have necessitated bringing in more labour. With us in paper-making it is not a new industry. In our case we require more home-skilled labour. We have in our place one or two natives who are smart and intelligent, and would make fairly good machine men, but for milling it is impossible. Actual technical work can only be done by a man who is brought up to it as a boy. As a matter of fact, we find at home in the mills that there are quite a number of men who at the end of five years are not competent as beater men.

President.—*Q.* This is not in any way a political question, but a matter of business. The Tatas are doing it in their own interests; and if it is not a success they are going to come to grief.

Hon'ble Sir R. N. Mookerjee.—*Q.* No manufacturing firm could live on political considerations.—*A.* That is true, but you would have to begin pretty young. There is no reason at all why it should not be done.

President.—*Q.* From my experience while going round India I must say it is extraordinary the way you can train Indians to take responsible posts, if you train them yourself. I don't mean the man who is sent home to be trained.—*A.* Taking the mechanical staff we find we can get very intelligent mechanics, but it is a different matter in the mill; whether they have no desire or not, I am not prepared to say.

Hon'ble Sir R. N. Mookerjee.—*Q.* I suppose you are not prepared to take Indian apprentices in any of your departments?—*A.* Are they prepared to come to us on the lines that the apprentices do in the mills at home?

Q. Yes, bind them as they do in the English mills.—*A.* A great deal will depend on the individual himself.

Q. That can only be done with the view of economising your own industries.

Dr. E. Hopkinson.—*Q.* Your firm, as you are no doubt aware, have the reputation of being pioneers in paper-making in India. I want to ask you whether, in the course of your experience during the last 10 or 12 years, you have found that you have got every possible assistance from the Forest Department?—*A.* Oh yes, everything we asked for we have always got.

Q. You have got it promptly and fully?—*A.* Yes, within their capacity. They have always given us everything they had.

Q. You are unconscious of delay in regard to any information that you may have wanted quickly?—*A.* Yes, there has been delay. An enlarged staff would be an advantage.

President.—*Q.* You have felt that in spite of their being willing, they have sometimes been unable to give you the full information that you have wanted?—*A.* I think they have been overworked.

Dr. E. Hopkinson.—*Q.* You told us that you had spent a large amount on your own scientific staff. To go back a period of time, I daresay it would have been an advantage to you to call upon the services of the Government chemist for any particular chemical problem that presented itself?—*A.* Personally I do not think so.

President.—*Q.* What about the waste from your grass; has no research work been done in connection with that?—*A.* Yes, our chemist is at work at the present time on it. I have not as yet got any results that I can go on.

Q. I suppose it would have been for your good if the Government chemist had been at work on the same kind of problem?—*A.* Yes.

Dr. E. Hopkinson.—*Q.* I will put the question in another way. Supposing there was a Government department that would take up chemical problems, would you be willing to submit such problems to such a department, knowing that the result would be national property, and that you would to some extent suffer or only share in the benefits?—*A.* I don't think I would have any hesitation in going to them.

President.—*Q.* Your chemist, I presume, is fully occupied with routine duties and cannot devote the whole of his time to research work?—*A.* Not the whole of his time.

Dr. E. Hopkinson.—*Q.* You have devoted a great deal of your time and money to research bearing upon paper manufacture; do you regret that expenditure, or do you consider the money well spent?—*A.* We have collected a great deal of valuable information, or which may some day be valuable, and one cannot regret it ever.

President.—*Q.* The item on which you may save materially is chemicals. Supposing chemicals were made cheaply in the country, and your waste products were turned to account, and you reduced your charges for foreign raw materials, there would be a very material saving. Those are the large items. Would it not be better to concentrate your attack on Government, or on us, with regard to these things than to raise the question of import duty, which only amounts to ·91 per cent of your cost. If you raise this question of import duty, it will be raised in another way also by the chemical manufacturers in this country; they would be justified in protesting if we removed the import duty on your chemicals. If you could in any way encourage the manufacture of chemicals in this country, you would save a part of the items which now amount to 16·05 per cent instead of ·91 per cent of your costs.—*A.* That of course is only proposed as a temporary measure, until chemicals are made in the country. We are prepared to take it out. What about the freeing of paper making. stores, such as felts, wires, beater bars, etc., which have to be imported. They cannot and never will be made here, and have got to be imported?

Q. I leave that to you. We are not authorized to discuss these things, except so far as we have gone in calling your attention to the fact that it may not be advantageous to you to get a privilege of this kind. What I would concentrate on is getting chemicals made in the country, not only for you but for other people, getting your raw materials more cheaply and trying to do something in the way of utilising your waste products, which you throw away after you have paid freight on the materials.—*A.* May I suggest that it is a 60 per cent loss altogether; for instance in our liquor, after we boil the raw material we require a certain amount of vegetable matter to be left in the liquid. If we don't, we must burn more coal. The question of what we can get for our bye-products is a matter that we have not had an opportunity of going into. Private research has been very handicapped in this particular industry by a lack of funds. All the mills have done so badly.

Mr. C. E. Low.—*Q.* Have you any data regarding mills outside India, as to the quantity of grass they have to waste?—*A.* I think about the same.

Q. You say to reduce waste to a minimum requires research. Is that a kind of research which Government would have to take up, and would it have to be on a very large commercial scale?—*A.* It is a purely technical matter, the question of that particular kind of research.

Q. Do you think that is a promising line, on which help can be given either here or in England?—*A.* Yes, I think it would be; anything of that sort that is discovered we want to hear of very quickly, naturally.

Q. You pay away a certain amount of money in freight on your grass. I understood you to say in the mill the other day that it probably would not be advantageous to concentrate grass areas. You have not any light railways at present. Is it a thing that could successfully be taken up?—*A.* Generally it is very rough and broken country on which the grass grows.

Q. What about concentrating areas under this grass; could you make it grow more or less where you require?—*A.* We have generally found a certain amount of difficulty. We are strictly forbidden the use of land that is not waste; it boils itself down to that that you can only take waste land grasses.

Q. Has not the Forest Department seriously considered the question whether they can concentrate these grasses?—*A.* The Forest Department object to the grass on account of forest fires.

Q. Then it would be all the better for them to concentrate it?—*A.* If they could get it out of the jungles. One great point about it is that if you spend a lot of money on it, it increases the cost of manufacture. If you cultivate, to any great extent, it means planting and weeding and a considerable degree of care: generally speaking in the third year grass deteriorates, and it needs replanting.

Q. Still you can encourage the concentration of the grass by certain cultural means which do not involve actual cultivation, such as allowing or refusing grazing, fire protection or no fire protection. You don't know if the Forest Department have really gone into the thing.—*A.* Oh yes, they have fully. I don't think they have gone into the question of concentrating but of protecting grass. I cannot tell you about concentration. We have, of course, given it a considerable amount of thought.

Q. Then there is the question of bamboos. I suppose you are not prepared to tackle that under present conditions?—*A.* I think it is impossible at present.

Q. Simply owing to the war being on?—*A.* You cannot get plant for one thing, and even if you could, the cost of plant would be enormous.

Q. You understand there are various people talking about making bamboo pulp; would it be your idea to purchase pulp from them, or make your own?—*A.* We should always be pleased to buy.

Q. You had not got to the question of the rates at which they could deliver it?—*A.* The only rates would be those in competition with Scandinavian pulp.

Q. Do they understand they could make it on favourable terms to compete with Scandinavian pulp?—*A.* I have not found anybody yet.

Q. I suppose they have not been able to make it on an actual commercial scale, and are not prepared to talk about it yet? Is it a question of uncertainty originating from the fact that they have not had any experience of it on a commercial scale, or because they cannot make it.—*A.* I don't know that anybody has said anything to us on those lines.

Q. Do you think your mill is in the most economical situation in regard to your raw materials, with reference to its distance from the sea and from the coal-fields?—*A.* I think it is fairly central, as central as it could be.

Q. You say that you have had all assistance from the Government Technical Department which they were able to give; is there any direction in which you think that research undertaken by Government at present could be successfully extended from your point of view?—*A.* A Chemist would no doubt be useful.

Hon'ble Pandit M. M. Malaviya.—*Q.* Have you any definite information as to the State aid which you say is given in Germany, as well as Austria, Norway and Sweden, to paper manufacturers?—*A.* I think our statements here are based on more or less general knowledge of what is done. The only experience that we have actually is the rate at which paper can be sold in this country, and foreign paper can be sold at rates at which we cannot make it.

Q. You infer from that circumstance that the Governments of these different countries are helping the manufacturers in some form or other?—*A.* Certainly, because the manufacturers, I suppose, would not care to give away their stuff at lower prices than they make it.

Q. You think that they are giving away their manufactures at lower prices than they can make them?—*A.* Yes, we think so.

Q. Have you any definite information as to the cost of production in those countries?—*A.* No, that is impossible to have.

Q. It is possible then that they may be producing paper cheaper than you can?—*A.* It is possible but not probable. One can have a reasonably fair idea of cost without actual knowledge. Of course the actual cost could no doubt be obtained through the London Chamber of Commerce, or by similar methods.

Q. I will suggest to you one consideration. You are spending 11·97 per cent on labour. You have to import trained workmen from England, and therefore you have to pay them very much more than the Swedish Foreman or Chemist of a corresponding degree of ability would receive in his own country, and you have to do that in the case of all the 25 Europeans whom you have for supervision of the mill. Suppose it was in Sweden and that you substituted Swedish men for one fourth of the cost; would not that reduce the cost of production considerably?

President.—*Q.* How much of that is due to Europeans?—*A.* The labour is a big item. The labour works out to Rs. 35 per ton of paper, the actual handling of the stuff. A great deal of the collecting staff is paid by contractors at 2 per cent.

Q. During the 40 years you have been working this mill, this aspect of the question which has been pointed out by the President to-day, *viz.*, the substitution of Indians in place of your European supervising staff, did not strike you?—*A.* It has been tried up to a certain point.

Q. I understood you to say that you never looked for them at the earlier stage of the enterprise?—*A.* We have not advertised; we have not gone outside to look for them.

Q. If you had looked for them; if you had endeavoured to train men for these appointments, you would probably have been able to replace some of the imported supervisors by Indians?—*A.* *President.*—He cannot say anything to that except "Perhaps."

Hon'ble Pandit M. M. Malaviya.—*Q.* You also speak of the subsidising of the paper industry in Japan; have you got any definite information as to that; we want to know if the Japan Government did subsidise paper?—*A.* It is quite common knowledge there that the steamers of the Nippon Yusen Kaisha are always subsidised to the extent of introducing goods, I mean in the matter of steamer freights.

Q. But so far as the manufacture of paper is concerned, is any assistance given?—*A.* That I cannot tell you. Commerce and Industry may be able to get that information.

Q. As far as your industry is concerned, unless you are able to satisfy the Government that you are working it on the cheapest lines consistent with efficiency, are you entitled to ask for Government help?—*A.* We maintain we are.

Q.—You say that "Prior to the war there was a movement to obtain a considerable quantity of paper formerly made in India from Europe to save money." What was that movement, was it on behalf of departments to substitute this cheap paper from Europe in place of Indian paper?—*A.* The departments of the Controller of Stationery and the Superintendent of Stationery, Madras.

Q. On the ground that it would be cheaper?—*A.* Yes.

Q. Did you make any complaint to Government against that movement?—*A.* We did not need to up to the present as the war came in and spoiled it, and instead of Government wanting to reduce rates the rates had to be put up.

Q. Let us assume that you have done the best you could to produce paper in the cheapest way you can; even then I understand you to say that without some protection from Government, the indigenous industry would not be able to stand foreign competition?—*A.* Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Have you got the latest machinery in your mills, or are they very old boilers?—*A.* We have brought it up-to-date as far as possible, with the money we have been able to earn in the last few years; but it is not yet quite up-to-date.

Q. All your machinery is brought from the United Kingdom or from Scandinavia?—*A.* No, it is all English.

Q. Have any of your staff been to Scandinavia or other countries?—*A.* Yes, Mr. Bryce has been there. He was 14 months in Norway.

Q. Do you think this machinery is as good as that which you use, with the latest inventions?—*A.* Most of the mills in Norway are comparatively modern.

Q. Do you think you would be able to compete with these other people if you had modern machinery?—*A.* We would certainly.

Q. Without any support from Government?—*A.* Oh, no.

Q. Have you been making any profits before the war; for how many years in the 5 years before the war, on an average?—*A.* We had to pass dividends for 3 years. I think up to 2½ or 3 years before the war we were making money.

Q. What is the largest dividend you have ever paid?—*A.* At the beginning dividends were quite good. In 1900 14 per cent: 1903 to 1913 average of 5 per cent: 1914 we had to pass dividends altogether.

Q. And the first half of 1915?—*A.* It decreases steadily from 1908 onwards.

Q. What do other paper mills in the same position as you pay?—*A.* They pay proportionately higher, on account of having written down their capital. They paid 6 per cent for several years, from 1906 8 per cent, but mostly 6 per cent; that with capital written down three-fourths.

Q. Do you think your machinery would be suitable if the bamboo pulp industry were started in the country?—*A.* Oh yes, we could use any pulp.

Q. I suppose there are no companies who can supply you with raw materials like rags, etc., just like the United Kingdom?—*A.* No, we do our own work.

Q. Do you get a sufficient quantity?—*A.* Before the war we were getting plenty; now we find that we have to go further afield and pay more.

Q. Do you think that if you get any encouragement from Government in the form of a subsidy, that after four or five years you will be able to stand without Government help, or do you think you will want continual Government help?—*A.* The real difficulty is the rate at which imported paper is sold in the market irrespective of what it cost to make.

Q. Then without protection you can never thrive?—*A.* No.

Sir D. J. Tata.—*Q.* If the industry cannot flourish without protection, are there any special reasons why you should try to persist with it. It is not benefiting the country in any way; if we get paper cheaper from outside, why persist in making it at a dearer price?—*A.* It is because of our allied industries which would benefit the country very much; grass and fibre-growing, making of pulp, handling, collection; all these employ an enormous number of coolies.

Q. How is grass and fibre an industry itself, apart from the making of paper?—*A.* Otherwise it would be wasted.

Q. China clay; how does that form an allied industry?—*A.* For paper-making and cotton.

Q. China clay is imported?—*A.* At present.

Q. Do you think that work of that kind could be introduced into this country?—*A.* We would be very glad to see them.

Q. Dyes and colours form a very minute part of your paper-making processes?—*A.* Yes, but they are very valuable.

Q. I want to understand, where do you get your supplies of raw materials; from the Government Forests?—*A.* Not always; for instance at Sahebgunge there are places belonging to the Santhals, where grass is grown. No body can go there without special permission. Government protect it, but without revenue from the grass, these people would starve.

Q. You have no control over your raw materials practically then; you are absolutely dependent upon them; if something happened you could not go into this Santhal country; you would absolutely have to stop work?—*A.* We are not dependent on one district; we work on that principle.

Q. Before embarking on an industry, don't you think it would be wiser to try and control the raw products upon which your industry depends; to some extent to have some control over them?—*A.* Unfortunately the industry was started before any of us here had anything to do with it. We are trying to improve conditions.

Q. It practically goes to prove that India is not suited to this industry?—*A.* I should not say that. Conditions here are difficult but not impossible.

Q. Now with regard to the cost, don't you think it is possible that these countries from which cheaper paper is imported can make it much cheaper than you think it can be made? *President.*—*A.* How can he say that it can be made much cheaper than it can be made? He says it is possible, but not probable.

(*Witness.*) We are fairly closely instructed, and we keep ourselves very much in touch with anything new in the paper-making industry. We have correspondents in different parts of the world who keep us advised of the very newest things for paper-making.

Q. But you are not using the newest things, and Mr. Bryce has said that he has worked 14 months in Scandinavia. He can tell us something about the cost. (*Mr. Bryce.*)—*A.* No, I am afraid I cannot.

Mr. A. Chatterton.—*Q.* Besides this sabe grass which you are using at the present time, you have been experimenting, I understand, with bamboos?—*A.* Yes.

Q. Is there a fair prospect of bamboo pulp becoming ultimately a big source of supply for paper mills?—*A.* It is impossible to say without a considerable deal more experiment.

Q. I suppose that if bamboos are used, pulp factories will have to be established. What percentage of pulp do you get from your bamboos, from the experiments you have made?—*A.* On our experiments the results were between 38 to 42 per cent of fibre unbleached.

Q. Does this bamboo pulp require more chemicals for bleaching than sabe grass?—*A.* It is a very difficult fibre to work, so far as we have discovered. We don't pretend to have had the last word in it at all.

Q. You stated that one of your sources of supply is rags. Is the business in rag collection properly organised in India?—*A.* It is very closely organised indeed.

President.—*Q.* What is the difference between your mill and the mill at Lucknow, which has always paid dividends; what difference is there in the circumstances which make it possible for them to pay a steady dividend?—*A.* I think its position is very much more favourable.

Q. Why; because they have to import chemicals?—*A.* Very little comparatively. They use sujji to some extent, and they make a great deal of badami paper which is not bleached.

Q. Do they import any foreign raw materials?—*A.* Very little, for Government use only. They are close by the grass district of course.

Q. So they have some advantage over you except that you are making a superior class of paper?—*A.* I don't think they have to make the same grades. They make badami and brown paper, and their market is at their door.

Q. That is a small market comparatively?—*A.* They have only a small quantity of paper.

Q. Then on a small scale you think their conditions are very suitable?—*A.* Yes, because they have only 3,000 tons of paper to dispose of in a year. They can dispose of it in their market. They get their raw materials close by, their labour is cheaper than it is in districts surrounded by Jute mills; they have no competition; they don't meet home competition.

Q. Is it fair to assume that small mills dotted about the country would be better than one large mill or two large mills?—*A.* I cannot answer that. There is no doubt that if paper could be sold at a fair rate, without cut competition from outside, that there is room for several mills of the same sort.

Q. That brings us to Mr. Chatterton's question, would it still be possible to establish pulping mills in several localities with the view of reducing the cost of raw materials?—*A.* The difficulty is that too small a mill would not pay.

Q. Would you establish a pulp mill in Sahebgunge?—*A.* No, you could not collect sufficient raw material to feed the mill, and there is also the question of water. The Ganges changes its course so frequently at Sahebgunge, and then your coal is dearer to go there than to Calcutta.

Q. Does that apply equally to bamboos; could you have your pulp scattered about in jungles?—*A.* It might be possible.

Hon'ble Pandit M. M Malaviya.—*Q.* In considering the question of how the Lucknow Paper Mills are able to pay better dividends, you have also to consider the staff that they employ. So far as I know they have only one European on the staff?—*A.* (*Mr. A. Chatterton.*) Three Europeans.

Hon'ble Pandit M. M. Malaviya.—*Q.* Secondly, if you can find out whether any of these Governments, the manufactures of which compete with our manufactures, are really subsidising their paper industry, it will help us. You will find much information in the Consular Report No. 73 on the paper industry of the world in the office of the American Consul. I am advised that paper manufacture is not subsidised. I wish you to look into it, and if you can send information on this subject to the President, that will help us. We are of opinion that the raw materials of the country should be utilised. It is not merely a question of whether we can or cannot produce paper as cheap as any other country. Even if we do not, we must

help our industries to grow. We have to put the real facts of the situation before the Government, to show what is necessary to help our industries to grow; and if you will send us any information bearing on the subject, I shall be grateful?—*A.* (No answer.)

Dr. E. Hopkinson.—*Q.* Have you any objection to telling us what your output is?—*A.* About 19,000 tons per annum.

Q. How much of that is bleached?—*A.* About fifteen to sixteen thousand tons per annum.

WITNESS No. 101.

Mr. H. W. Carr. MR. H. W. CARR, representing *Messrs. Balmer, Lawrie & Co., Managing Agents, Bengal Paper Mill Company, Ltd., Calcutta.*

ORAL EVIDENCE, 4th DECEMBER 1916. For WRITTEN EVIDENCE, *vide* pages 140—141 of Vol. II of the Minutes of Evidence.

Dr. E. Hopkinson.—*Q.* In connection with your paper industry, you give the figures for the consumption of coal in tons, not in rupees. Could you give us the corresponding value in rupees?—*A.* We use slack coal. I might say a lakh and a half rupees.

Q. Putting the cost of all these items together would that represent the total cost per annum?—*A.* There are several things that are not included. For instance, all the money we spend on the importation of chemicals is not included in this statement.

Q. What percentage of your total cost is due to imported chemicals? Could you give it roughly?—*A.* They would come to 2½ lakhs. That is about 15 per cent.

Q. If you number the items, I believe 1 and 3 make the total cost of the raw material apart from freight. Is that so?—*A.* The total cost of grass only, and then of course there are the contractors' profits.

Q. That is not included?—*A.* No.

Q. Do you cut the grass yourself?—*A.* By contract. We take up leases and our contractors cut it.

Q. You give the railway freight on raw and finished products. Does that represent the total freight charges of all sorts?—*A.* That practically is our railway bill paid by us, but does not include freight on the paper which is paid by buyers, amounting to about 1 lakh.

Q. The duty on imports is of course on chemicals?—*A.* Yes.

Q. Why do you separate rosin?—*A.* Because we used to buy that from home. Now we get it from Dehra Dun.

Q. Your mills are situated on the edge of coal field?—*A.* Yes, in Raneegunj.

Q. So you are in a particularly favourable position?—*A.* Yes.

Q. Do you bleach?—*A.* Yes.

Q. In the 2½ lakhs do you include bleaching powder?—*A.* Yes.

Q. Would you roughly separate the bleaching powder and the caustic?—*A.* I should say that the figure is 3 lakhs and not 2½, but of that caustic might be taken at 1,30,000 on a pre-war basis.

Q. And bleach?—*A.* At ¾ lakh.

Q. What proportion of your output do you bleach?—*A.* Out of 6,600 tons we bleach 6,000.

Q. Practically the whole?—*A.* Yes.

Q. You say the bleach cost ¾ lakh and the caustic 1,30,000. Can you say how much would be the cost for a similar output in the United Kingdom? Of course before the war. —*A.* I could not, because it all depends on the quality of the paper. Provided the home mill was making the same quality of paper, we use practically the same amount of bleach.

Q. What would be the cost?—*A.* The same except for the difference in freight. There is also the deterioration of bleach in this country.

Q. What do you put that at?—*A.* Deterioration varies very much. You might put it at 15 to 20 per cent.

Q. Independently of the season?—*A.* On an average throughout the year.

Q. How much does the freight come to on these chemicals?—*A.* You mean ocean freight.

Q. All shipping charges?—*A.* I am afraid I could not answer.

Q. Can you give an instance of the price of bleach in England and the corresponding price at the same time in India at your mill?—*A.* I am afraid you will have to allow me time to refer to that point. Prices are extremely variable.

Q. Will you kindly send in the figures?—*A.* Yes.

Q. You see the point is to find out how far the industry is handicapped by the chemicals not being produced in India. You do not include establishment charges at all. Can you give us any figures for that?—*A.* You mean native wages at Raneegunj.

Q. I mean establishment charges, the charges of management?—*A.* I am afraid I shall have to work that out.

Q. Will you send it in. We should like you to make your table complete giving every item separately and the cost in rupess, so that we may note the percentage of each item to the total expenditure?—*A.* I shall do so.

Q. The items that we shall want are raw materials, foreign and country labour, chemicals, foreign and country coal, freight, import duty, mill staff, and the other charges such as income tax and so forth.

Witness subsequently sent the following statement.

On Pre-War Basis.

Cost of imported chemicals	12½ per cent of total cost.
„ „ indigenous chemicals	4 „ „
„ „ local material, etc.	16 „ „
„ „ imported material, etc.	18 „ „
„ „ coal	6 „ „
„ „ railway freight	14 „ „
„ „ import duty	1½ „ „
„ „ mill staff (technical)	5 „ „
„ „ „ wages (Indian)	8 „ „
Miscellaneous charges	15 „ „
	100

Bleach.—The cost of bleach in June 1914 was Rs. 6-5-3 per cwt. at the Mill and £ 5-3-0 per ton f. o. b. London.

Q. How many Europeans do you employ?—*A.* 12.

Q. Do you want chemicals separately? The point is we want to know what chemicals could be made in the country for the benefit of the industry. What raw materials do you use. Do you use rags?—*A.* Chiefly grass and waste paper. We use about 20,000 maunds of grass, 2,000 maunds of rags, about 2,500 maunds of jute and 1,500 maunds of hemp monthly.

Q. I suppose you made no experiments on wood pulp?—*A.* No. We have not made any.

Q. Have you worked up the system of boiling grass yourself or have you been dependent on other firms?—*A.* We worked it out ourselves more or less. We have always depended more or less on the home mills for information.

Q. Have you had any assistance from the Forest Department?—*A.* No. We have never asked for it. So far as I am concerned, I do not think they could assist us in this particular.

Q. With reference to the collection of grass?—*A.* With regard to that we get all assistance from the Forest Department.

Q. Do you buy the grass from Government lands or private owners?—*A.* Partly Government land and partly Native States, chiefly Government.

Q. Do you consider that your mills are in the best possible location for paper mills?—*A.* I went home last year, and I found that our mill compared very well with those at home.

Q. With regard to the raw materials, disposal of manufactured products, etc, do you consider that the situation is better than Calcutta?—*A.* We went there for water and coal which are two essentials, and we are fairly near our chief grass field. But we are badly placed for chemicals. We have a railway freight upon everything.

Q. You have a good water supply?—*A.* Yes.

Q. Have you had the support you wish from the Government of India in the matter of purchasing paper?—*A.* As we mentioned in our written evidence there is the continued fear of the contract going home. We are always a bit chary of developing, because an influx of paper in the market caused by Government importing their supplies, would leave us without buyers at a remunerative price. I should add that we have no fear of competition from imported supplies made from similar quality of raw material, but only from papers manufactured from inferior materials not obtainable in India.

Q. The 12 Europeans that you have, do they constitute the technical staff?—*A.* Yes, including engineers.

Q. How many chemists?—*A.* One chemist.

Q. Where does he come from?—*A.* He was trained, so far as paper-making is concerned, at a Lancashire mill. I cannot tell you where he was educated.

Q. He has been through paper mills?—*A.* Yes.

Q. Have you employed any Indians on the technical staff?—*A.* No.

Q. You never even tried?—*A.* We have never tried.

Q. Have you ever thought of having Indian apprentices?—*A.* We have one as a matter of fact from Assam. We have taken him at the request of the Assam Government.

Q. Is he bound to you?—*A.* He is bound to us for two years.

Q. How long has he been with you?—*A.* About a year and 9 months.

Q. Has he been satisfactory so far?—*A.* In a way. I mean for a native he has done fairly well.

Q. Would you employ him?—*A.* I would not employ him.

Q. Is he going back to Assam?—*A.* That I cannot say.

Q. Are you likely to try others?—*A.* No.

Q. You do not feel inclined to work a regular system of training your own Indian supervisors?—*A.* I should rather not attempt it.

Q. Have you had many definite chemical problems in the nature of research which you have had to tackle?—*A.* We have never had anything out of the way beyond the usual paper-making problems.

Q. You have never felt the need of superior chemical knowledge?—*A.* No.

Hon'ble Sir R. N. Mookerjee.—*Q.* You say that your capital is Rs. 21,60,000. How do you account for such a large capital. It is nearly three times as the Titaghur Mills.—*A.* That is not our capital. That is our total expenditure.

Q. What is your present capital?—*A.* 4 lakhs of ordinary and 2 lakhs preference.

Q. On what capital do you give dividends?—*A* 4 lakhs of ordinary shares and 2 lakhs of preference shares.

Q. How much debenture?—*A.* 5 lakhs.

Dr. E. Hopkinson.—*Q.* You speak of 5 lakhs of debentures. How are these held?—*A.*—They are held pretty widely. They do not change hands very much. They are 6 per cent debentures.

Q. You have never experienced any difficulty in regard to capital?—*A.* Not till now, but paper shares have not been popular for many years

Q. What dividends are you paying?—*A.* For the last two years we have paid 8 per cent. Before that we were paying only 6 per cent.

Hon'ble Pandit M. M. Malaviya.—*Q.* You said that there are 12 Europeans one of whom is a chemist and another an engineer.—*A.* Three are engineers.

Q. One is a chemist and three are engineers. What are the duties of the other eight?—*A.* They are practical paper-makers.

Q. Corresponding to what you call the foreman?—*A.* The foreman and the machine-man.

WITNESS No. 102.

Babu Bhupendra Nath Basu.

HON'BLE BABU BHUPENDRA NATH BASU, *Attorney-at-Law, Calcutta.*

Extract from ORAL EVIDENCE, dated 4th December 1916, *vide* page 153 of Vol. II of the Minutes of Evidence.

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Speaking about the Association for the advancement of technical and scientific education of Indians he said—

This Association about which I was asked, are attempting more to strike the imagination by the large number of send-outs than by sending a very small number of men for whom they could adequately provide a suitable course of training, which would be much more beneficial.

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WITNESS No. 105.

Mr. W. T. Grice.

MR. W. T. GRICE, C.I.E., *Messrs. Smith, Stanistreet & Co., Chemists, Calcutta.*

Extract from ORAL EVIDENCE, dated 5th December, 1916, *vide* page 161 of Vol. II of the Minutes of Evidence.

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Mr. C. E. Low.—*Q.* You say that you have some confidential information about certain new industries for India. Are there any other industries in addition to starch?—*A.* There is the caffeine industry, and also the artificial manure trade. At present India is importing phosphates.

Q. As you know Calcutta used to export large quantities of tea waste. These went to Germany before the war. Now they are diverted to a certain extent to the United Kingdom?—*A.* Most of it to America.

Q. Would the making of caffeine mean considerable research?—*A.* We all know the laboratory process as to how to isolate the caffeine. But to make it as a manufacturing process one would have to spend a considerable sum of money on experimental plant, etc.

Q. Supposing a man takes it up and there is a fair chance, what would you propose?—*A.* First of all Government should help him with expert knowledge if available. The drug is wanted in India by the Medical department and what remains could be shipped home.

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WITNESS No. 112.

Mr. W. H. Everett.

MR. W. H. EVERETT, *Officiating Superintendent of Industries, and Inspector of Technical and Industrial Institutions, Bengal.*

Extract from WRITTEN EVIDENCE.—*Vide* pages 197—204 of Volume II of the Minutes of Evidence.

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Q. 15. When professor at Sibpur College, I carried out many tests of Indian timbers, and also commercial tests of iron, steel, cement, bricks, stones, etc. An endeavour was made to enlarge the scope of this work, which was much appreciated by engineering firms and others concerned; but proposals had been independently made by the Railway Board for appointing an Inspector of Local Manufactures in Calcutta, with a testing house containing an equipment of testing machines and appliances, and no development of testing-work at Sibpur was therefore allowed. Some commercial testing work is, however, still done there occasionally. Technical aid.

Besides the above, I occasionally undertook tests of power plant, and other professional work for commercial firms.

Q. 17. Officers in the Education Department should be given every encouragement to undertake a reasonable amount of outside professional work. In such cases I usually experienced considerable delay in obtaining Government sanction, which moreover had to be applied for in each separate case. The fee also had to be stated, in compliance with the Civil Service Regulations. I fail to see why educational officers should not be given the same freedom in respect to time and fees as medical officers, as regards private practice. It is obviously in the interests of his students that a professor should do what he can to keep in touch with commercial work in his special line.

Q. 56. There is no organisation in Bengal for the development of industries. Government created in 1909 a post of "Superintendent of Industries and Inspector of Technical and Industrial Institutions," and Dr. Denning was appointed to this post direct from England early in 1910. He was invalided home in September 1911, and I have acted in the post since November 1911. Dr. Denning's view was that the first step necessary was to establish a large technical institute in Calcutta, which should be under his direction and whose staff should be available for teaching, inspecting, and assisting in the starting of new industries when advisable. This was not the first time that the opening of such an institute in Calcutta had been proposed, but I need not go into previous history. Government appointed a representative Committee in 1912 to consider the question, and this Committee was almost unanimously in favour of the proposal. Their report was considered in detail by Mr. R. Nathan, I.C.S., Mr. Küchler, Director of Public Instruction, and myself, in consultation with many businessmen and others, and our final report with full recommendations was issued in 1913. The question of starting an industrial institute at Dacca was also dealt with. The whole question has since then been under the consideration of the present Director of Public Instruction, who has been heavily loaded with his many duties, and who presumably has regarded the matter as one of no immediate urgency in view of the curtailment of all expenditure owing to the war. In the meantime, I have been continuing as before the duties of Assistant Director of Public Instruction for Technical Education, and Inspector of Technical and Industrial Schools. I have also attended to enquiries on industrial questions which have reached me from time to time on various matters, such as pleated straw, gold leaf, jute-mill bobbins, the capacity of Bengal firms to supply certain engineering stores, etc. Official organisation.

Our recommendations are given in the 1913 report; see particularly pages 20, 21, 43, 44. Without dealing with these recommendations, which still await orders, Government have recently asked for the appointment of a Director of Industries, under the Revenue Department, but the question of the organisation of his work has hardly been touched on. There is, I think, ample room for such an officer, who would deal with the business side of proposals for the development of industries as distinguished from the technical questions involved, on which he would naturally seek the co-operation of the head of the technical institute, if this is established.

Q. 111. I would suggest for consideration the manufacture of straw hats. I received enquiries some months ago from a firm at Luton, Bedfordshire (a centre for this industry), for sample and prices of plaited "straw" made from palm leaves, and I ascertained that supplies of the plaits can be obtained from the Diamond Harbour district. The plaited samples looked very promising, but an expert's opinion would be necessary. There may, of course, be other suitable raw materials in India, in the form of straw or leaves, as to which the Botanical and Forest Departments might advise if the suggestion were to be taken up. For example, the expensive Panama hats are made from the leaves of the screw pine, which grows in some parts of India. General.

Extract from ORAL EVIDENCE, dated 6th December 1916.

* * * * *

Hon'ble Pandit M. M. Malaviya.—*Q.* You speak of the possibility of developing the manufacture of straw hats. Why do you want to keep this information confidential?—*A.* It is only thrown out as a suggestion. I have not gone into it from a responsible point of view.

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WITNESS No. 114.

Mr. E. Hoogewerf. MR. E. HOOGEWERF, *Principal, Government Weaving Institute, Serampore, Bengal.*

Extract from ORAL EVIDENCE, dated 6th December, 1916.—*Vide* page 219 of Volume II of the Minutes of Evidence.

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Mr. A. Chatterton.—*Q.* I understand that you are one of the gentlemen who were awarded a Government of India scholarship, and it would interest the Commission to hear your opinion regarding the nature of the training you were thus able to obtain, and generally the results of your observation?—*A.* Yes, I was selected by the Bombay Government for one of the State scholarships to study textile manufacture at Manchester. I accepted the State scholarship to enable me to enhance my knowledge of the subject which I had gained at the Victoria Jubilee Technical Institute and later in the local mills of Bombay and Ahmedabad. In this connection, I may state that the knowledge the student obtains at the Manchester School of Technology is chiefly theoretical. No opportunities are given to students of increasing their practical experience, as the Lancashire Mills are not anxious to admit foreigners. These were the conditions when I went to Manchester with the first batch of Indian students, but since then circumstances might have changed which I am not aware of. Under the circumstances, I consider it practically useless for Indian students to study at Manchester, if opportunities cannot be afforded them of working in the mills, during the period of their stay at Manchester. In my case it was rather different, inasmuch as I had received a technical training as well as I had mill and commercial experience before I went to Manchester, and hence the instruction I received at Manchester was very useful to me.

Q. What are your previous experiences?—*A.* I was employed in the Bombay mills for several years, and I gained a knowledge of commercial work during the seven years I was employed by Messrs. Greaves, Cotton & Co., as a commercial traveller.

Q. Was the two years' instruction in Manchester of great benefit to you?—*A.* Yes. It assisted me considerably in completing my studies in textile manufacture.

Q. Did it remove your difficulties?—*A.* Yes, as far as theory went. One does not get very much of practical knowledge at the school.

Q. From the papers it appears that nearly £ 400 were spent. Do you think that the money was well spent? Would you have spent it yourself?—*A.* I think so.

Q. You spent six months at Messrs. Hattersley and Sons. Did you have any difficulty in getting into their machine shops?—*A.* There was some difficulty in getting in as it is not easy for foreigners to get admissions into the mills or factories there. But I had the help of my firm and they assisted me.

Q. Do you know about the other men who went to England simultaneously? About Mr. Puttack?—*A.* I do not know very much about the other men. Mr. Puttack was weaving master in Pulgaum. On his return from England he was appointed Manager of the Bengal Laxmi Cotton Mills. He was not a textile student, but took up dyeing as his subject.

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WITNESS No. 117.

Mr. A. Pointon. MR. A. POINTON representing—

(1) *Messrs. Kilburn & Co., India General Navigation and Railway Co., Ltd.*
(2) „ *Macneill & Co., Agents, River Steam Navigation Co., Ltd.*
(3) „ *Andrew Yule & Co., Managing Agents, Bengal Assam Steamship Co., Ltd.*

Extract from WRITTEN EVIDENCE.—*Vide* page 268 of Vol. II of the Minutes of Evidence.

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Extract from the Proceedings of the meeting of the Standing Waterways Committee, held on 16th December 1914.

On the 3rd July, 1912, the Standing Waterways Committee advised Government to appoint a sub-committee to consider the question of the proposed formation of a Waterways Trust. A sub-committee was appointed, and the results of its deliberations were placed before the Standing Waterways Committee meeting of the 16th December, 1914. The sub-committee were in favour of a Waterways Trust being formed, if and when the Grand Trunk Canal and inland harbour schemes were sanctioned. "The official members of the Standing Waterways were generally in favour of the Public Works Department carrying out the work first before handing it over to the Trust, or that the Public Works Department should control the Trust who carried it out" (*vide* minutes). In a letter, dated 28th December, 1914, the non-official members set forth the importance of forming the Trust at once so that a permanent body of waterways engineers could be secured as early as possible for the general improvement and maintenance of the waterways as well as to carry out under Government supervision the Grand Trunk Canal and inland harbour schemes and thus secure for it from the commencement all the advantages of a permanent whole-time staff. Owing to the frequent changes in the Government's personnel it is absolutely impossible for its officers properly to control the waterways and develop the terminal facilities.

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WITNESS No. 123.

MR. R. S. FINLOW, B. Sc., F.I.C., *Government Fibre Expert, Bengal.* *Mr. R. S. Finlow.*

Extract from WRITTEN EVIDENCE.—*Vide* page 315 of Vol. II of the Minutes of Evidence.

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(25) *Artificial retting*.—The high prices of jute in recent years have, of course, stimulated the efforts in the direction of artificial extraction and, apart from what may be happening abroad, there is at present in India one big enterprise in jute cultivation on a large scale, which must depend for its success on an artificial process of extraction. I have had a good deal to do with the experimental work in connection with the elaboration of this process, and as far as I can see, there are reasonable grounds for believing that it will be an economic success. Such an event might give considerable help to the production of jute outside India, but it would also on the other hand render it an easy possibility in irrigated tracts, such as the Punjab colonies where, at present, lack of retting facilities is at least as powerful a bar as difficulties in regard to labour. Artificial retting would thus ultimately contribute towards preserving the monopoly of jute for India, if not for Bengal alone. Even in Bengal the adoption on co-operative lines, of artificial extraction of jute, apart from its sanitary effect, would relieve the cultivator of the labour of retting and stripping, and would thereby enable him to grow a maximum of jute without, as appears to be the case at present, taking up so much of his time as to curtail his production of food crops.

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WITNESS No. 129.

MR. P. L. ROY, *Additional Legal Remembrancer, High Court, Calcutta.* *Mr. P. L. Roy.*

ORAL EVIDENCE, 11TH DECEMBER 1916. For WRITTEN EVIDENCE *vide* page 353 of Vol. II of the Minutes of Evidence.

President.—*Q.* We have had brought before us frequently the complaint that those who have money among the Indians do not invest their money in industries, because there are many other attractions in the form of money lending.—*A.* That is, in my judgment, one of the reasons.

Q. That is to say, they get not only high interest, but they have frequent opportunities of seeing their money and verifying its existence?—*A.* Yes.

Q. But if they put their money into industries, there is no immediate prospect of a sufficient return, and the money is tied up in bricks and mortar and plant?—*A.* I think the main reason is that they get better interest.

Q. We have been told that this freedom with which money can be lent to anybody results very often in hardship to those to whom money is lent?—*A.* Undoubtedly.

Q. Do you think it would be practicable or fair if there were any such thing as legislation to limit the amount of interest that might be charged on money lent in this way?—*A.* Yes.

Q. You think that would be fair and practicable?—*A.* Yes. In the Santhal Parganas it depends upon the Magistrate or the Deputy Commissioner in charge as to what interest he allows, and the people there are protected in this way.

Q. What would be considered a fair percentage? That would vary according to the money market? Is there any formula that you can suggest which would fix a resonable maximum—so much above the Presidency Bank rate or the average earnings on Government paper?—*A.* I would limit the rate of interest to depend upon the security. If it was a bond on landed property, I would certainly limit it to eight per cent and without security nothing more than twelve per cent.

Q. Eight to twelve may be taken according to circumstances?—*A.* Yes. It is only a matter of degree. In Calcutta money may be lent out at seven per cent on mortgages.

Q. Or would you say, instead of eight per cent fixed, three per cent above the average earnings on Government paper?—*A.* Yes.

Q. If we then adopted Government paper as our standard, and limited the maximum to three above the income from Government paper, that would be fair?—*A.* Yes.

Q. That would be for land. For other things a higher rate of interest may be reasonable?—*A.* Lending money to tenants or a body of tenants without any further security perhaps twelve per cent, unless there are industrial banks by which interest can be reduced in regard to which I have decided opinions. An industrial bank will create a revolution for the better as regards this thing. Co-operative societies will create a revolution in time, and I think we ought to support them for all we know.

Q. Co-operative societies can do what they wish to do consistent with the rules governing co-operative societies?—*A.* Yes.

Q. They are already provided with rules?—*A.* Yes.

Q. Would there be any danger of such a law being defeated by people from the Native States or from outside altogether?—*A.* In what respect?

Q. Could you make them subject to this general law?—*A.* Yes.

Q. You are speaking especially with regard to Bengal conditions?—*A.* Yes, only with regard to Bengal conditions.

Mr. C. E. Low.—Q. At what rate is interest usually paid on loans on landed security in Bengal?—*A.* In Calcutta I do not think they will pay more than six or seven per cent, but in Bengal I have known as much as 24 per cent.

Q. On clear security?—*A.* Yes.

Q. That means taking advantage of the man being hard up?—*A.* Yes.

Hon'ble Sir R. N. Mookerjee.—Q. Only in exceptional cases?—*A.* It is not exceptional; it is more common than is usually supposed.

Mr. C. E. Low.—Q. Presumably if we attempted to restrict such investments by putting such a tax on them, if it would simply hit the unfortunate landholder, that would be worse than useless?—*A.* Yes.

Q. If limitation were imposed, would not the lender adopt some devices, such as making the recipient admit a larger sum of money than he would actually have received?—*A.* I should give powers to the judges to decide. It is an expedient that is resorted to even now. I know of instances of money lent on mofussil properties where the lender insists upon a certain amount being paid as commission—he says to servants, but it is generally meant for himself.

Q. Would not that involve a great addition and complication in the existing procedure of suits?—*A.* In time, I think, if there was that provision, the lender would be more careful. He would know there is risk of being found out.

Q. It will have a good moral effect?—*A.* Yes. We cannot expect to have a millennium in these cases. In England the people who go to the pawn brokers' shops pay only a certain rate of interest. Here, it is astonishing, but it is nevertheless true, that people who lend money on gold ornaments which is the best security, get 24 per cent. In Calcutta there are many money lenders who lend money on gold ornaments at a very exorbitant rate of interest.

Q. My small experience of the British pawn broker leads me to believe that he makes it up in the long run in the following way. He does not advance as a rule anything like the value of the article except in certain cases, and there are a very large number of unredeemed pledges on which the original pledger never calls for any accounts and lets it go?—*A.* They have to publish a sort of gazette. That is quite true.

Q. Do you think that the unwillingness of the people of Bengal to put their money into industrial enterprises is part and parcel also of the same tendency which they have had, at any rate till recently, not to engage in industries themselves, which several of the witnesses who appeared before us have ascribed very largely to the form of education at present given in Bengal?—*A.* The education that they get in Bengal?

Q. Yes. That is to say, they are not industrially minded, very largely owing to the form of education which has been hitherto prevailing, and being not industrially minded, they neither engage in industries nor are they disposed to invest in industries?—*A.* I do not think I have considered the matter sufficiently, but judging from my own case, I am a university man and I had no industrial education, but I have always detested the idea of lending out money on interest, and I have invested all my money in industrial concerns. My university was Cambridge. With regard to the other question, I cannot give a considered opinion. I cannot say at all what the effect of education here is.

Hon'ble Pandit M. M. Malaviya.—Q. Is it not rather a dangerous thing to tamper with the usury rules prevailing in a country?—*A.* I think not.

Q. Don't you think that before you lay down by legislation a definite hard-and-fast rule, you would require to make sufficient provision for capital being available to the people who want it?—*A.* I am not in sympathy at all with money-lenders.

Q. If there is a thing like money-lending, there must be money-lenders?—*A.* There is a difference between money-lending and money-lenders in this way, that if you give the money-lender a whip in hand over the debtors it is a gross shame.

Q. That is another thing.—*A.* That is the issue. I say, if in an advanced country like England, they can have legislation with regard to protecting the debtor against the money-lender, it ought to apply with greater force to a country like this.

Q. I am quite as much as you are perhaps, in favour of legislation. I understand you suggest a definite limit to be fixed?—*A.* Yes.

Q. Three per cent. above the Government paper rate in the case of land?—*A.* It ought to be enough for anybody.

Q. And twelve per cent. in the case of tenants. You recommend that these limits should be fixed?—*A.* Yes.

Q. You can conceive of cases where there may be no co-operative bank, no modern bank, but only the village shroff or money-lender whom you detest, and perhaps to a certain extent rightly, and suppose the man who needs money cannot get money except, on a rate of interest higher than twelve per cent, would you rather that his business should suffer than that he should pay at the higher rate?—*A.* What is the point?

Q. I want to know whether in such a case legislation which would fix a definite limit, would not be injurious to the interest of those whom you want to protect?—*A.* I think not. If the man knew that he would have to lend his money, and he knew that he would not get 24 per cent, he would be very glad to take twelve per cent.

Q. Suppose he finds it more advantageous to invest it elsewhere with a better return?—*A.* If it is the limit of interest, he could not lend it for more than twelve per cent.

Q. But he might invest it in business?—*A.* He could not get twelve per cent.

Q. Do you know what Tata's works are paying?—*A.* I think he would be very wise to invest in it.

Q. Then the man who stands in need of money will be left without the money help that he wants?—*A.* He will get it. It is my opinion that he will get it.

Q. You think that by legislating you will compel a man to lend at a rate of interest at which the State lays down money should be lent?—*A.* I think so.

Q. You are aware that what has been recommended so far, you know more about law than I do, has been that there should be an amendment of section 74 of the Contract Act giving the court discretion to decide, after going through the particular circumstances of each case, whether the interest claimed is reasonable or not?—*A.* I am aware of that.

Q. Don't you think that it is the utmost that is needed and that is desirable?—*A.* No.

Q. You think it should be more?—*A.* Fixing down limits.

President.—Q. In the case of the application of section 74 of the Contract Act you will have to bring a suit first?—*A.* Yes.

Q. The cases you have in mind are the large number of people who could not afford to bring suits in any case, and those are the people whom you really want to protect?—*A.* Yes.

Q. *Hon'ble Pandit M. M. Malaviya.*—*A.* Besides yourself, Dr. Rash Behari Ghose, and Dr. Nil Ratan Sircar are Calcutta University men?—*A.* Yes.

Q. They also invest money in business enterprise to some extent?—*A.* I do not know at all. I cannot say about their private dealings.

Q. I understand that Dr. Rash Behari Ghose has invested money in match factory, and Dr. Sircar has a tannery?—*A.* I do not know.

Q. You say there are three causes which explain the failure of the joint stock enterprises in Bengal. The first is, the facilities that exist for lending out money at high rates of interest on tolerably good securities. So far as this is concerned, do you propose that the facilities for lending money at high rates of interest should be interfered with or removed in order that money may be invested in industrial enterprises?—*A.* I do not say so. I do not propose that.

Q. Then your suggestion relating to the limitation of rates of interest is confined to giving the necessary protection to poor people?—*A.* Yes.

Q. Your second reason is the want of proper training and commercial education. What suggestions have you to make for the proper training and commercial education of our young men?—*A.* What I mean by that is that I should not put a foot-baller in charge of a bank. We want men trained in banking to take charge of the banking business.

Q. The man who is trained as a banker may have developed a taste for football?—*A.* A man may be a good bank manager and be at the same time a footballer, but the contrary proposition does not hold good.

Q. Have you any definite recommendation to make?—*A.* I have. I should say that our young men should, as soon as they arrive at years of discretion, apprentice themselves to the various stages of occupations, and thus get a training in business. No man can rise to the top of the tree without having begun at the beginning. Our fault lies in the fact that we think we can do everything.

Q. Do you think there are many firms who would be willing to take Indians as apprentices?—*A.* I do not see why they should not.

Q. Have you got any knowledge that they are willing?—*A.* I think so. We have to

fight against a dead weight of prejudice, but we can overcome it. We should not merely see the points of difference, but we should try to see points of agreement.

Q. Do you know of many Indian young men who are working as apprentices in any of the firms?—*A.* I cannot recall to my mind many. But I know I have employed some men in some businesses.

Q. Beyond that you do not know of other firms where they employ any young men?—*A.* Messrs. Martin and Company have had, and they do in all the firms. I do not think they will be sent away from any place if they put their minds to it.

Q. You say, "In my judgment there is little chance of any purely Indian joint-stock concern succeeding without Government aid and a certain measure of Government control". What kind of Government aid would you recommend? Have you any definite suggestions to help us with?—*A.* I do not limit that to merely a subsidy in money, but I had in my mind at that time the question of smaller industries. For instance, one of the crying wants is that we cannot get in India milk, and we have to pay quite as much as they have to pay in England, and our vegetables are dearer than they are in England. It is a great shame to my mind that in a vast country like this that should be the case, and I think in these instances that assistance of Government should be sought and a certain amount of subsidy raised, and model farms should be started by Government and model dairies, if necessary, with Government money. I think that will be an excellent training for our people, and they ought to be in time made over to them.

Q. You do not think that co-operative societies would be able to take up that work?—*A.* Co-operative societies are more or less under Government control.

Q. They are supervised?—*A.* I have advocated both things, subsidy and Government control.

Q. But for businesses of this kind—dairy business or vegetable growing—you do not propose subsidies?—*A.* I do not see why there should not be.

President Q.—You mean that you would like to see it made one of the duties of the municipalities?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* Do any other industries strike you to which Government aid may be given?—*A.* I am not an expert in these things.

Q. And what measure of Government control would you wish to be exercised in the case of these joint stock concerns?—*A.* It will be necessary for Government to appoint an Inspector and Auditor.

Q. You think that an Inspector going round once or twice a year will do?—*A.* I think that will have to be localised. It is quite impossible for one man having his head office at Calcutta to supervise all these things.

Q. You would have a suitable number of Inspectors?—*A.* I should localise them. The control should rest in somebody who would be a Registrar or something like that. There must be one man at the head, and all these local industries should be controlled by him as the head of the department, and the local control should rest in the hands of people appointed locally.

Q. What is the kind of control that you would like the head of the department to exercise?—*A.* The same kind of control as the Registrar of Co-operative Societies.

Q. You do not propose that the Inspector, whom you propose, should have any wider powers than the Registrar of Co-operative Societies?—*A.* That will be settled by business men. I can only give general ideas.

Q. You recommend that there should be Government audit of accounts occasionally?—*A.* Yes.

Q. You say that money will be forthcoming if a big industrial bank were to be started by Government for the purpose of assisting local enterprise?—*A.* Yes.

Q. Would you wish the Government to put forth a scheme and to call for shares, or would you wish Government to help it merely?—*A.* I should say that, if the Government got together business men of the city and started a bank under their control, I think that would be quite enough. There might be a Government officer who might be a director. It would be at the instance of the Government.

Q. If an officer of the Government deputed for the purpose were to call together the business men of the city and explain the project to them, do you think they would put their money into the bank, even if the Government did not put any money or did not guarantee interest upon the share bonds?—*A.* I think so.

Q. Without Government putting in any money?—*A.* Yes.

Q. Without Government guaranteeing any interest?—*A.* I think so.

Q. The mere fact of a Government officer coming forward to recommend the project will be sufficient?—*A.* I wish it to be very clear. It must be at the instance of the Government.

Q. Suppose the Government suggests or recommends that such an industrial bank should be started?—*A.* And there should be Government control.

Q. In what form?—*A.* A Government official would be a director. There might be a Government official as manager if he knows banking.

Q. Do you think the shareholders will agree to a Government official being selected to be the manager and forego the right of electing the manager whom they think to be proper?—*A.* The shareholders have nothing to do with the manager. Shareholders have control over the election of directors. The manager is appointed by the directors.

Q. You would not let the directors appoint their manager?—*A.* I would let directors appoint their manager.

Q. You want that there should be some measure of control?—*A.* Yes.

Q. In regard to cottage industries you recommend the establishment of central depôts?—*A.* Yes.

Q. Do you think that in addition to this small assistance, some help in the shape of machinery on the hire-purchase system would be of help?—*A.* It would be more helpful.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* In reply to Mr. Low's question, you stated that you have invested all your money in industrial enterprises?—*A.* Yes.

Q. In what enterprises?—*A.* Coal, chemist shops, railways, jute.

Q. As regards the industrial bank, there is a special Act called the Presidency Banks Act, under which the Government put their money in these banks, and people subscribe their money. Don't you think that it would be a sufficient safeguard if you had an Act specially passed, or would you want Government control?—*A.* I should not say that Government should not put money into it, if they desired.

President.—*Q.* In forming an industrial bank would it not be better to have legislation specially for the purpose? In that case the whole object will become public and will be discussed by the public?—*A.* I think that will be desirable.

Q. Instead of having it done by an executive order of the Government?—*A.* Yes.

Hon'ble Sir Fazulbhoy Currimbhoy:—*Q.* I suppose the jute mills in Calcutta have been established for a long time?—*A.* Yes.

Q. And do you know whether there are any Indians as managers in the mills?—*A.* No.

Q. As you say, they have easy access to get in as apprentices and go into industries?—*A.* All the capital is English capital. If I start a thing, I naturally want to have some body whom I like. My firm opinion has been ever since I have been here, that now and for a long time to come, we should start business in co-operation with the English. I do not see why 30 or 40 years hence all our jute mills should not be controlled by Indians.

Dr. E. Hopkinson.—*Q.* Would you make it a penal offence to lend money at a higher rate?—*A.* No.

Q. You would subject it to fine or rescission of the contract?—*A.* The fine would be his not getting interest.

Q. Do you consider that, in the case of Government aid to an industry, it will be sufficient to have Government inspection and Government audit and no other control?—*A.* I say again that that must be settled in consultation with business men as to what is necessary and what is not. It would be necessary for Government to consider what would give confidence to the public. If Government were to subsidise a business, I should think that Government should take the advice of expert men as to the degree of control, and whether they should control it.

Q. In regard to cottage industries, if the Government established central depôts, do you think that they would be self-supporting after the initial stages?—*A.* Not perhaps in the initial stages, but afterwards they would be. Many things are not known. For instance, the Collector of Maldah brought to my notice a man who made mango preserve. It was most excellent, but he could not advertise it, and therefore the business was not prospering, but if there was a central depôt where such things could be brought in and there could be a sufficient measure of advertisement, it would bring new sources of income to people.

Mr. C. E. Low.—*Q.* I want to ask you about the Bengal National Bank.—*A.* I am quite willing. This Bank started with a subscribed capital of eight lakhs and a nominal capital of 16 lakhs. When it was first started the swadeshi movement was in the height, we were called together by the Maharajah of Darbhanga; we had several consultations with regard to it and I told him, that before we started industries we ought to have a very big bank with an enormous capital, so that in the event of any particular investment proving wrong the bank would not be in jeopardy. I also told the Maharajah that now and for a little time to come, it would be necessary to put the Bank under English management. That was conceded at the time, and we went to Mr. David Yule who recommended an English manager, and this gentleman was engaged and he came out to India and took charge of the bank. At the first meeting they elected about twenty directors. Then I said that, as the directors should be men who should take a real interest in the bank, if we had such a large body of directors, nobody would come and take interest in the bank. I was defeated with regard to it. I was one of the directors and Mr. Chuckerbutty also. After the bank was started, no director came there, and Mr. Chuckerbutty and I had to keep all the men in the bank till 8 or 9 o'clock late in the night, because we were professional men and could not get

to the bank before 7 o'clock. This went on for some time, and a secret circular was issued that the English manager was eating the profits and he knew nothing about the bank, and that he should be dismissed, and the bank should be a swadeshi bank under Indian management. The majority of the people who were subscribers to this circular were against us, and we thought it would be better for us to resign. However, we considered that before we resigned, we should have a fight for the principle of having as competent manager a man who had been in charge of a bank. We had several meetings, but ultimately we were defeated and this gentleman was turned out and another man who had never been in a banking office was made manager on a salary of Rs. 500 a month. He was in charge of the bank for about a year, and within a year out of a capital of eight lakhs six lakhs had absolutely gone. The money was lent out to the brother-in-law of one of the directors, and a nephew of this director was the manager, and the money was lent on forged documents and it was absolutely lost. When this came to light, we were taken back into the directorate, and I had to give my services in an honorary capacity. I did not know very much about banking myself, but having been there about one year and four months, I gained some experience, and I showed the directors that it was possible for a man to steal money within the space of one week, but after that if the directors really did their work, it was not impossible to find it out, and I devised a system of checking accounts by which if they were checked week after week, the bank could not have lost the money they did. That is one of the instances of mismanagement and criminal neglect on the part of the directors and incompetency on the part of the manager. Besides this, the bank appears to have been made a happy hunting ground for people who wanted to borrow money. I do not say that they had no property at all, but at all events there were no mortgages on their properties, and monies were lent out to these people on pro-notes. I am not giving names. On bare pronotes they were all dead accounts. I do not say that I know very much about banking, but I know that all bankers consider dead accounts to be bad banking business. It must be an account which must be running, money coming in and going out. The result was, when I took charge of the bank, I found in addition to a number of people hanging about the place, a number of accounts which it was impossible to do anything with. On being written to they never replied, and they seemed to take it as an offence when we asked for the money back, whether as interest or portion of the capital lent. I am sorry to say that I made myself most unpopular in making myself rather persistent in my demands. As far as my understanding went, I tried my best. This is the way in which this thing failed, but if we had just enough sense to start the business under English management, I think, in my opinion, by this time that bank would have been in a very flourishing state.

Q. The bank was started very largely with the idea of financing industries?—A Yes.

Q. Did it finance any industries?—*A*. The industries that were financed were of this description. One was, to buy a silk business having a shop somewhere in Barabazar which ended in a loss of Rs. 30,000 to the bank, and another was, advancing money on certain motor lorries which are now laid up and in regard to which there is a suit. The financing of industries was not carried out. I know that the manager Mr. Bose did lend out money. For instance, he lent money to certain people who had certain iron works making steel trunks and something of that sort. This is a healthy account. Lending money on second class motor cars—that is not financing industry.

President.—Q. The bank was registered under the Joint Stock Companies Act?—*A*. Yes. It is very difficult for me to remember the names of all the directors, but I shall send a list of the names, as well as all the annual reports from the very beginning up to now.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. Had you auditors?—*A*. We had auditors and the audit was being done every six months just like the joint stock banks.

Q. And had you any deposits from the public?—*A*. Yes. It was started exactly as a bank. You could put money on fixed deposits and current accounts.

Q. You said the other directors never attended the meetings except you two?—*A*. At first nobody used to go there except myself and Mr. Chuckerbutty.

Q. What about the quorum?—*A*. This was going every day to check the accounts. No quorum was needed.

President.—Q. Had you full attendance at the Board meetings?—*A*. Also very poor.

Q. Were there any directors' fees?—*A*. The directors were paid nothing. They objected to paying anybody for the work done.

Q.—They attended the Board's meetings?—*A*. Some of them did. We were there for a short time and then we were turned out, and since we came back I insisted that the directors should be paid and they were paid for a few meetings, but afterwards we have not been paying anybody anything at all, because there has been no money.

Q. Who was the chairman of the Board?—*A*. I forget now who he was. I think, the Maharaja of Darbhanga, and then Janakinath Rai. Since we came back, Mr. Chuckerbutty has been the Chairman.

Hon'ble Pandit M. M. Malaviya.—Q. We have been told on several occasions before the Commission that the Bank of Bengal does not help Indian firms to the same extent that it

helps European firms. Have you any knowledge of it, and would you like to say anything on the subject?—*A*. I have no specific knowledge, but it is only natural.

Q. You have no knowledge of any particular facts?—*A*. No. I think Messrs. Martin and Co. could get any amount of money from the Bank of Bengal. It depends very much upon the credit of the firm. As a general proposition it may be quite correct that they are not as willing to lend money to Indian firms as they would to European firms, because they know more about the European firms. In regard to other banks, that is also a correct proposition.

Witness No. 130.

Mr. T. W. Tutwiler, *General Manager, The Tata Iron and Steel Company, Limited, Sakchi.* *Mr. T. W. Tutwiler.*

Extract from Written Evidence—*vide* page 356 of Volume II of the Minutes of Evidence.

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THE TATA IRON AND STEEL COMPANY.

Statement showing details of tonnage number of employes' salaries, etc.

—	Tonnage.	Average number per month of covenanted hands for the period.	Average number per month of local hands for the period.	Total salary paid to covenanted hands during the period	Total salary paid to local hands during the period.	Remarks.
				Rs.	Rs.	
			Coke ovens.			
October 1911—June 1912 .	67,089	6	485	36,942	45,137	This period covers nine months only.
July 1912—June 1913	154,971	5	813	38,961	96,336	
July 1913—June 1914 .	196,758	3	982	26,922	1,20,673	
July 1914—June 1915 .	196,683	3	785	24,167	1,03,061	
July 1915—June 1916 .	202,055	2	792	19,011	1,05,477	
			Blast furnace.			
January 1912—June 1912 .	36,083	27	529	92,754	42,943	This period covers only six months and only one furnace was working.
July 1912—June 1913 .	128,238	16	1,508	1,24,116	2,20,583	
July 1913—June 1914 .	155,383	10	1,424	93,638	2,31,599	
July 1914—June 1915 .	160,587	10	969	83,668	1,83,179	
July 1915—June 1916 .	157,257	9	956	78,208	1,76,291	
			Steel works.			
July 1912—June 1913 .	31,380	49	1,059	2,49,374	1,90,556	
July 1913—June 1914 .	77,850	55	1,419	2,45,278	2,97,403	
July 1914—June 1915 .	96,180	33	1,135	1,83,825	2,68,242	
July 1915—June 1916 .	123,430	36	1,205	2,45,109	2,61,411	
			Rolling mills including blooming mills and bar mills.			
July 1912—June 1913 .	19,129	37	686	2,11,926	1,56,177	Bar mill only started in November 1912.
July 1913—June 1914 .	48,871	39	932	2,33,007	2,16,430	
July 1914—June 1915 .	66,764	38	1,286	2,31,469	2,84,293	
July 1915—June 1916	90,998	35	2,003	2,19,927	4,42,932	During this period one bar mill was added and the shipping which was formerly managed by the Traffic Department was done by the Mills Department.

Laboratory.

In August 1913 we employed five European chemists whose monthly salaries amounted to Rs. 2,550. At present we are working with only two Europeans whose salaries amount to Rs. 1,425 per month.

Drawing office.

In the early part of 1914 we employed four European draughtsmen whose monthly salaries totalled Rs. 2,325. We now employ one only at a salary of Rs. 750 per month.

Electrical department.

Formerly we had in our employ two European electrical engineers whose combined salaries were Rs. 1,065 per month. This department does not now contain any Europeans, only Indians being employed.

Mechanical engineering.

There were seven Europeans in this department formerly whose salaries totalled Rs. 4,490 whilst three only are now engaged whose salaries amount to Rs. 2,850.

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WITNESS No. 136.

MR. M. M. S. GUBBAY, C.I.E., I.C.S., *Controller of Currency, Calcutta.*

Extract from ORAL EVIDENCE, DATED 13TH DECEMBER 1916—*vide* page 414 of Volume II of the Minutes of Evidence.

* * * * * *

Hon'ble Pandit M. M. Malaviya.—*Q.* Of course, you have surveyed the whole situation. In what way do you think Government could help industrial banks?—*A.* I have thought a good deal of the question of Government assisting industrial banks from their balances by lending them money, and I am not prepared to say at present that it should be ruled out. As one who has had to manage the Government of India balances in this country, for the last five or six months, I find it is extremely difficult to say that we could make our resources more readily available for banking concerns, and therefore, I don't like to commit myself at present without further examination of the question as to whether we could make these available. I shall be very glad if the evidence I am giving on these points could be treated *in camera*. The questions require very careful and delicate examination and cannot be shouted out from the house top.

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WITNESS No. 150.

Mr. E. R. Powell. MR. E. R. POWELL, *Senior Inspector of Factories and Steam Boilers, Central Province and Berar.*

Extract from WRITTEN EVIDENCE—*vide* pages 550 and 553 of Volume II of the Minutes of Evidence.

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Mechanical Engineers.

3. Under the Bombay Boiler Inspection Act no Inspector shall be a member of the Board of Examiners appointed under the said Act. The objection to an unbiased person would seem unreasonable, when it is considered that all the Inspectors are Board of Trade Engineers with long and varied experience. As a result it seems that in some cases District Loco. Superintendents have been appointed as members of the Board. These men, without prejudice, are well trained, but their experience and knowledge are practically confined to locomotive engines, which are rarely, if ever, required under the Boilers Act.

Extract from ORAL EVIDENCE, dated 18th December 1916.

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Mr. C. E. Low.—*Q.* I suppose the object of Bombay is that being a very large province, they do not mind much whether their certificates are accepted; whereas you being a small province, attach to it much more importance?—*A.* If we don't recognise Bombay, I think this province will be handicapped. I understand that they are revising their rules now. Before writing any written evidence, I wired to Bombay to get a copy of these rules to see whether they suit our purpose, and if necessary, to make some suggestions. The Chief Inspector of Boilers, Bombay, thought it undesirable to communicate them at present, as they were not finally accepted by the Bombay Government. I do not know whether they have published it by now.

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WITNESS No. 165.

Mr. A. C. Carr. MR. A. C. CARR, *Chief Mechanical Engineer, Bengal-Nagpur Railway.*

Extract from WRITTEN EVIDENCE—*vide* page 651 of Volume II of the Minutes of Evidence.

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Training of apprentices.

I believe at present that one Railway has a certain number of Indian lads of education under training in a British Railway shop with a view to their employment in the supervising grade of the Locomotive Department. My own experience of Indian lads, who have undergone similar training, is not very encouraging. I append a copy of a letter from a British Locomotive Superintendent regarding a young man who applied to me for employment:—

> "In reply to your letter of 9th February, this young man entered the shops here as an apprentice in July 1914, apparently having left just recently, but was only actually present at work 50 per cent of this time, having been very unsatisfactory in his timekeeping and attendance.
>
> As to his capabilities, considering the short time he was here, and especially the time he lost, these are naturally very small, and I certainly could not state that he would be of any use to you. The ability that he appeared to show on the few occasions when he did attempt to work was of average quality.
>
> He was employed in our machine, fitting and erecting shops, also in our millwrights' department and one of our running sheds. He also spent a short period in the drawing office due to ill-health, but in that office his work was very unimportant tracing and this cannot be taken as any great experience.
>
> My experience of Bengalis has certainly been unsatisfactory. I have had two in the shops, and both have now left after a comparatively short period. They seem very unsettled, very unsatisfactory from the point of view of timekeeping, and of not very marked ability; and I am afraid that this will be my last experiment in accepting individuals of that nationality as apprentices."

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WITNESS No. 173.

MR. J. B. LLOYD, *Messrs. Shaw, Wallace & Co., Calcutta.* *Mr. J. B. Lloyd.*

Extract from WRITTEN EVIDENCE—*vide* pages 713—715 of Volume II of the Minutes of Evidence.

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Surveys for industrial purposes.

Q. 25.—A full survey of the waste lands of Assam would facilitate very greatly the acquisition of land for tea by promoters. If the Land Records Department displayed its wares, the further development of Assam would be rapid. At the same time, it is possible that the drag which Government administrative methods represent is indirectly responsible for the well-being of the industry. Facilities might lead to overproduction.

The existing surveys of minerals require to be extensively supplemented by further surveys. So far as I am aware, only two coal fields have been surveyed and mapped, in anything approaching detail. These are the Raneegunge and the Jherria Fields. Many other coal fields exist, a survey of which, if carried out, and maps published, as was done in the case of Blandford's and Hughes' surveys, would be of the greatest assistance to commercial people desirous of exploiting minerals. The occurrence of minerals other than coal should also be indicated on maps. Frequently people have approached us with samples of various minerals, such as corundum, graphite, chromite, and garnets, but we had no means of ascertaining whether the given location of the occurrence had any probability of correctness or otherwise. The probable extent or amount of mineral occurrences should also be stated in reports. If the Commission desire further information of a detailed character regarding minerals in this connection, I suggest that they should call on Mr. W. J. Wood, of Messrs. Shaw, Wallace & Co.

Q. 26.—The precise object of the survey would be to produce maps and reports of the occurrences and probable extent, and if possible, quality of such minerals, etc., as Government investigated. I suggest that maps of important areas should be produced on a 1″ scale. If the Commission desire further information of a detailed character regarding minerals in this connection, I suggest that they should call on Mr. W. J. Wood, of Messrs. Shaw, Wallace & Co.

The whole of the waste land in the province of Assam, for instance, should be mapped out and labelled.

Certificates of quality, etc.

Q. 89-92.—* * * * * In the saltpetre trade, it is a matter of common knowledge that adulteration is undertaken on a large scale by the various dealers, and while it may be easy for the analyst to trace admixtures of common salt (sodium chloride), Khoree salt (sodium sulphate), and other impurities, it is not so in cases where nitrate of soda has been added to the Indian saltpetre. The latter is sold on the basis of purity or refraction, and the analytical test in vogue in Calcutta is based on the contents of impurities, such as—

Insoluble matter,
Moisture,
Sodium chloride,
Sodium sulphate, and
Potassium sulphate.

A 95 per cent Chilean saltpetre (nitrate of soda) is naturally cheaper than a 95 per cent Indian saltpetre (nitrate of potash), and it therefore pays the unscrupulous dealer to adulterate. The damage suffered by the buyer consists in the fact that when the nitrate is used for the manufacture of nitric acid, the bye-product is not the valuable bisulphate of potash, but the cheaper or practically worthless bisulphate of soda. Government are, I think, aware that adulteration of this nature has recently been discovered in Calcutta.

Mining and Prospecting Rules.

Q. 103.—A difficulty Messrs. Shaw, Wallace & Co., have experienced in the working of Mining and Prospecting Rules originates by reason of want of a comprehensive survey and report on the coal field, such as Blandford's maps of the Raneegunge and Jherria Fields and

T. H. Ward's report on the latter field. In consequence of the lack of information of the foregoing nature, we have taken up blocks of land and found, on prospecting the same, that only a small portion of it proved to be coal-bearing. Terms of the mining rules prohibit our discarding or relinquishing the non-coal bearing or unworkable portion of the lease, and the consequence is that, out of the total area which we are permitted to hold, considerably less than 50 per cent consists of workable coal land; and as, by the provisions of the Act, even if we have prospected and discovered other coal-bearing land containing workable seams, we are not eligible to be granted mining leases of the same, the further development of the portion of the Central Provinces coal field, in which we are presently interested, is at a standstill, notwithstanding the fact that we are ready and willing to go ahead.

The question of the amount of coal at present locked up as support for Railways is a very serious one. It has been ascertained that over 200 million tons are now lying unworked under the lines. The matter has already formed the subject of a Conference at Simla in 1915.

Beyond this, a further and larger question exists, which is the amount of waste involved in pillaring out the upper seams in a coal field, such as Jherria. The operation of taking out pillars in seams near the surface, the thickness of which may be anything up to 30 or 40 feet, is naturally creating more or less deep depressions of the surface, which act as reservoirs for catchment areas of considerable dimensions during the rains, and make pumping a practically impossible recourse. The non-observance of boundary barriers between different owners materially adds to the trouble, as connections are made under ground, enabling the whole of the rainfall to flow from the surface *viâ* the subsidence into the mine, and once there, to find its way to the lowest point and flood the workings of whoever may be mining at the dip-most part of the seam. Heavy flooding is certainly caused by this, and there may be loss of life. The remedy for the foregoing is a proper system of stowing the upper seams so as to keep the surface intact as far as possible, and allow of the lower seams being worked, by keeping out influx of flood water into seams in which winning is at present proceeding. There are thus two operations of serious detriment to the proper winning of coal. The question now arises, what person or persons are fit and proper to control these matters? At the present time the Chief Inspector of Mines is the sole arbiter of the amount of coal to be left for support of land acquired by railways, and in some cases, land lying adjacent thereto. As Chief Inspector of Mines, it would appear he is *ex-officio* the mining adviser to each of the Government Railway lines in India. His decision appears to be final. It seems that he is personally responsible for the safety of railway lines, in so far as subsidence due to coal removal is concerned. He has personally to guarantee that the line will not subside, and it may be supposed he takes care that ample coal is left in order to achieve that object, in fact, more than many mining engineers consider necessary. I suggest that a Mining Department should be formed, whose duties would be to decide on the amount of support for railways that is really necessary, and to determine measures for the stowing of coal seams, and generally to see that minerals are mined to the best advantage of the country. The present Chief Inspector of Mines would perhaps be the person naturally fitted for this, but as his Department is at present understaffed, it would appear to be necessary to organise a new department with proper expert staff. I suggest that this Department should work solely in the interests of the coal industry, and that the railways should have an entirely separate expert to protect their interests.

A contributory cause in infringement of boundary barriers in working coal seams in Bengal and Bihar and Orissa, is the amount of error in the revenue surveys. When laying down boundaries between adjoining mouzas, it is sometimes possible to get the boundary lines to tally correctly. This gives rise to infractions of the boundary barriers, alleged encroachments, and often real ones, floods in mines, and to expensive law suits. We have an instance of incorrect revenue survey at New Tetturya, and we understand from professional surveyors of long experience, the occurrence is a common one. If the Commission desire further information of a detailed character regarding minerals in this connection, I suggest that they should call on Mr. W. J. Wood of Messrs. Shaw, Wallace & Co.

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Witness No. 175.

Mr. G. D. Hope. Mr. G. D. Hope, Ph.D., B.Sc., F.C.S., *Chief Scientific Officer, Indian Tea Association, Calcutta.*

Extract from Written Evidence—*vide* page 729 of Volume II of the Minutes of Evidence.

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Research abroad. Owing to the proximity of my Calcutta central office to that of the Reporter on Economic Products and of his some time chemist Mr. D. Hooper, I was closely in touch with the work of that office, and I consider it a matter extremely to be regretted that the activities of that office were not extended instead of being curtailed.

The post of Reporter on Economic Products held by Mr. Burkill, who is now the head of the Botanic Gardens in Singapore, and that of his chemist Mr. D. Hooper, were most important ones and should never have been partially closed. This department ought to have been, but never was, of great value to India. The man at the head of it should be of big influence and should have powers to demand information from the following Government Departments: the Botanical Survey; the Geological Survey; the Zoological Survey; the Imperial Agricultural Research Institute, Pusa; the Provincial Agricultural Departments; the Forest Department; the Veterinary Department; the Indian Medical Service; the Fisheries Department, etc.

He should have on his staff a botanist, zoologist, mineralogist, agriculturist and one or more chemists who would be in touch respectively with the above departments; the Reporter on Economic Products himself should be in close touch with the work of his staff, and with the business communities of India, and with the Imperial Institutes and the Agricultural and Commercial Departments of the overseas Dominions of the Empire and of foreign countries, so as to be in a position to bring to notice, and further any possibility (*a*) of the profitable utilisation in India and elsewhere of Indian raw products (*b*) of the exploitation of Indian manufactured products, and (*c*) of the successful acclimatization of foreign animals or plants, etc., in India.

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Extract from Oral Evidence, dated 5th January 1917.

President.—*Q.* I have got one question that I should like to ask you in order to supplement your note. You propose the revival of the post of Reporter on Economic Products, and you say that he should be in touch with the scientific departments and should have on his staff a botanist, zoologist, mineralogist, agriculturist, and one or more chemists, who would be in touch respectively with those departments. The conclusion of most people was that the Reporter on Economic Products should, as nearly as possible, be a post office, or still better a switchboard, to send an enquiry in the right direction, and not engage himself to give advice on subjects with only one botanist, or one zoologist or one mineralogist. Another difficulty that would arise from your proposal would be that the zoologist, or botanist, or mineralogist, would never have any chance of promotion. He would not be part of an appropriate department in which he could get a fair scope for his ambitions. These specialised departments like the Geological Survey are known more or less to people, and they can go direct to them. In addition to the specialised departments, and to supplement them, we have the Director of Commercial Intelligence who is more strictly a post office than the Reporter on Economic Products would be, and he can pass on enquiries to the appropriate department. Don't you think that this system is sufficiently satisfactory? I take it for granted that extraordinarily good work was done by Mr. Watt and Mr. Burkill at a time when the scientific departments were not sufficiently developed and were not sufficiently known. Since then, the scientific departments have taken a greater interest in the economic aspects of their sciences, and they are better known and better organised. Probably there is still room for improvement; but don't you think that it is better to go on in the direction of improving these departments, keeping them in touch with people who want problems to be solved, and using as a safeguard a mechanical post office like the Director of Commercial Intelligence?—*A.* The difficulty is chiefly this. These departments are not quite clear themselves whether their particular work is to be advisory or to be purely research. If it is to be purely research work, the officers object very strongly to their time being taken up with advisory work, and if on the other hand their work is to be advisory, I think that the retention of the post of Reporter on Economic Products would be a desirable one, because he would be a man who would be in touch with the public as well as with these departments and would control and distribute their advice.

Q. Let us go a step further than that. You say that these departments ought to consider as their normal duties not only research work, but advice to those who are concerned in its practical application to science?—*A.* Yes. But I think the two branches of any department's work, research and advice, should be kept to a certain extent separate.

Q. That principle is accepted as one of the gospel principles of the Geological Survey?—*A.* That it should be both a research and an advisory department.

Q. That it should be in direct contact with practical people. It was with that end in view that the Government established the Geological Survey. I cannot speak for the Zoological Survey or the Botanical Survey. There is no doubt that the Geological Survey was established primarily for the survey of coalfields, and thereafter it was expanded with the definite intention of developing the mineral resources of the country?—*A.* A case came to my notice about two years ago. I was in Java and afterwards in Ceylon. I found it an extremely easy matter to get information about the soils of Java from the Geological Department. I found, on the other hand, that it was impossible to get similar information in Ceylon. I understand that the officers of the Geological Department there spend most of their time in work connected with the economic resources of the island as distinguished from pure geology.

Q. In Ceylon they have only two men doing geological work?—*A.* Yes. I think it is a very small department.

Q. Where you have a department of, say 20 officers, you can provide a certain number of specialists, and then you have men devoted to the geology of minerals and the general application of geology in addition to those who are working on the purely scientific aspects of geology. From a department of that kind you would get sounder advice than from a single geologist attached to the Economic Reporter?—*A.* I think it has been clearly defined in that department to what extent each officer should do research, and to what extent advisory work.

Q. That is the business of the Director of the department?—A. Yes. But in some cases in India there is a hostile attitude towards advisory work on the part of heads of departments.

Q. The system adopted there is perfectly simple. Every year the whole of the officers of the department meet the Director some time in August or September, and a statement is drawn up of all the requisitions that have been received from local Governments together with a statement of the advisory work that has to be done in India, and the forces of the department are divided into these groups, so many devoted to the expansion of the geological map for unknown areas, so many to deal with direct enquiries from local Governments, so many devoted to headquarters work in the laboratory, and so many devoted to special economic enquiries. That programme is then threshed out; officers volunteer for particular sections; the whole scheme is drawn up in the form of a statement, sent to Government by whom it is sanctioned; and that programme holds for the next following cold weather season. This seems to be a perfectly simple thing?—A. That is in regard to the Geological Survey. It is possible that, if it is not the case with the other departments, my difficulty will arise.

Q. It is one of those things that we are up against. What is the economic unit of a scientific department? What is the economic unit for zoologists or botanists? We know what the economic unit in geology is,—it is 21. Anything below that must be inefficient, and one mineralogist, or one zoologist or one botanist, unless he is an ideal creature, might be a danger to the Economic Reporter?—A. Yes. Consequently at present a great deal of work has perforce to be done by the Imperial Institute on behalf of India which could, in my opinion, be better done in India.

Q. Because you have got raw materials in abundance here and in natural condition?—A. Yes.

Q. I think the lesson to be drawn from your statement is not a revival of the post of Reporter on Economic Products with one specialist on each subject attached to him, but the proper development of appropriate scientific departments, so as to cover not only every normal phase of the science, but the normal applications of the science to practical problems?—A. In such a way that the general public could get information, and with a proper channel for getting that information.

Q. If I had a fishery problem, I would go to the Zoological Survey. If I had a question connected with a drug-producing plant, I would go to the Botanical Survey?—A. Yes.

Q. If you had a question connected with economic mineralogy, you would go to the Geological Survey?—A. Yes. Personally I should feel a little bit in doubt, and at present feel in doubt, as to what extent a private individual is entitled to approach this and other departments for information.

Q. A private individual in this country is entitled to go to any department. I have never come across a case of a private individual coming to the Geological Survey and being turned out. Any questions sent up by post or by private persons are attended to as much as if they came from local Governments?—A. I have come across cases, and many cases, where information has been refused to private individuals.

Q. In the case of the Geological Survey?—A. In the case of the museum. There is hostile attitude there towards any economic problem being dealt with in the museum.

Q. May I say neutral attitude? I understand that the present Director of the Zoological Survey considers that, as he has only got four officers including himself, it is better for him to stick to purely scientific zoology and not to attend to the economic aspects of zoology. But this is not necessarily a hostile attitude to the economic aspects of zoology?—A. I can quite believe so. But the absolute attitude at the moment of these officers towards the general public is one which results in the fact that the general public cannot get information.

Q. You say that the department should take an interest in the economic aspects of zoology?—A. Yes.

Q. And be available to answer requests from private individuals as well as local Governments?—A. Yes.

Q. I think that is exactly the policy that they have been trying to follow in the Geological Survey. That is a much closer approximation to one's ideal of classification of sciences than attaching single experts on each subject to the Reporter on Economic Products?—A. Yes, possibly so. What I put forward in my written evidence was a skeleton of a complete scheme; a scheme which was partly in existence formerly. The idea of this scheme was that the Reporter on Economic Products should be a specialist and be in close touch with the departments from which he required information in carrying out advisory work.

Q. Although things are not perfect under the present development, we might again restore that spirit of hostility which existed before the abolition of the post of Reporter on Economic Products, if we started again the Reporter on Economic Products with specialists of each kind attached to him. There would be a tendency to change the neutral attitude into one of hostility. There is likely to be a certain amount of jealousy between the single zoologist of the Economic Reporter and the Director of the Zoological Survey?—A. Yes. Because he would be in a very difficult position in regard to the obtaining of information.

Q. I am afraid he would not be in touch, as you suggest, with the appropriate department, but rather be out of touch?—A. Yes. What I was trying to get at was a scheme by which the general public might be able to get all the information available with regard to the economic aspect of any product, and at the same time an arrangement by which research bearing on the economic as well as the purely scientific aspects of Indian products should be carried on steadily.

Q. Is it fair to assume after this discussion, that you are of opinion that if these appropriate scientific departments were developed so as to touch all the proper sides of their subject, that would be a better way of meeting the case than the revival of the post of Reporter on Economic Products?—A. Certainly. I would add that these departments should be well organised so as to cover every matter of scientific enquiry, and that there should be proper and well-conducted channels by which information might reach the general public and through which the general public might make enquiries.

Q. The Director of Commercial Intelligence ought to be an appropriate channel; also these departments themselves, if established on a sufficiently large scale, would be known to the general public?—A. Yes.

Q. I look upon the organisation of the Geological Survey as the ideal one for a scientific department. You will find the lines drawn up before my time and neglected before my time, partly restored during my time, and now perfected by Dr. Hayden. As far as geology is concerned, you find that there is no necessity for the Reporter on Economic Products?—A. No.

Mr. C. E. Low.—Q. What kind of questions did you previously use to refer to the Reporter on Economic Products which you now refer to Pusa?—A. I am not referring to any questions which I personally have directed.

Q. A great many things that used to be referred to the Reporter on Economic Products are now dealt with by the Imperial Agricultural Chemist at Pusa. What are your own official relations to Pusa?—A. Not very close. I attend the meetings of the Board of Agriculture, and apart from that, except that I have always found all the officers at Pusa very ready to help me and my colleagues, I have no other connection. I have visited Pusa several times.

Q. Do you refer problems to them to work out, or for advice?—A. Chiefly for advice, particularly from our Mycologist to Dr. Butler and to Mr. Shaw, and in some cases I believe problems have actually been worked for our Mycologist at Pusa. We have an experimental station at Assam and a small library there, and it is quite inadequate for complete references on mycological subjects, and requests for advice, and reference to and the loan of books are occasionally made by our Mycologist at Pusa. Similar requests are occasionally made by our Entomologist, and also in connection with our chemical branch.

Q. I suppose the Assam Government Agricultural Department is hardly of much use to you?—A. Their work is so entirely different that, except that we meet on common ground in the study of soils, we have no other connection. They have one chemist, Mr. Meggitt, who is now acting as Deputy Director of Agriculture.

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Witness No. 181.

Prof. C. J. Hamilton, M.A., *Minto Professor of Economics, Calcutta University.* Mr. C. J. Hamilton.

Oral Evidence, 12th January 1917.

N.B.—Professor C. J. Hamilton was orally examined on his note on economic developments in Japan prepared on behalf of the Department of Commerce and Industry. The note is not reproduced here.

President.—Q. Is there anything in the report which is of a confidential nature, or is the information contained therein of a kind that may be freely discussed?—A. There is nothing in the report that is confidential, except perhaps the reference to the policy of the Japanese railways. I think I have stated that the Japanese railways do distinctly give preference not only to encourage certain branches of export, but to favour producers in certain areas as against others, if they think it necessary. That was in some cases denied by the authorities. I found all the members of the Consular Service were suspicious that the fact was so. I do not know whether that can be regarded as confidential. Otherwise there is nothing confidential in it, nothing that I was asked not to publish.

Q. Even that is a small matter?—A. Yes.

Q. There is one point which did not appear to be quite accurate as a general conclusion. You state that Japan is not a rich country as regards mineral wealth, and you have referred to the minerals that are found in large quantities, coal and copper, but you leave out what are generally called the smaller minerals which are really very important. Sulphur, for instance, is a very important mineral and it is obtained in Japan. Zinc is another.—A. She has very little zinc of her own. I leave these out, because, although they are no doubt important, when regarded from the standpoint of the possible development of Japan as a large industrial country, I think they are relatively unimportant. I was regarding the question rather from the standpoint of the possible expansion of Japan into a sort of Great Britain industrially.

Q. They are very important things?—A. Zinc is chiefly obtained from Australia. In Japan they have a great deal of zinc refining, but they have not much zinc of their own.

Q. Sulphur is important from the point of view of chemical industry. They have a small quantity of petroleum ?—*A.* Yes.

Q. This variety of minerals would be useful if they took care to follow them up ?—*A.* (No answer.)

Mr. C. E. Low.—Q. You speak about the change that has taken place in Japan. Are there not considerable points of dissimilarity between Japan and any other oriental nation ?—*A.* The origin of the Japanese people is rather a disputed point. They are probably a mixture of the original inhabitants with people from Korea and China. I do not think the secret of Japanese success is to be found in special characteristics due to difference of racial origin. I attach very great importance to the political and social organisation of Japan in the pre-Meiji era. I think they were organised very largely for the purpose of warlike conduct. They were very warlike people so far as the ruling classes were concerned, and the lower classes were for generations compelled to implicit obedience and to extraordinary industry, and both these qualities are very noticeable still.

Q. Was the population of Japan in the pre-Meiji era very high ?—*A.* There are no statistics that I could find bearing on the early population of Japan. I should say that it was less than half the present population. There is no evidence of any considerable devastation, and the population was something like 20 millions in the middle of last century. How it varied for any considerable period back, I did not enquire.

Q. Would you say that the Japanese at present succeed because labour is still cheap ?—*A.* I think cheap labour is one of the chief factors in their success.

Q. In page 9, you compare Indian and Japanese wages, and you point out the comparatively low wages for female workers in Japan as compared with male workers. Taking the male workers, do you think that there is the same relative difference between the skilled and unskilled in Japan as there is in India ?—*A.* That is the result of my figures. So far as Bengal is concerned, the instances that I have taken may not be on a sufficiently wide scale to be conclusive. They are accurate so far as Japan is concerned. These figures that I have taken for Bengal are not all from Calcutta, but mostly from Calcutta. I was thinking rather of factory industries. If you develop factories in Bengal, you will have a rise in the wages of unskilled labour in their neighbourhood, with a relative fall in the wages of skilled labour which finds a permanent market there. You would approximate to the conditions that you get in Calcutta.

Q. Is the margin of skilled over unskilled labour going to be bigger in India ?—*A.* Of course, the difficulty really is in using the word, 'skilled' and 'unskilled' which suggests a hard-and-fast division. I should say, on the whole, the tendency would be towards a great increase in the class that one might more properly call semi-skilled. Of course, it very much depends on what industries are going to be developed. Supposing you consider the development of oil-seed-pressing or soap manufacture or weaving, the kind of labour required in the factories is largely semi-skilled. Skilled labour is not likely to be so important an element in the development of Indian industries as the semi-skilled.

Q. Did you take any figures at all about the output of cotton yarns per head compared with other countries ? Do you think there is any improvement there ?—*A.* It is improving, but not so fast as it is at home or America. That is the result of the figures I have got. As a matter of fact, I did not print them because I was not satisfied that they were reliable, and I had no means of verifying them.

President.—Q. We have a statement from a correspondent to the following effect, "Efficiency is the keyword. Where we take off, say, for example, 5 ozs. of cotton yarn per spindle, 10 ounces is obtained in a Japanese cotton mill." ?—*A.* They work day and night. What is that 'we'?

Q. It probably refers to 'we' in Bengal. Did you go into any of the cotton mills in Japan ?—*A.* Yes.

Q. Did you note any particular sign of special cleanliness about waste cotton ?—*A.* I enquired on that point and I was told that the mills were cleaner, and that there was less waste of cotton in the Japanese mills than in the Indian, but more waste on the other hand than in the mills at home.

Q. Do you know how that waste is treated ? Do the people put on clean shoes ?—*A.* They all wear tabis, that is a sort of sock.

Q. That is done to prevent waste cotton from being dirtied ?—*A.* It is their normal dress. They wear them always. In the street they wear a sort of clog, and as soon as they enter a building, they take the clogs off just as an Indian takes off his shoes. They are very clean in that way.

Q. It is not done specially for saving cotton ?—*A.* No.

Q. This is the expression used here, "Dirty waste is unknown and represents another saving of 10 per cent. No human foot touches the clean white flooring boards, and not a drop of oil stains them. Work people and visitors alike don clean white cotton over-shoes on entering a mill just as pilgrims do on entering a Shinto or Buddhist temple or even an ordinary tea house."—*A.* I went to three or four cotton mills but was never asked to put on over-shoes. I think your report is much exaggerated.

Sir D. J. Tata.—Q. The floor must be covered with oil droppings and cannot be kept clean ?—*A.* I know nothing about the Bengal cotton mills, but that is a great exaggeration of the cleanliness of the Japanese mills. Although they are clean the girls do not put on these things specially.

Mr. C. E. Low.—Q. In speaking about the factory law, I suppose you have seen the Japanese factory law which is published in one of the papers published here, *The Indian Textile Journal*. It states that this law came into operation on the 1st September 1916.—*A.* Yes.

Q. What does that amount to ?—*A.* It amounts to practically nothing at present. The law did come into operation, but I was given to understand that the extent to which it was enforced at present was practically negligible, partly because there was a good deal of resistance from the local employers, and partly because there was practically no inspectorate organised by the Department of Commerce which would be capable of enforcing it. It is nominally in force. In busy times it is quite a common thing to work 16 hours a day in Japan. Of course, if they exercise that right of giving extensions, it largely destroys the effect of the Act.

Q. Sixteen hours a day at a stretch ?—*A.* Yes. They will have some meal time, that is, including meal time.

Q. There is not at present an efficient inspectorate to enforce this ?—*A.* No.

Q. Is the Japanese Government much in favour of enforcing this ?—*A.* The enforcement of the Act is the outcome of a good deal of clamour on the part of public opinion against the evils of child labour in factories in particular and also with regard to long hours. There had been considerable activity on the part of certain missionary organisations, for instance, calling attention to the abuses of child labour and female labour in respect of long hours. An Act was passed seven years ago, but not promulgated by Parliament until it was forced by public opinion to bring it into operation. But what I was given to understand was that the Member of the Department of Commerce realising that it would interfere, if the Act was enforced, with textile factories in particular, was not anxious to enforce it at any rate, drastically, and as a matter of fact, they have not yet got an organised inspectorate.

Q. There is a socialist press in Japan ?—*A.* There is practically no socialist party in Japan. I have not heard of any organisation that can by any analogy be associated with the socialist party in England.

Q. There is no party specially representing the interests of workmen ?—*A.* No. There was at one time an attempt to organise trade unions. There was a small socialist party started some years ago, and that led to the taking of immediate repressive action on the part of the Government, and I believe two people were actually executed, and since then one hears very little about it. I made a number of enquiries as to whether there was any kind of organisation even limited to individual businesses on the part of work-people, and I was always told that there was none.

Q. These guilds are simply of employers ?—*A.* They very often include small masters' working craftsmen.

Q. At the top of page 12 you speak about the increasing demand in India for capital in agriculture. Do you mean for movement of the crop ?—*A.* I do not mean only movement of the crop. I meant everything that would be included in advances to agriculturists.

Q. You do not refer to any capital expenditure for agricultural improvements ?—*A.* No.

Hon'ble Sir R. N. Mookerjee.—Q. As regards wages, you have not made any enquiries in Bengal ?—*A.* I have.

Q. All these you say are facts obtained by you from personal enquiries in India ?—*A.* Certainly. I have been over 15 or 20 different small scale industries and also to various mills in Bengal.

Mr. C. E. Low.—Q. You speak about the land taxes in Japan, and you say that they are heavy in the case of capitalist owners amounting to a half or even more of the rental value ?—*A.* In addition to the land tax which broadly corresponds to the land revenue here, there are a number of other taxes paid by the landowners.

Q. Cesses ?—*A.* You might call them cesses. The policy of taxation has been until quite recently to increase the taxes leviable from the landed interests, and as a matter of fact, the increase has been, roughly speaking, about 300 per cent in the last twenty-five years.

Q. That is to say, the landowner in Japan would be something in the same position with regard to what he paid to Government as the permanent settled landowner in the North-east of India ?—*A.* The landlord in Japan, as distinct from the peasant cultivator, is not in a position comparable to the Bengal Zemindar. In the West of India, in temporarily settled areas, the land revenue might be 50 or 60 or 70 per cent of the rental value, and still there is a considerable margin in the income obtained by the cultivator over what we might call the minimum of subsistence, and that margin may go to the cultivator eventually as a means of improving his standard of living, or it might be obtained by some other interest. I think in India it is largely obtained by other interests, *e.g.*, by money-lenders. In Japan there is not that margin partly because the area of cultivation is small and the income of the Japanese peasant is not capable of reduction, and if it were reduced, it would produce a

reaction on the amount of productivity of the labourer. That being so, there is no means by which the purchase of land can be of great profit, because it is heavily taxed.

Q. You say there is little or no hoarding in Japan. Was that the case in the pre-Meiji times?—*A.* I should say so, because in those times there was very little use of precious metals, and it has not been the custom of the Japanese to use precious metals, as the Indians do, for decorative purposes. All the revenues and so on were paid in kind, so that you get to a state of things where there was no need for hoarding.

Q. You say, at the end of page 12, "From these local loans alone over £55,000,000 was spent directly on the encouragement of industry." How was this spent?—*A.* A great deal on technical education, exhibitions, the giving of advances to guilds, on the improvement of local means of communication, on docks, and the improvement of fisheries and so on.

Q. In page 13, you talk of the unsoundness of the Japanese banking system?—*A.* I was then referring to the extent to which credit is extended in times of expansion. The margin of security seems often to be too small. I think there is a considerable amount of unsoundness in Japanese business; it tends to facilitate over-trading.

Q. You say that after the Government had started various factories, those students who went abroad came back and started business. Where did they get capital from?—*A.* In many cases they were members of families of the old nobility. One of the most remarkable things to my mind is the rapidity with which members of the leading feudal families seem to have taken to commerce as their normal occupation on the passing of the old regimé.

Q. Was there not a family called the Mitsui who had taken to commerce already?—*A.* They were bankers in the old feudal times. They had no commerce in the modern sense of the term. They had dealings, of course, with the Dutch merchants of Nagasaki.

Q. You say that these Government enterprises were necessary before private enterprise appeared?—*A.* At that stage they seem to have been necessary.

Q. You speak later on of the Wakamatsu Iron Works and the Senju Woollen Mill. Are they not successful? Do they not show a profit?—*A.* No. My statement does not refer to the present war period, and they are now making a profit of course.

Q. Before that was all their stuff sold to the public?—*A.* No. Very little of the Wakamatsu iron output was sold to the public, but the output was sold to the ship-building yards for the purpose of building men-of-war and for arsenal work for the purpose of munitions, but a good deal was sold to the ship-building yards for the purpose of making mercantile vessels.

Q. You say there are a number of privately owned iron and steel foundries, and business opinion is in favour of transferring the Government foundry to private ownership?—*A.* Yes. I do not think it can be claimed that there is any private foundry on anything like the scale of the Wakamatsu Works, but private concerns like the Osaka Steel Works could take over the Wakamatsu Works and their management would be more efficient. It is rather a question of management.

Q. You say, "The Railway Department, in consultation with the Department of Commerce and Industry, can and does give assistance to such industries as are striving to obtain a place in foreign markets." It is all with reference to export trade?—*A.* I do not say it is so entirely. You may take it that it practically is so. As you know, the almost universal opinion on the part of officials in Japan and the general business public is that it is to the advantage of the country to stimulate its export trade, and its commercial policy takes that as the first article of its programme.

Q. But you have seen remarks somewhere to the effect that the Japanese produce better articles for consumption in their own country than they do for export?—*A.* I have found no instances of that at all. They make a different class of things for export, not in quality but in kind. As a result of their protective tariff, they can manufacture a good many things for the home market at a profit which they cannot export.

Q. There is a large demand in India for cheap things, and they have been making things too cheap?—*A.* Yes. I have suggested one or two reasons why they make these cheap kinds of article, *e. g.*, they often manufacture under conditions in which uniformity of quality is not obtainable. Also they compete so keenly that they cannot supply goods to sample at a profit.

Q. With regard to special rates for export articles, that means that the export article really gets a sort of bounty at the expense of the home consumer?—*A.* Yes.

Sir D. J. Tata.—*Q.* I would suggest that the Japanese are rather artistic people and they like to have everything of good quality and well made, and they pander to the taste of the outside countries by making cheap stuff, while they themselves like to have good things.—*A.* That is largely true of limited classes of goods. It is very largely the case that the consumers of expensive articles in Japan are very few in number, but they patronise the products of handicraftsmen and the best artists, whereas inferior goods are made for tourists and for export.

Mr. C. E. Low.—*Q.* You say at page 18 in speaking of the Railway service "Special care was taken in filling up the classes with students possessed not only of a certain amount of scholarship, but also reliable character and practical ability as proved in their actual service." That means that a very rigid system of selection was employed by the heads of

departments concerned?—*A.* I think that is so. I think you would find it true all through Japanese life that there is a sense of more or less irresponsible power on the part of the superior over the inferior, and the Japanese business man or the head of the department has a very keen sense of efficiency, and I think he would exercise the selective power very largely with regard to efficiency, and the action taken would be, to a large extent, unquestioned.

Q. The same point is referred to at page 19. I suppose many of these students were adults?—*A.* Yes.

Q. In page 28 you say, "Allowing for these and other possible economies there would, however, appear to be no justification for the assertion of certain authorities that running costs are 30 per cent lower on the Japanese boats than on the British." To what authorities do you refer?—*A.* That estimate was given by a large firm of shipping agents in Hongkong. I questioned a good many shippers in Shanghai and Hongkong in order to find out their opinion as to the effect of Japanese shipping competition. I have consulted a number of shippers in Japan, and they are all agreed that that was an over-estimate.

Q. You say also, "but by means of the system freight rates are controlled and modified in the interests of the Japanese shippers." Do you mean export rates or import rates?—*A.* Only export rates.

Q. The import rates are more or less competitive?—*A.* Yes. The department determines the principles which shall govern the rate schedules, and all such rates in the case of subsidised steamers are submitted to the Department of Commerce and approved. Import rates are not so submitted.

Q. It is not a question of importing articles for Japanese industries?—*A.* Supposing they (a subsidised line) charge a higher rate, say, on cotton, the Cotton Imports Association would probably make a representation to the department, and there the influence of the Government would come in. The Government would then say, without any absolute power to determine the rate, that this rate is too high, and that opinion is practically taken as of great weight, and almost as a command.

Q. You speak of the Yokohama Specie Bank and say that the Government entrusted it with the management of several million yen of the Treasury Reserve Fund, thus giving it ample resources for the purpose of discounting foreign bills?—*A.* That is for the purpose of discounting foreign bills.

Q. You speak of the Industrial Bank and say that it uses a large part of its funds for the purpose of making loans on the security of sites and buildings of factories. Can you get us any further details about the way it works?—*A.* The Industrial Bank lends out on bonds and securities and the Hypothec Bank lends on immoveable property.

Q. It lends on the shares of the mill?—*A.* Yes. It will lend not only on Government security but on industrial securities also. This makes the capital more fluid.

Q. Supposing a mill wanted money, would the banks take shares?—*A.* I do not think so. I did not hear of any transaction of that sort either of the Industrial Bank or of the Hypothec Bank. If it is done at all, it is done by the local industrial banks who might, I believe, in certain cases take up shares in the undertaking. The Hypothec Bank exists for the purpose of advancing loans on immoveable property. I think its present minimum loan is 1,400 yen, and that has been recently reduced. Two or three years ago the minimum was more than double that. They want more and more to help the small industries. They make their loans repayable in one to five years.

Q. Do they exercise any control during that time?—*A.* No direct control. They get no seat on the board.

Q. They would not make advances to guilds or local associations?—*A.* The banks do make advances to guilds.

Q. For the purposes of the guild and not of individual men?—*A.* The way in which the guild uses the money may be for a co-operative purpose or an individual purpose. It is certainly true—I do not think they do so much now—that some 10 or 15 years ago some of these export guilds were receiving money from local banks which was put in a fund and these monies were granted by the guilds for the purpose of giving bounties on exports, but it was found that it had disadvantages. The banks lost. But the guilds still themselves levy a contribution per head in certain cases for the formation of export bounty funds.

Q. How do these banks get money, that is the Industrial Bank and the Hypothec Bank? They cannot rely on deposits?—*A.* The Hypothec Bank has a capital of four millions, and it has a right to issue shares to the extent of ten times its paid up capital by means of which it can get another 40 millions. It practically borrows on the strength of its own loans

Q. It makes those loans on property liquid?—*A.* Yes.

President.—*Q.* How does the Industrial Bank proceed to value the prospects of any business?—*A.* I do not think they would lend money for the purpose of starting a new enterprise.

Q. Are you quite certain?—*A.* I am not quite certain. I cannot say that they do not lend to new enterprises, but I should imagine as a rule that they would lend to people who have some sort of established business connection.

Q. But most banks will do that within certain limits?—*A.* Yes. At certain times they have advanced monies to industries that had been in low water. On one occasion both the banks and the manufacturers were in very low water during a period of industrial depression, and the Government came to their assistance by placing money at the disposal of the banks for the purpose of making loans. I do not think it is a normal part of the Hypothec Bank's business to start new enterprises. In every prefecture there is a local agricultural and industrial bank and these prefectural banks are agents for the Hypothec Bank and so it has its money spread over prefectural banks.

Mr. C. E. Low.—Q. It needs a certain amount of technical advice as to the prospects of the concern and the prospects of the trade?—*A.* I do not quite see that to be a necessary conclusion. If you are lending on fixed capital say, machinery, factory and site, those are things which are capable of valuation apart from the business prospects of the undertaking. I imagine what would happen would be just what happens in banking now in any country.

Q. But the point is whether it is going to make loans, and for that expert advice is required?—*A.* It has a mortgage on the property.

Q. It takes, say, £10,000 to sink a shaft into a supposed coal seam, and suppose it is found that coal does not exist, what is the use of spending £10,000?—*A.* It would be the banker's business to realise that.

Q. Who gives the advice whether it is worth while?—*A.* No doubt, the manager of the local industrial and agricultural bank.

Q. But he is not a technical man? He does not know the value of a mining enterprise or any other technical industry?—*A.* If your suggestion is that the banks employ a staff of technical experts, I certainly heard nothing of it.

Q. You do not know to what persons they refer on the purely technical aspects?—*A.* No.

Q. At page 30, you say that in 1912-13 there were seven millions and odd elementary scholars and there were only 128,923 children in the middle schools, and then you go on to say that only 68 per cent of those seeking admission are received after a selective examination. That shows that the number of students who go up to the middle schools must be very small. Why do not more children apply for entry into the middle schools?—*A.* Partly because the accommodation for middle schools is very restricted.

Q. Deliberately restricted?—*A.* No. They have not spent enough money on that. They are taking active steps at the present moment largely to increase the number of their secondary schools. I think it is the result of two things, one, they have not got money to spend on it, and secondly, after all a very large majority of the population consists of agriculturists and they do not look beyond agriculture for a living.

Q. You say that they have not got money, or do not see sufficient prospects if they go to the middle schools?—*A.* Yes. The middle schools contain mostly children of local officials or of the middle classes and very few of the children of the cultivating peasants.

Q. Is there anything approaching a literate class whose children would presumably be literate?—*A.* I think there is tending to be a kind of official and business class.

Q. Lower down on the same page, there appear to be a very large number of law students and literature students compared to other subjects. Do they take to anything else than law after they pass the law examination?—*A.* They aim at law. They do not take a combination of "schools" as they do here in Calcutta.

Q. Do they take to Government service?—*A.* It may be so no doubt, a large number of them earn their living in law.

Q. In Tokyo the number of law students is far in excess of that in engineering or agriculture?—Yes. No doubt a very large number of these drift off into other occupations. I think it is certainly difficult sometimes for the university students to find an opening. I should say that the law student is probably to some extent a survival. The law school is an older school and the other departments are more modern.

Q. Is it considered more respectable to take up law than to take up agriculture or engineering?—*A.* No. I have not heard of any suggestion like that. There is nothing at all in Japan comparable to the sort of class distinction between those engaged in commerce and those not in commerce.

Q. There used to be so?—*A.* Yes. In public esteem it is the industrial and commercial class that receives honour and occupies a position of importance socially to-day.

Q. You say at page 31, "The most important feature of the Tokyo School is its organisation and equipment on a scale that not only enables it to turn out graduates with capacity to pass after a short time from the school to directive posts in industrial enterprises, but also puts it in a position to serve as an industrial experiment station." Why do you consider that these Tokyo students are fit for directive posts after a short time after they come out of the school?—*A.* I assume they are qualified, because in a number of factories that I went to, I found almost in every case people exercising directive functions who were comparatively recent graduates of the Tokyo School. For instance, in a number of glass works and soap factories that I visited, I found one or more of such people. From that I conclude that they do, as a matter of a fact, whether it is the result of their technical training

or not, very soon after their graduation from the Technical School appear as occupying directive posts.

Q. It might be explained in one of the following ways, either the Japanese factories are inefficiently run in consequence of these people coming in, or before these go to the school they have had a lot of practical experience?—*A.* I do not think that it is the case that they have come from industry to school and then go back to industry. They are people who have come with a general education to the school and then go to industry, having picked up a little knowledge of the industry during their school course. The important factor is this, that in recent years there has been a very rapid expansion in the number of small scale factories all over the industrial areas, and hence a great demand for people with anything like expert knowledge, particularly in glass-making or soap-making, etc., and they have necessarily to rely on the supplies available. Such men may be weak on the business side. But such understandings are frequently in reality branches, in another name, of a big firm, or at any rate they are supervised by some bigger capitalist organisation. In that case the young man will probably be a semi-technical expert who will be the head of the technical department but he would not have control of the business.

President.—Q. Would not the fact that they go through a rigid discipline in the various stages of their school life make a great difference? I mean in their efficiency as managers?—*A.* I should not have thought that there was any necessary connection, although it would probably conduce to such qualities as regular time-keeping and so forth.

Mr. C. E. Low.—Q. Is it not the case that when he goes to the business shop, he has got to face a series of problems which he has never faced before in his life, and that requires a lot of experience which he has never had before?—*A.* Those problems would be more elementary in a small scale factory with 30 or 40 employees doing comparatively elementary processes. The factory organisation is not on a very large scale.

Q. Would it not be the case that he has a fairly good access to men who have expert and business experience in the guild or something of that sort, to whom he goes round and asks for help?—*A.* I should say that if he went for help to anybody outside the business, it would probably be to the head of the department in the technical school from which he had come, or possibly to the local experimental station if there was one. I think he will get his business guidance from his superior in his own business or from the larger organisation which probably has a controlling influence on the smaller firm, for instance, in determining capital outlay and all that sort of thing.

Q. Would the superior organisation go round and inspect?—*A.* They no doubt keep an eye on the thing to see whether the business is profitable or not. I am rather thinking of small scale manufacturing enterprises which owe their initiation to bigger firms which might subscribe a part of the capital or perhaps the whole of it, but they would be run under a different name.

Q. Do they get any local capital?—*A.* They would probably get some local capital They will be ultimately, as it were, the people who will direct and control the firm.

Q. What are the reasons for decentralising in that way?—*A.* The reason is this. At present manufacture is usually on a small scale and it would not pay probably to start on a very large scale enterprises in an untested industry. Local labour is an important thing. The fact is that many of these undertakings are in an experimental stage, and they are started for the purpose of testing the possibility of profitable business.

Q. At page 34, you say, "The guilds are not in receipt of State contributions to their funds, but from time to time they have been given help, as for example, by the loan of machinery on favourable terms." You mean regular contribution?—*A.* Yes. Some of these guilds are very old in their origin, and you might say that there is very little that the Government has not done in the way of subsidising at some time or other.

Hon'ble Pandit M. M. Malaviya.—Q. You say in the first page of your note, "The second fact, even more arresting from an Indian point of view, is that this remarkable transformation has been achieved by an Asiatic community. The Asiatics have long been regarded as intensely conservative, unprogressive, needing the help and guidance of Western nations for the maintenance of law and order, and even with their assistance, being with difficulty persuaded to adopt the modern aims and methods associated with economic progress." Since when have they been so regarded?—*A.* I think they are still regarded so.

Q. By non-Asiatics?—*A.* Yes. I am only speaking quite broadly. I was thinking of the prevalent state of things in China and India.

Q. Before the advent of European nations into Asia, Asiatics, including the Indians, were progressive peoples, both politically and economically? Were they not?—*A.* As far as I understand, I should not have said that they were of a progressive nature in this economic connection. The standpoint here is economic. I am not thinking of literature or philosophy.

Q. Confining ourselves to economic matters, 150 years before the advent of the power loom and the steam engine, did not India possess a better manufacturing industry than England?—*A.* I do not think they had any manufacturing industry in the modern sense of the term. If one understands it as something which involves the use of machinery, I should say that India had very little manufacture. She had a number of crafts, and

150 years ago Europe consumed a number of Indian products, because at that time Europe had none of these crafts, *e.g.*, in the case of silk goods.

Q. And cotton goods?—*A.* Yes.

Q. And in the earlier part of the last century Indian goods were still in demand in large quantities in England?—*A.* Yes. It died out fairly early in the nineteenth century.

Q. They were still in demand in the earlier part of the 19th century?—*A.* During that period India had a considerable export of manufactured textiles, but after the decline of the East India Company there was very little progress made.

Q. Putting aside the question of progress, you say in your note that Asiatics are regarded as unprogressive, needing the help and guidance of Western nations for the maintenance of law and order. I presume you are familiar with the history of the cotton and silk trade of India in the earlier part of the 19th century and how it died out?—*A.* Yes.

Q. In view of that, will you say that Indians are intensely conservative and unprogressive so far as economic methods are concerned?—*A.* I would say that they are unprogressive.

Q. In your first note at page 4, you say that the Japanese have certain psychological advantages which account for their progress, and you say of them "The people are extremely imitative and very inquisitive." Is not that remark based on what you have seen in your recent visits?—*A.* Yes.

Q. Of course, you have no personal knowledge of what prevailed 50 years ago?—*A.* No.

Q. Is your opinion based partly on what you have observed and partly on what you have read or heard?—*A.* It was largely my impression of what I observed. It was very prominently brought to my mind all through my visits to Japan, both the first and second visits.

Q. That they possess certain psychological qualities which fit them better for economic progress than Indians?—*A.* It may be due to climate or racial origin, but whatever it may be due to, it strikes one that they are extremely alert and active in temperament. I am trying to bring out the contrast. I do not mean, of course, that these generalisations are true in the case of all individuals, but the normal attitude of the Japanese is that they are much more alert and active and of a more inquisitive temperament than the Indian.

Q. My point is whether these qualities are almost entirely due to the education which has been imparted to them during the last thirty years, or whether there are other factors, racial or other that you have noted, which account for them?—*A.* I think it is admitted that education has had a good deal of influence in stimulating these qualities. I was told that as a result of general education the agricultural population were more ready to take up new ideas.

Q. In this book which I have in my hand, written by Robert Porter . . . . ?—*A.* His work is not very reliable.

Q. In what respect?—*A.* He approaches everything, I think, from a biassed standpoint, *viz.*, a desire to magnify the Japanese.

Q. I am asking you about a fact which he states. I wish to know whether from your knowledge acquired during your visits you are prepared to support it. He says, "As a matter of fact, the defeat of the Russians by the Japanese was none the less a miracle in that the preparations for it took fifty years. The conception of Japan credited above to the average Englishman is hardly a travesty of the state of things existing in 1853: at that time the country was as helpless before a handful of Americans as were the Incas when Pizarro assailed them with two hundred men." Would you, from what you have learnt of the Japanese, support that, or are you prepared to question it?—*A.* I should think that is picturesque, but exaggerated. That does not seem to bear at all on the Japanese character.

Q. I am coming to it. At page 469 of 'Fifty years of New Japan,' Count Okuma writes:—"In looking back to the time of the Restoration, we are compelled to admit that farmers, merchants, and artisans were then for the most part uneducated and ignorant. On resigning office in 1873 the writer made a representation to the Government (in combination with Mr. Kaoru Inouye afterwards Marquis Inouye), partly in the following words: 'At the present time the people in Europe and America are studying practical sciences and equipping themselves with important knowledge. They regard it as a great dishonour not to be able to earn a living by ability and industry. Our shizoku, on the contrary, know only how to live on the pensions handed down from their ancestors, and they neither study nor aspire to civil or military science. Our farmers know only how to work their hereditary farms, and have no desire to develop the arts of agriculture or sericulture. Our artisans know only how to discuss about their wages and are quite ignorant of machines. Our merchants compete only for a small profit and do not know how to carry on business properly. These things are so, because men do not know how to use their abilities and endowments. Sometimes we hear of a few who are reputed for cleverness, but they turn out to be men that rejoice in corruption, engage in speculation, or monopolise profits. The worst of them ruin their own business and lose their property by cheating, by fraud, and by committing all sorts of dishonesty. Now it would be easier to expect a cock to crow in its eggshell than to see those advanced at once to the stage of civilisation.' It was a broad

description of the education of the times." Taking that as a correct presentment of facts do you think that what you have discovered of the psychological qualities of the Japanese is largely, if not entirely, due to the education which they have received during the last 40 years?—*A.* I should think that it is very far from being entirely due to it.

Q. Largely?—*A.* I should say that people without the organisation of business or familiarity with the modern methods of industry or commerce and so on, might very well be all the things that Count Okuma has described and yet have native qualities which are capable of development.

Q. But unless the modern system of education were applied, these qualities would not, even if they were latent, have been developed?—*A.* No. You must have education.

Q. You agree then that, even if these qualities were latent in the Japanese, they would not have been developed but for the system of education, a widespread system of national education, that has been at work in Japan for the last 40 years?—*A.* It seems to me that it is not true to say that no indication of the existence of these qualities was given in the state of things prior to 1873, because he was not concerned with a discussion of those qualities. Even if there had been no education, the ordinary Japanese peasantry would present characteristics in many ways in marked contrast to the normal characteristics of the Indian peasantry, which I have tried to describe by the use of the words, 'alert,' 'active' and 'inquisitive' which I do not regard as purely the products of education. That these qualities are made applicable by education, I think, is obvious.

Q. In 1873, the Japanese writer deplored that his people did not show the qualities that you have here described. He said, "Our farmers know only how to work their hereditary farms, and have no desire to develop the arts of agriculture or sericulture. Our artisans know only how to discuss about their wages and are quite ignorant of machines?—*A.* That does not say that they are not alert, industrious, active and inquisitive. One way in which you notice the inquisitiveness of the Japanese is that when he gets any mechanical contrivance, he wants to pull it to pieces and to see how it works. I think that implies a quality in part at least independent of education.

President.—*Q.* Where do they get their cotton machinery?—*A.* From Manchester chiefly. They are making some in Japan.

Q. Is it an improvement on the Lancashire type?—*A.* I do not know. They go in for American machinery also.

Hon'ble Pandit M. M. Malaviya—*Q.* In your first note you say that India can develop industrially by the application of similar qualities which the Japanese show?—*A.* Yes.

Q. Do you think that if a system similar to that which has been tried in Japan were put in force here, there is every reason to expect that similar qualities would be developed in the Indian people?—*A.* It is a question of degree. Personally, I only know a small part of India, but my impression is that in India there is a great field for development by means of a good kind of education and training. Whether as a result of that training and education you would get the same type of men as you have now in Japan is doubtful, because I think climatic conditions would continue to exercise an important effect.

Q. You say in your previous report that the advantage of having a more rigorous climate was possessed by Japan, that the labour supply was more efficient and better fed?—A. Yes.

Q. You say also the psychological character of the Japanese is partly an advantage so that climate alone cannot account for that?—*A.* I do not attempt to separate the climatic factor from its psychological manifestation.

Q. At page 4, you say that another characteristic of the Japanese is the gift for combination and co-operative action. That you say from what you saw in your recent visits?—*A.* Yes.

Q. Have you studied the history of joint stock enterprise in Japan?—*A.* Broadly. I know the main statistical facts about its development.

Q. Have you come across a description of the first company by Count Okuma where he says that people would not subscribe to joint stock companies without some Government pressure. He says—"The Government first paid attention to banking business, and as a result, in 1873, the first National Bank was established. Hitherto, business in this country had consisted of small transactions, the public being ignorant of the advantages of conducting it on a joint stock basis. But very few came forward to assist, and the Government had to persuade, nay, almost to order, the Mitsuigumi and the Onogumi to form it; and if these two families had not taken part as principal shareholders it is extremely doubtful whether the bank could ever have become an accomplished fact. . . . This indicates clearly how little disposition the public in general entertained for a joint stock company. If it was thus difficult to collect capital, still more so was it to find men of ability to conduct the banking and other business." That was in 1873. So, don't you think that so far as natural aptitude is concerned, the Japanese did not show any gift of combination and co-operative action before or up to 1873?—*A.* I do not think that the extract you have read proves that the people were not at all familiar with the investment of capital or the functions of banking.

Q. It proves that they did not at that time show any keenness for combination or co-operative action?—*A.* They might have had capacity for co-operation and combination in other ways.

Q. But they did not show them at all till then?—*A.* I think they did. Their closely organised clans showed their capacity for organising their social life.

Q. Comparing Indians with the Japanese, have you any reason to think that Indians do not possess a natural aptitude for combination and co-operative action, bearing in mind the old village communities and trade guilds and caste guilds of India?—*A.* I do not think so, at any rate at present. At present one does feel that the Japanese loves organisation, combination and order, and to my mind he is very German in his attributes in that way, whereas I have not seen a similar kind of quality in India.

Q. My whole point is whether the difference is to be ascribed largely to the education which the Japanese has received, or whether there is something inherent in the Japanese?—*A.* I should think it is the result of education, and social life largely. I have not the least desire to suggest that India is incapable of progress. So far as I am concerned, I should not like to commit myself as to how far the Indian community could attain to exactly the same psychological state as the Japanese community, but I do believe that the Indian community is capable of enormous progress if the right means are taken to develop it.

Sir D. J. Tata.—Q. Don't you think that compulsory military service and the education that they receive tends to make the Japanese more disciplined and more apt to take advantage of education?—*A.* I think it does. That is noticeable all through the school life in Japan.

Q. Is that a point that struck you the disciplined life that they lead from their youngest age up to their death?—*A.* I do not think it is so noticeable in the older ages. What is noticeable I think, particularly of the lower classes, is the habitual obedience in factories and that sort of thing, and also the absolute readiness with which they accept official guidance and control and suggestion. They do not resent officialism as intrusion or interference with individual liberty.

Hon'ble Pandit M. M. Malaviya.—Q. You have given natural and reasonable weight to the system of elementary education and the system of technical education which supplements it, and you think that the difference in the system and outlook of the Education Department in Japan and India accounts for a good deal of difference among the two peoples. For instance, you say; "In Japan the schools are a good deal more than mere places for imparting elementary education. They are the instruments through which the State endeavours to guide and stimulate the interests of the rising generation. Two points are especially worthy of notice. The greatest care is taken to develop the sense of patriotism, the pride in Japanese institutions and the necessity for progress."—*A.* Yes.

Q. You say also, "Every child is taught that it will be his future duty to contribute to the practical advance of his country." Would not that give a good deal of ambition and energy to the students?—*A.* Yes.

Q. Stress is also laid upon the importance of physical culture and development?—*A.* Yes.

Q. These circumstances, as you say, contribute largely to the general economic efficiency of Japanese labour?—*A.* Yes.

Q. If you had a similar system in India, you might expect similar results?—*A.* Similar in directions.

Q. You say that the various grades of technical schools have played a very great part in developing the Japanese industry, and the Tokyo Higher Technical School is an efficient instrument for the training of industrial workers. Do you think that if you had one such Higher Technical School in every province of India, it would give a new direction to the tendencies of our young men and divert them from literary and legal pursuits to industrial pursuits?—*A.* I am afraid I do not know much about it, but from what I have heard I should suggest that the difficulty in India is to get students to avail themselves of such opportunities as exist. I have heard frequent complaints that the technical institutions or technical colleges in India are not fully availed of.

Q. Have you given any personal study to the question, or is it merely an hearsay?—*A.* I am personally familiar with the conditions in the Sibpur Engineering College, but not with colleges in the other provinces of India.

Q. You say "That the school is much in advance of any facilities to be obtained in India seems to be proved by the fact that there were recently as many as 60 Indian students of the school."—*A.* It is quite possible that the students were attracted not only by the excellence of the School,—I think the Technical School is an excellent school—but they may have been attracted by the fact that they were getting other experience in Japan.

Q. But that may have been an additional inducement so far as you can see? You found that this school was affording facilities which are not to be got in any of the existing institutions in India?—*A.* I was really accepting the statement made in Japan. I do not know the Victoria Technical Institute in Bombay for example, which is at present the chief training school for textile work. I do not know whether it is as good as, or better than, the Technical School at Tokyo?

Q. But the probability is that, if there was an equally well-equipped institution here, the students would go to it rather than to Japan?—*A.* Yes.

Q. Have you got a calendar of the Tokyo School?—*A.* No. I have the annual report.

Q. You say at page 31, "As the result of careful enquiry into the work of the Tokyo Higher Technical School, I was convinced of its value as an efficient instrument for the training of industrial workers. The school is intended to give a thorough scientific and technical training in the theory and practice of the main branches of Japanese industry. It now contains the following departments,—dyeing, weaving, ceramic, applied chemistry, electro-chemistry, mechanical engineering, electricity and architecture." You say at page 32, "In all this work I was much impressed with the close co-operation between the Department of Commerce and the school. The administrators of the department are most active in receiving or initiating suggestions for the extension of native manufacture." In what way did you notice this?—*A.* For instance, as you know, frock coats are a common article of clothing for the middle class Japanese, and until quite recently the material for these frock coats was imported. The Department of Commerce noticed that there was an obvious field for a native industry there and commissioned the weaving department of the Tokyo School to experiment for the production of cloth suitable for frock coats. The school showed that it could be manufactured. The Department of Commerce then approached some private firms, and they started manufacturing this cloth, and they are now doing it with some success.

Q. You say that they have not much provision for research in Japan?—*A.* Yes.

Q. They are content more with spreading a knowledge of the results which are already known in respect of the application of science to industry than to conduct researches in new line?—*A.* They are making a number of researches. I have referred to the Laboratory in the Physico-Chemical Institute. They are quite alive to the necessity for research.

Q. But they are at present giving more attention to spreading a knowledge of the known methods of manufacturing articles?—*A.* Yes.

Q. The sum total of your observation was this. You state "It will be apparent from this brief account of the chief activities of the State in the promotion of education and experiment bearing upon industry and commerce, that the Japanese Government has in recent years definitely accepted the responsibility for furthering industrial development by means of the spread of new ideas and the offer of specialised training." Are they continuing the same policy?—*A.* Very much so, particularly with regard to technical education. They are now over-hauling the whole system and they are quite conscious that it is capable of extension and improvement.

Q. And as a result of this war they have developed their institutions for technical instruction very largely?—*A.* As a result of the war, indirectly. It will give them a larger amount of capital to use.

Q. At the end of page 28 you say—"The Industrial Bank uses a large part of its funds for the purpose of making loans on the security of sites and buildings of factories." In answer to Mr. Low, you said that you were not sure that money was advanced for new enterprises?—*A.* Yes.

Q. But is it not a fact that when a new enterprise is started and finds capital enough to acquire a site and erect a building and buy machinery, then on the security of that building and machinery the bank would advance money to the enterprise?—*A.* I think so. I do not mean to say that it will do so as a matter of course.

Q. But it is open to the bank to do so if it likes?—*A.* Yes.

Q. Not only that, but the bank is expected to do so?—*A.* I cannot say that. It will be a matter of business. There will be no obligation on the part of the bank.

Q. Have you seen the Industrial Bank Act of Japan?—*A.* Yes.

Q. Does not that show that these banks are started with the special object of aiding industrial enterprise?—*A.* Yes. If a company came along with a site and building and machinery and said that they wanted a loan, there would be no obligation on the part of the bank to make the loan.

Q. The bank would exercise its discretion?—*A.* Yes.

Q. But ordinarily it is expected to help such enterprises?—*A.* Yes. Certainly that was the intention with which the bank was started.

Q. And the Government has put in good sum into the bank out of the public revenues?—*A.* The Government came to its aid by means of a loan of £1,350,000 at a cheap rate arranged through the Bank of Japan and the Yokohoma Specie Bank at a particular juncture, when it was suffering heavy losses owing to advances made to particular gold mines.

Q. That was on a special occasion. Apart from that?—*A.* There was no other instance in which the Government actually provided the Industrial Bank with funds.

Q. Are you quite sure?—*A.* Not in any recorded account of the bank's working.

Q. Did the Government guarantee interest on the capital of that bank?—*A.* No.

Q. Do you think that similar banks started in every province would help the industrial development of this country?—*A.* I should like to see the Industrial Bank developed on different lines from those of Japan.

Q. What are those lines?—*A.* What I think necessary in India is something which would perform the function not only of providing a certain amount of capital at discretion, but of exercising a certain amount of control—fairly close control—over management. I have been to a number of factories and so on in Bengal, and what struck me more than anything else was the lack of business capacity, in fact, an ignorance as to the right conduct of business concerns on the part of those having control. That, to my mind, is a serious defect, and you want some kind of institution which would combine these two functions, not only assistance with regard to capital, but assistance with regard to control.

Q. You know that as regards the Industrial Bank of Japan, the Government nominates the Governor and the Deputy Governor?—*A.* Yes.

Q. Would you recommend a similar measure here to ensure that amount of supervision which you have in view?—*A.* It is very difficult to state anything like that without knowing what is to be the general constitution of the bank.

Q. But you want the Government to exercise some supervision?—*A.* Yes, certainly if the Government were to provide any funds. It is conceivable that you might have an Industrial Development Company which is no bank at all,—a company with considerable capital—and then precautions might be taken that it should be managed and controlled by really able people, and then you could give a free hand to it to develop the industry in Bengal in any way which they thought fit. My own idea is that you want in India some body or bodies which would do similar things to those done in Japan. Take cottage industries. The backbone of agriculture might be said to be cottage industry in Japan. The cottage industry there could not have attained its present development and stability without the advantage of a well-developed marketing organisation. That is in the hands ultimately of these big firms. So far, I know of no parallel in the nature of industrial organisation in India.

Q. How would you constitute these firms, or would you leave it to private enterprise to do so?—*A.* I am inclined to think that it is in need of some State assistance. I think the two essential things are, considerable capital and first-class ability of a purely commercial kind. For instance, there is a suggestion that this kind of marketing organisation might develop by the growth of co-operation, but I am distrustful about it. I think experience shows that it is weak on the business side. That is rather a different problem to the one presented to the Industrial Bank. I am rather inclined to think that it is one of the most important things.

Q. Don't you think that that is a separate need which should be provided for in addition to the Industrial Bank?—Yes.

Sir F. H. Stewart.—*Q.* I should like to begin by asking you a general and a rather personal question. Your report is naturally a collection of facts and statistics rather than an expression of opinion. Could you develop that a little further? Did you know your subject before you went to Japan, and did you check your knowledge by personal observation there, or was it the other way about? Did you go there with a fairly open mind and collect your information and views after that?—*A.* Speaking about this note, I may say that to some extent I had formed fairly definite opinions on a number of points bearing on the economic position of Japan as the result of my former visit to Japan.

Q. Have you been there before?—*A.* I have been twice to Japan. I have gone there during two vacations. The year before last I was in Japan. I was there on a holiday and was not spending all the time on any definite work. I did a good deal of looking round and I formed a number of opinions. This year I did not go with a purely open mind on a number of questions. What I did this year was to spend the greater part of my time in getting into touch with the various departments of Government which were responsible for the direction of the economic policy of the Government, such as the Department of Railways, Commerce and Transport. I interviewed Consuls, and particularly Mr. Crowe, and I went with them into these questions in order to get as definite an idea as possible as to the effect of the principal forms of State aid such as bounties, particularly the shipping bounty, the effect of their railway policy and so on. The principal difficulty, if I may say so, is that one finds a very general atmosphere of suspicion with regard to the economic investigator. I think any body who has been there would support my statement. I have tried to suggest a number of cases in my note in which the action of Government is not so much taken in the way of administering a specific Act or Regulation. There is in addition a general power of control and suggestion. And the action of the departments of Government is in many cases extremely complicated, widespread and far-reaching. But I think it is the purpose of Government to minimise as far as possible the extent of their action in the eyes of foreigners. It is not always easy to trace the ways in which the thing is done. It is a well known fact that the public finances of Japan are so arranged that it is extremely difficult to trace the amount of funds spent by the Government for different purposes. For that reason I have not attempted to estimate the total amounts which have been spent by the Government in assisting industries. It is easy to give figures under a few heads, but it would be very difficult to give an accurate statement as regards the total expenditure of the State in helping in one way or another any particular industry.

Q. Your conclusion then is that the Government appear only to adopt a benevolent attitude, whereas in reality they are actively engaged in giving all the support they can?—*A.* That is broadly true.

Hon'ble Sir R. N. Mookerjee.—*Q.* Is the aid given by the Japanese Government limited only to industrial matters, or does it extend to all other things?—*A.* This statement will in all probability be found to be true of many other activities besides industrial affairs. Naturally I confined my attention to industrial matters.

Sir F. H. Stewart.—*Q.* You bring out the force of the great developments made. Do you think that these were effected in the first instance by being considered the expression of the Emperor's will?—*A.* I think it is very important to remember this. This was especially the case in the earlier stages. I have tried to suggest what appeared to me to be a remarkable fact that in a comparatively few years the attitude of the State which had previously been one of indifference to trade and manufacture had been completely changed. They had accepted universal education, accepted the provision for industry and commerce, which had previously been regarded as degrading, as right. There was a great revolution also in the position of the occupying tenants and in the position of the landed proprietor. That was revolution, and it was effected practically as an expression of the will of the Emperor.

Q. Granted the quickness and the keenness of the material on which that power had to work, is not the population of Japan practically a homogeneous whole?—*A.* You may say that at the present time it is homogeneous.

Q. If the population is homogeneous, that would facilitate development to a very great extent indeed?—*A.* At present they are practically a homogeneous people. There was a class of untouchables not very long ago. These people lived in their own villages and they were completely segregated. They formed a distinct population living their own life. This kind of social boundaries is fast breaking down.

President.—*Q.* In the matter of the local Governments, is there any sufficient similarity among them as to enable you to say whether local Governments are also fairly uniform in carrying out their methods?—*A.* In the matter of constitution and powers they are uniform.

Q. Are people governed on an average in a way similar to other local Governments. There is very little similarity for instance between people governed in Madras and the North-West Frontier Provinces. I want to know if there is a similar contrast in Japan?—*A.* I should say that the contrast is not so marked as in this country. There are a few outlying regions of course in which the activities show a marked difference. Some places are more industrial in their outlook than others. In some places you see that the standard of civilisation is fairly high, and you also get a type of district with a purely primitive people.

Q. There is no such thing as an ethnological contrast and difference in religion?—*A.* There are contrasts as far as religion is concerned. There are Buddhists and Shintoists. But the religious element does not, I think, touch the actual practical every-day life of the people. The religious element does not affect the people to the extent that one sees it in India.

Q. And all these religious elements, whatever they may be, are subordinate to the one religion, namely, the worship of the country, the spirit of nationalism?—*A.* I would say that the more you get into touch with the primitive districts, and the agricultural districts the more you would find it true that the belief in the person of the Emperor as a semi-divine personality enters into the frame of the religious life of the people.

Q. It is sufficient to colour all other forms of activity?—*A.* Undoubtedly. That belief brings them all to a focus.

Sir F. H. Stewart.—*Q.* Is the population wholly literate now?—*A.* They are literate. Nearly all the school children in Japan when they leave the school are able to read and write Japanese sufficiently well. It is a very common thing to see even rickshaw coolies able to read and write. As soon as their job is over, they sit down and take up some newspaper and read. I noticed it everywhere.

Q. Is the Bank of Japan entirely a State Bank?—*A.* Yes.

Q. Does it engage in trade like the exchange banks?—*A.* I do not think it is an exchange bank except mediately. It places funds at the disposal of other banks for the discounting of foreign bills. It is a trading bank in the sense that it would engage in loans with trading firms and make advances.

Q. So the principal trading bank of Japan derives its assistance from the State bank?—*A.* Yes, to some extent.

Q. Do the industrial banks have branches all over the country?—*A.* The Hypothec Bank is the central bank. There is a separate bank in each district, and each prefecture has its industrial and agricultural bank. There are local agents of the Hypothec Bank which is a central bank. They are not branches but they act as local agents.

Q. Then with reference to shipping could you ascertain if there is a keen competition between the various Japanese lines? Or do they carry out a uniform policy without reference to their private interests?—*A.* There is a considerable competition between the Shanghai line and the Nippon Yusen Kaisha with regard to some of the coasting traffic the

short sea traffic between Japan and the China ports. Then again there is a certain amount of competition now arising between the Nippon Yusen Kaisha and the Toyo Kisin Kaisha over the Pacific. Up to now the policy has rather been that each company works a certain route. The Toyo Kisin Kaisha for instance works the Pacific route, the Nippon Yusen Kaisha the European and the Indian services and the Osaka Shosen Kaisha the China service.

Q. You say that competition is now springing up. The absence of it hitherto has been to some extent due to Government influence and Government pressure?—*A.* In this way certainly. The Government have offered subsidies to these various companies for the maintenance of a particular mail service, and of course Government have never offered subsidies to more than one company in the same line. It has offered a subsidy to the Nippon Yusen Kaisha for the European service and so on.

Q. Do you see any tendency in Japan to the formation of corporations?—*A.* Undoubtedly.

Q. How is that regarded by the Government?—*A.* I do not know. I found that there was a certain amount of anxiety on the part of the heads of these big combines or big interests to discount the power of these corporations and to belittle the extent of their growth. I think the position is this. In Japan itself there is a very real feeling of the danger of what I may call the trust system. I think that is felt by the smaller business men and by public opinion. In my interviews with the heads of the various departments they tried to show their reasons why it is not likely to affect development harmfully.

Q. You think there is a certain amount of apprehension? *A.* I am doubtful whether Government is apprehensive or not. Government would probably favour it for this reason. In the first place, it facilitates control to have a few powerful corporations which are intimately associated with Government. The members of the corporations may be in the Government itself. Government may be able to work through these corporations for all sorts of purposes. It is able therefore to exercise a good deal of power. I am rather giving now my own opinion of the matter, what I gathered in the way of impressions. I should say that, so far as I can see, there is no opposition on the part of Government to the extension of the influence and uses of these big corporations. They rather facilitate Government control, and it fits in with the idea of a high degree of centralisation and organisation Looking at these corporations as instruments for the extension of trade, it seems to me that at present they are performing a very useful function. I have tried to bring that out in my report. Apart from their being the actual owners and directors of big industrial enterprises like the ship-building yards of the Mitsui Busan Kaisha, they are the principal channels through which capital flows into smaller businesses and new industries. You have in the central institution, in the big firm, ample capital resources, men who have first-class ability and through that you have, it seems to me, a very large and efficient instrument for the development of new industries and assistance on a small scale to people all over the country. So that their capital and their influence does not act detrimentally to the small manufacturer or the cottage industry.

Q. With regard to the Government attitude towards the development of industries, do the Government work through a very large number of officials, or are they also in close touch with non-officials?—*A.* Both. They have a very large number of officials. There is also a very close connection between the official element and the non-official element. In a number of cases I was told of striking instances of Government interference with the management of private business.

Q. Are there any local Directors of Industry?—*A.* I do not think there is any official who could be so described. There is in the local Government no officer responsible for industrial development. The assembly as a whole will consider any proposals brought before it, and then they may detail off some person to make investigations. The whole assembly acts as a committee for the decision of questions. There is no local director.

Q. Is there imperial control over this?—*A.* That is only in so far as Imperial funds will have to be used. The local Governments have their own funds. They can without reference to the Imperial Government send persons to foreign countries to study foreign markets, or offer special advantages for the purpose of encouraging local industries.

Q. What is the attitude of the people towards officials? Do they think that they are official-ridden, or do they welcome these officers?—*A.* So far as I can judge the attitude was one more or less of ready acceptance of the officials. It struck me that the attitude in Japan in that respect is very similar to that of Germany. They are quite conscious of the activities of the official, but I do not think they resent it. Even the ordinary policeman is a person who commands enormous respect.

Mr. C. E. Low.—*Q.* Are the subordinate officials honest? Could you tell of Japan the same thing that you could tell in regard to Germany?—*A.* I do not think you could say the same thing of Japan. They are not notoriously honest.

Sir F. H. Stewart.—*Q.* You refer to tobacco and salt as Government monopolies. How does that affect consumption through middlemen?—*A.* The tobacco goes to the public through the Government warehouses. All the tobacco that is made in Japan goes into Government warehouses. It is practically what you might call a bonded warehouse, and then it is distributed to the shops. It is sold at a fixed price. At the same time there is a good deal of smuggling.

Q. How is the retail sale conducted?—*A.* Any man may buy from the Government warehouse and sell at a fixed price.

Q. That would tend to eliminate the profits of the middleman?—*A.* Yes.

Q. How is the wealth distributed? Is there a very wealthy class at the top and a large poor population?—*A.* I should say that there is no large wealthy class. The wealthy class is a small class considering the total population. Then there is a growing middle class, a commercial and industrial middle class. But it is a comparatively small class relative to the total population. The bulk of the people are quite small agriculturists or craftsmen.

Q. How does the income tax range?—*A.* I am afraid I have not got the schedule of taxes. I think it is a graduated tax.

Q. Is the better and well-to-do class going into commerce and industry?—*A.* There was a time of course when commerce and industry were regarded as degrading occupations to which the higher classes would not go. That is not so now.

Hon'ble Sir R. N. Mookerjee.—*Q.* Can you tell us how that has been accomplished?—*A.* I should say that the reason was that very soon after the new era began the more or less limited class of nobles threw in their lot in a whole-hearted way with the party which was working for the adoption of western ideas and progress. People were eagerly setting themselves to a new life with western ambitions. The Japanese is an extremely proud person. The idea of any other person being superior is very irksome to him. They were in the early days of the modern era anxious to assert their national independence, and they became convinced that the right way to get that was to show the Great Powers that they were really a progressive people and capable of doing things in the right way, and this led to an enormous wave of opinion in favour of western methods, and they began to imitate the Europeans in their manners and mode of dressing and habits of living and so on. This was a general motive leading the higher class Japanese to adopt western methods. But, apart from this, the Japanese seem to be naturally gifted with commercial aptitude. They like it naturally.

Sir F. H. Stewart.—*Q.* Would you say that the sense of commercial morality of the Japanese is developing?—*A.* I think so. Because I think the motive of self interest is showing more and more that it is a very short-sighted policy to anger your customers. I have tried to give two reasons for this defect in quality noticeable in Japanese goods. I do not think it is quite correct to call a Japanese person who is lacking in commercial morality. Naturally the Japanese show an anxiety to capture all new markets. The things which the Japanese make for the foreign market are chiefly the cheap goods. First, with a view to capture markets they quote rates which are not very profitable to them. After they get the orders, they try to make a profit for themselves which means that they very often depreciate the quality and do not send goods up to sample. That is one reason. The other is that the exporting firm gets its things, whatever they may be, from many little workshops. Owing to this the quality is not uniform.

Q. Are the Government proceeding on much the same lines in Korea and Formosa as in Japan?—*A.* I do not know much about Korea and Formosa. They are still in an elementary stage of development. In Formosa the advance of the sugar industry is due largely to the adoption of compulsory cultivation. There they adopt the compulsory system of cultivation as in Java.

Q. Is that likely to lead to discontent among the people of Korea and Formosa which may cause trouble in the future?—*A.* I think that is quite likely. But I did not go to those places. What I did hear was that the Koreans are becoming more and more discontented, because all the posts of any value have been filled by the Japanese and the Koreans are only kept in the subordinate posts. There was a good deal of discontent on that account.

Q. What restrictions are placed on foreigners in Japan with regard to trading? Do they have to be registered?—*A.* The chief disability is the inability of the foreigner to become the free holder of land in Japan. In practice that is not a very serious difficulty. I do not think there is any other legal difficulty. The difficulties that arise in regard to foreigners are not so much legal as the difficulties, for instance, in regard to the preferential treatment, which I think is certainly extended to Japanese, in competition with foreign traders. Thus Government, as consumers, will always prefer the direct trader. Again railway facilities and rates, as also shipping, are in favour of the Japanese trader.

Q. You refer to the fisheries. How does Government assist financially?—*A.* They give a bounty on the trawlers that are built. The principal object has been to encourage deep sea fishing.

Q. With reference to the guilds, I do not quite understand from your note the present position. Do these guilds start themselves or at Government initiative?—*A.* They may start themselves. It might quite well be that the Government official might suggest the desirability of starting one. But the process is that any number of people in a trade in a district may come together and approach the Government for the registration of the guild. If they can get the right proportion to come in, then the Government registers that guild and gives it a legal personality.

Q. Does the guild make any levies? Are they compulsory?—*A.* Not always. The principal character of the guild until recently may be described as a mixture of the old craft guild and the modern employers' association.

Q. It is not in any sense a trades' union?—*A.* It is not a trades' union. It is an employers' association primarily. It would have general functions in regard to the general interests of the trade and amongst these functions one of the most important is the attempt to improve quality, and a number of them have from time to time developed schemes for the inspection of goods. They sometimes issue labels marking the first, or second, or third class quality of the goods. I was told the result of this system was frequently negligible. Very often the label was no real guide to quality.

Q. Do they deal with the question of wages from the point of view of the employer?—*A.* They do not deal with the question of wages. That is not the work of the guild. What the guild would do would be to develop exports, to find out where there are possible markets and to encourage improved methods of production. They might approach Government to give a subsidy for these objects.

Q. Is the aid which the Government gives in so many ways returnable to Government?—*A.* I do not think so. In the earlier days I understand that Government did actually make loans to the guilds on the security of the machinery. That does not take place now.

Hon'ble Sir R. N. Mookerjee.—Q. Since what time?—*A.* I cannot tell you any precise date. These present guilds are to some extent the survival of the medieval craft guilds which have existed from the middle ages in Japan. When the Government in the early days was looking round for ways of developing industry, it would naturally have fixed on the guild as a corporate body with which to deal conveniently.

Sir F. H. Stewart.—Q. Any Government aid to the guilds would go through the local prefectures?—*A.* Yes.

Q. Do you think that the presence of these guilds is likely to lead to the association of members in the shape of trades' unions?—*A.* I do not think that the presence of these guilds is a very important factor from this point of view. I think it quite likely that trades' unionism will develop in Japan at some time or other. How soon it is very difficult to say. Government will try and suppress it.

Q. That is rather the gist of my questions. Here is a country which has made enormous progress in a comparatively short space of time. Do you think that things are going on smoothly? Are there any signs of the manifestation of discontent either on the part of their own people, or elsewhere?—*A.* One often hears the word 'industrial revolution' applied to Japan, and the suggestion is that Japan has passed through the industrial revolution. But Japan has not yet passed through the industrial revolution in so far as that phrase implies the social changes which are associated with the Industrial Revolution in England.

Q. And therefore when one speaks of Japan as a model to be imitated, one has to be very careful indeed as to the proper lines of development?—*A.* There are certain dangers attendant on industrial development in any country in the world. You may imitate Japan, for instance, as regards the protective tariff, the banking laws and the matter of establishing subsidies, but industrial development will bring social problems in Japan and in India apart from the adoption of these particular practices.

Q. Do you know whether the Government gets any return on the shipping subsidies?—*A.* The Government makes some arrangement whereby the shipping companies must carry the mails and in certain cases troops.

Q. You say that the cultivation of land in Japan is very intensive? What kind of manures do they use?—*A.* The principal manure is the human manure. The Japanese make full use of this. In towns and in the country districts alike it is all preserved and sold. They also use a good deal of sulphate of ammonia.

Q. Is the use of artificial manure increasing?—*A.* I think so. The use of human manure is of long standing. The use of ammonia and that sort of thing is more recent and is increasing.

Q. And bone meal?—*A.* Yes. They get a certain amount of fish manure too. I have not paid very much attention to agriculture.

Q. With regard to the fishing industry, do you think that the fisheries are the foundation of Japan's mercantile marine and its navy?—*A.* No, I do not think so. I think the foundation of her mercantile marine and her navy might be found in the ships which were built in the period of the feudal era with an idea of resisting foreign invasion. I think that is probably the origin.

Q. Do you think that the climate has a large effect on the temperament and life of the people?—*A.* I think the climate has a large effect on the vigour and the propensity for active life on the part of the people.

Q. Do you agree that much is also due to the discipline and training of the people?—*A.* That accounts for the general habits of obedience. That might account quite well for the readiness with which the Japanese submit themselves to the control of the policeman.

Q. And in that you see to a certain extent the survival of the old feudal ideas?—*A.* Yes. I do not want to suggest that the Japanese are a submissive lot of people. They

cannot be driven like a mob. They are independent in many ways. They have strongly developed in them the spirit of fighting. At the same time they are accustomed to discipline. I do not want to exaggerate that. For instance, in a factory you will have to be very careful as to how you deal with Japanese labour. Difficulties may arise now and then. They are touchy in many ways.

Q. Passing to the question of factory law, why has not the Factory Act of 1908 or 1911 been brought in operation?—*A.* I have pointed out that they have not yet organised their inspectorate and for that reason the Act is scarcely operative. The position was not very different in the early days of factory legislation in England.

Q. Can you divide the factory labour into the family labour and general?—*A.* There the law is that no child under 12 may be employed in a factory.

Q. Would you say simply that they work all their labour to the utmost possible extent?—*A.* Yes.

Q. Would you say that the exploitation of cheap female labour is likely to have a deteriorating effect on the womanhood and consequent race deterioration?—*A.* I think it is often prejudicial to health, but I doubt whether it is such as to cause race deterioration.

Hon'ble Sir R. N. Mookerjee.—Q. Are the females also educated in Japan?—*A.* Yes. They all go to elementary schools.

Sir F. H. Stewart.—Q. Taking that point, is it not likely that female labour is likely to be a national loss in the long run?—*A.* If you mean to ask whether it will affect the population, I should think that it probably does conduce to a high rate of infant mortality. But without female labour the standard of living would be lower. It is a question of conflicting forces. I do not think however it will have a lasting evil effect.

Q. You say that the Japanese is a very inquisitive person interested in new ideas and you doubt whether the same could be said of any other Asiatic community. Can you suggest how this comes about?—*A.* In emphasizing this aspect of the Japanese character, I am unable to say to what extent it is due to education or to other causes. I am inclined to say it is only partly the result of education.

Q. On page 15 of your note speaking about the Government pioneering industries you say 'Since the eighties the Government have been convinced of the folly of official trading.' Would you agree that practically all the Government pioneering enterprises were failures?—*A.* In this early period, I do not think they could be called failures. They were failures probably in that they did not achieve a profit-making position. When they were handed over to the various private enterprises, I think they were a success in the sense that they had paved the way to private enterprise.

Q. Your suggestion is that Government gave it up, simply because it could not go on?—*A.* That was probably true in a measure. Towards the end of the seventies financial difficulties were pretty urgent, and Government was looking round for various ways of economising. Also by that time a number of private people were ready to take over these enterprises. Government at the same time was anxious to save money.

Hon'ble Pandit M. M. Malaviya.—Q. You say on page 15 'By 1880 the Government had become convinced that manufacture was more efficiently conducted in private than in public hands.' It was on that ground that Government transferred these enterprises, and not because they were failures. This is also supported by what you say on page 4?—*A.* You cannot judge of failure purely by reference to a balance sheet in this matter. Government at this time was looking out for every means of economising, and private individuals had come along ready to take over management. They made offers to Government to take the thing over. Public opinion also supported that.

Sir F. H. Stewart.—Q. What was the old Japanese currency system?—*A.* Japan has possessed a variety of currency systems. It passed through a succession of rapid changes in the course of ten years. Before 1868 there was no uniform currency at all. Each of the feudal chiefs had the right to issue currency. Government early endeavoured to introduce the gold standard, but for a time they failed. Until about 1886 the currency was chiefly of inconvertible paper. This paper was gradually made convertible in silver. Finally in 1897 the gold standard was adopted.

Q. You say on page 16, 'The country has passed from the stage in which industry depended on the patronage of the State to that in which private enterprise was able to manage it on its own account.' Would you say that India has reached that stage?—*A.* A simple answer to that question would be misleading, because the conditions in India to-day are so very different from those of Japan at this early period.

Q. In the next paragraph you say that the outstanding fact is the manner in which the people themselves responded to the lead thus given. Would you ascribe that to the education that has been given?—*A.* I would not ascribe that to education so much at this early period. People in the eighties began to go to America and many other countries and learn the ways of foreign nations. There was a great desire on the part of the people to study western methods of banking and doing business. After the men came back they started firms. They had to pass through great difficulties and a good deal of capital was lost. But the people stuck to their work and frequently achieved success.

Q. With regard to shipping subsidies, what was the initial reason of the aid given by Government? Was it to promote the export trade of the country?—*A.* I think the original reason was to promote the export trade. It had for a very long time been the belief on the part of the Japanese statesmen that they wanted a favourable balance of trade. I think it had its origin in the currency difficulties of the eighties. They wanted precious metal and the way to secure that was to get a favourable balance of exports.

Q. On page 28 of your note you speak about banking facilities and the foundation in 1880 of the Yokahama Specie Bank. Was it due to the fact that the European banks did not help those industries?—*A.* I am afraid I don't know whether in 1880 there was any European bank in Japan. I don't know when the Chartered Bank and other banks were started.

President.—Q. You don't know what the attitude of the European banks was towards Japanese industries?—*A.* Not at that time. The Yokohama Specie Bank was definitely started with the idea of financing export trade. I imagine that one may assume from that that, whatever the banks were, in Japan they did not give the facilities that were desired.

Sir F. H. Stewart.—Q. On page 31 of your note speaking about the Tokyo Technical School for instance you say "The most important feature of the Tokyo school is its organization and equipment on a scale that not only enables it to turn out graduates with capacity to pass after a short time from the school to directive posts in industrial enterprises, but also puts it in a position to serve as an industrial experiment station." In the next paragraph you say that large firms have not their own apprentice schools and that they co-operate with the technical school so as to give to the students workshop experience as it exists in the factories. Is it not rather a contradiction in terms?—*A.* I do not think so. I don't mean to say from this that as soon as a person graduates from the Tokyo school, he is competent to take directive posts. The factories often co-operate with the school to give a certain amount of workshop experience during the school career. But what I refer to is the fact that graduates from the technical schools appear early in positions of responsibility in industry.

Hon'ble Sir R. N. Mookerjee.—Q. Are Japanese technical schools well equipped?—*A.* The Tokyo school is; particularly the Weaving Department. They have a very good man at the head of it. He struck me as an exceptionally able man who had not only knowledge of English processes of manufacture, but had travelled all over Japan with a view to see how machinery could be most effectively set up and what improvements can be made in the Japanese mills. I could not tell whether the machinery is up-to-date. But the manager assured me that it was.

Sir F. H. Stewart.—Q. On page 38 you say that there seems little doubt that the protective policy of Japan has been a hindrance rather than otherwise to the growth of these export industries. And again on page 8 you say that the tariff has certainly had the effect of promoting the growth of new industries. Can you reconcile these statements?—*A.* I think the idea ought to have been a little further developed. What I think is that the protective tariff has probably hampered Japan's export trade. If you take the textile industry for example, the increased cost of machinery due to the tariff must be very considerable. It is true that she gets certain advantage from the cheaper freights which may be due to the shipping subsidies. But speaking generally the exports, such as silks, cottons, braids, etc., have probably suffered from the tariff. On the other hand the tariff has certainly assisted the growth of other industries, *e.g.*, engineering trades, and many smaller branches of manufacture.

President.—Q. The protective tariff was at a low rate?—*A.* It is rather a high rate. The present rate on textile machinery is I think 15 per cent. It is about that at any rate.

Sir F. H. Stewart.—Q. What would you give us as the date when Japan really adopted a definite tariff policy?—*A.* She adopted a protective tariff at the date that I have mentioned. That is to say in 1904 she was able to denounce her old treaties and she effected the Tariff Revision of 1906, but her present high tariff first came fully into force in 1911.

Q. The suggestion here is that by that time most of her industries had already reached a fairly advanced stage.—*A.* Her textile industry had reached an advanced stage. I think the present effect of Japanese protective policy is to hinder the export trade, but to develop a considerable number of other industries, mostly on a small scale. The difference in duty between manufactured and partly manufactured goods for example, has brought a number of small manufacturing trades into existence.

Q. To sum up then the whole of what you have said, would you agree that it is the quality of the people themselves rather than State aid that has raised Japan in the eyes of the world?—*A.* It is very difficult to answer a question like that. I should certainly say that but for the inherent qualities of the Japanese themselves all the activities of the State would have been in vain. I think the Government has also been active to a considerable degree in keeping permanently before the people the needs of Japanese economic development as a whole. Generally my answer is 'yes'. I quite agree that the qualities of the Japanese are an essential element in their progress. But at the same time, the people could not have made the progress they have without the help of the Government.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. If the Government did not come in, what would have happened?—*A.* The rate of progress would have been slower.

Hon'ble Sir R. N. Mookerjee.—Q. Do you think that the Government of Japan have done more to develop the industries there than the Government of India have done here?—*A.* I think that in this connection one has to remember that Japan is a small country, and that it is a more or less comprehensive unit. Its problems are very easy to grasp. I do think that the Government of Japan has shown a degree of activity, hard work and intensity of purpose and energy in this connection of which I have seen absolutely no counterpart in India, and I think myself that it is one of the great defects of Indian Government so far. Speaking with a full realisation of what Government has achieved in other directions, I believe that the Government has been extremely lethargic in the matter of industrial development. They have not regarded it as within their sphere. I feel always that if Germany had been in command of India, the industrial exploitation of the country would have been carried forward with far greater vigour. I feel that both at home and here Government has not regarded it as within its proper sphere to take up the question of industrial development.

President.—Q. It would be fair to say, by way of qualification of that statement, that Government have found certain systems here and treated them as sympathetically as possible, and they have not followed the policy of interfering with them. I only make that remark because of the suggestion that if Germany had been here she would have done better. Germany would of course have done something. But at the same time, she would have broken down caste, interfered generally with the rigid observances of the people and turned them into machines for her own use without any regard to the genius of the people.—*A.* Certainly, I am not urging that German rule would have been for the real gain of India. But I believe our Government has carried *laissez faire* too far. For example, I believe Government could do much to increase the capital wealth of India. The Japanese Government has added greatly to the tax burdens of the people, but it has also added enormously to the capital wealth of Japan in recent years, and that is I think one of the things that Government will have to take up in India.

Hon'ble Pandit M. M. Malaviya.—Q. Is it not a cardinal fact that the Government of India have looked at questions of industrial progress in this country from a very different point of view from that from which the Government in Japan have looked at similar questions relating to their country? The Government here have helped European commerce and trade as largely as it thought it to be necessary by means of the Presidency Banks, but the Government have looked indifferently at the manufacturing industries which have been established in this country, whether European or Indian, without concerning themselves very much in promoting them. The Government have not hitherto regarded it as a part of their policy to train up Indians for business enterprise on a large scale, whereas in Japan you see quite a different situation. Take for instance the development of banking. Count Okuma says in his book that the Government of Japan in 1872 invited Mr. Alexander Allan Shand, recently a Director of the Paris Bank in London, to act as an adviser to the Government in banking. He wrote valuable books on banking, instructed young Japanese in the art of banking and paved the way for the development of Japanese banking?—*A.* If I may say so, the situation in Japan at that time was entirely different from the situation in India. The Japanese currency system was in a chaotic condition. It was a matter of absolute urgency from the point of view of the State that they should set their finances in order.

Q. But at the same time Government did secure instruction to young Japanese in the banking line?—*A.* Certainly.

Q. You find that the Japanese Government have encouraged the Japanese to go into the banking business by making it a condition that the shareholders in the Japanese banks should be entirely Japanese?—*A.* I did not know that was the case. It is very likely.

Q. In the matter of industries then the Government in India followed a policy of *laissez faire*, whereas an active policy of encouragement and help was adopted in Japan, and that accounts for the difference in the progress in the two countries?—*A.* I have already said that the activity of the Government has been a very important factor. It is very difficult to say how much can be ascribed to one reason or the other.

Q. Of course, as you said, education has played a very important part in qualifying the Japanese people for industrial progress?—*A.* Yes.

Q. I see Count Okuma saying that the general progress of national education has considerably augmented the efficiency of the workman and has greatly improved his characteristics, and certainly that factor cannot be ignored in judging of the efficiency of the people and their ability to respond to schemes of industrial enterprise?—*A.* Yes.

Q. Look again at the question of shipbuilding. Here again Count Okuma says that the system of technical education prevalent in Japan has considerably improved the ability of the Japanese in developing this industry. The Japanese have developed the shipbuilding industry, the ammunitions department and their arsenal, all in the course of a few years with the help of the technical education that has been provided in the country?—*A.* That is true partially, but I think there is a slight exaggeration. With regard to the Japanese naval yards, their success and their ability was not absolutely due to the Japanese technical instruction. Quite a number of Japanese had been to Germany and England, and they learned the art of shipbuilding and came back and began to work in their own country. From time to time many foreign workers have also been employed in these yards.

Q. You mean to say that the system of technical education provided in Japan, supplemented by an education abroad, has fitted the Japanese people and has enabled them to work up their own shipbuilding industry?—*A.* Yes.

Q. Judging from all that you have said, you are satisfied that if a similar system of education both at home and abroad is established for Indian youths, there is every reason to think that they will also acquit themselves equally creditably?—*A.* I am afraid you are asking me to prophesy.

Q. I say judging from what you have said about the effect of technical education in Japan.....—*A.* I do not think I have said anything to suggest that by means of mere technical education in India you would have flourishing industries established in India. I should think that certainly in some parts of India it would be true, but again it becomes a matter of prophecy.

Q. On page 17 you say "To organise and direct the industrial development of the country has come to be regarded as pre-eminently the function of the State, to take stock of the country's resources as a whole and to assist in their exploitation, to open up foreign markets and to aid manufacturers to gain a position in those markets, to give special encouragement to economic research and experiment, to exercise a guiding control over the flow of capital, all these are regarded as the principal duties of the Government"?—*A.* Certainly.

Q. And you think that the adoption of a similar policy would go a great way towards developing the industries of this country?—*A.* I think the development of any country depends upon many different factors. The natural resources of the country, the character of the people, their labour and so on, all of which I have tried to indicate in the prefatory pages of this report.

Q. You say on page 17 that when passing the naturalization law the Government stated that in order that economic life should flourish, it was necessary that the railways which are the means of carrying on commerce of land should be under the control and management of the State, and towards the end of that page you say that it is certain that a considerable section of the Japanese commercial world is unconvinced with regard to its advantages. What grounds have you to think so?—*A.* I had notes of statements which a considerable number of Japanese business men made to me. They said in the first place that the State has not been as active as it should have been in the matter of promoting new railway construction. It depends on the exigencies of State finances, whether funds are set aside for new construction or not. If the Government balances are short, then no new construction takes place apart altogether from the needs of the community. On the constructive side it has resulted in a slow rate of development. On the working side it has led to a great deal of wasteful expenditure.

Q. You say that the lowering of railway freights was to be achieved by the economies resulting from consolidation. Has that been achieved?—*A.* What I pointed out was that a good deal of consolidation has taken place. You will see from the figures of the mileage given that before the State purchase there were 3,232 miles of private railway. Now the mileage is 1,121. That means consolidation under State management. What I point out is that before the State purchased 17 private companies by the law of 1906, there was already in process a considerable development towards consolidation, and that might have gone on independently of State purchase, and hence the gain from consolidation is not necessarily dependent on State working.

Q. You say on page 18 in the last sentence of the first paragraph that it is admitted that the cost of working under the State has been higher in the case of certain sections than it was under company management, but that, on the other hand, it is argued that this is off-set by the greater facilities given to the public?—*A.* I don't say that myself. I only say that it is argued by the Government that the higher cost of working is off-set by the greater facilities given. I made a number of enquiries. You will understand that it is a matter of extreme difficulty to say whether the Government contention is justified. It is impossible in the first place to know what facilities these railways would have given had they been left under private management. The State maintains that one of the very important facilities it affords is the very low rate which it gives for long distance traffic, particularly for export traffic. It is impossible for anybody to say whether equal facilities or better facilities could have been given if the railways had been continued under private management. But there is a great deal of dissatisfaction. The opinion of a large number of big business men was rather opposed to the continuance of State management.

Q. Have you got notes of the opinions of these men?—*A.* I have made notes of the conversations that I had.

Q. Have you any objection to supplementing your note with these notes, that is to say, to quote what they actually said?—*A.* In the first place, I would not like to do it. I should not like to publish in any public report that a particular business man told me in the course of conversation whether he approved or disapproved of the Government policy. I think that to do so would be unwise, but I can say as a matter of fact that a number of big and representative businessmen in Tokyo hold that opinion. I don't think that opinion would be rendered more valuable by publishing the name of the person who expressed it.

Q. You have found that as a result of State management, the Government has been able to pursue a policy which it conceives to be in the public interest rather than for private profit.—*A.* That is true. It enables the State to determine railway rates and to apportion facilities on grounds of public advantage.

Q. Turning to page 22 I find that speaking about ocean-going steamship services, you say that there is a competent Minister of State who is empowered by law to grant navigation subsidies to Japanese subjects and commercial companies, whose members or shareholders are Japanese subjects undertaking transport business, and to cause them to maintain a regular service on certain ocean routes. Is that not another illustration of what the Japanese Government are doing with a view to encouraging the Japanese to take to these pursuits?—*A.* Certainly.

Q. On page 28 of your note you discuss the question of the Industrial Bank in Japan. Have you seen Mr. Shirras' note on the subject of Industrial Banks in Japan. I shall just draw your attention to page 36 of the note where Mr. Shirras speaks about the functions of the Industrial Banks. He says that 'the Nippon Kogyo Ginko may make loans on the security of land and buildings belonging to factories, as well as on the security of land and buildings and cities and in towns assigned by Imperial Ordinance, provided the total sum of these loans shall in no way exceed half the amount of its paid-up capital. You therefore find that they can make advances on the security of lands and buildings belonging to factories. Again speaking about Government guarantees it is said—"If the dividend to be declared for any business year of the Nippon Kogyo Ginko does not amount to 5 per cent per annum of the paid-up capital, the Government shall give a subsidy to make up the deficiency, provided that the period of the Government's liability under this article shall be limited to five years reckoned from the last day of the first business year of the bank, and provided further that the amount of the said subsidy shall in no case exceed 5 per cent of the paid-up capital." If such an Industrial Bank were started here, do you think that a subsidy like that given in the case of the Japanese Industrial Bank, would draw forth private capital?—*A.* I should think it would be probable.

Q. In answer to Sir F. H. Stewart you spoke about the effects of elementary education in qualifying the people for their work. Is it a fact that a practical turn is given to the education that is imparted in all the elementary schools in Japan?—*A.* I think so. They definitely try to make it practical.

Q. To qualify the recipients of it better for their particular vocation in life?—*A.* Yes.

Q. In addition to all that has been said above, you say that there is a very general sense of State influence as pervading, controlling, leading or being led by the forces of private enterprise. Do you think that, apart from any particular scheme which may be put forward, the creation of a similar feeling evidencing the moral support of the Government for industrial enterprise, would go a long way to promote industrial development, that is, if the people could feel that the Government is at their back, trying to support them?—*A.* I think that it would be true in many cases. But I think there are some important cases in which people should be made to feel and act upon their own responsibility. There are of course other instances where it is necessary that you should feel that the Government is taking an interest and will be prepared to help.

Q. Can you think of any enterprise or business in which such a spirit would not help the growth of industry?—*A.* I think that it is a very well established fact that excessive reliance upon the Government discourages enterprise.

Q. I am not talking of reliance but of the feeling that the Government was standing by to support and to render, when necessary, as much help as it could.—*A.* Is it not likely that such a course would weaken the sense of individual responsibility?

Q. Your question presupposes that Government would render aid without discriminating whether a particular case deserved it or not.—*A.* Very often it is difficult to say, until the actual crisis is faced whether the thing is worth supporting or not.

Q. Don't you think that the consciousness of such a feeling will be an advantage to industry all round.—*A.* I think in some cases it will be an advantage. In other cases it will be a disadvantage. There might be an inclination to depend too much on Government assistance.

Q. Does any case strike you at present in which it would be conducive to the benefit of industries?—*A.* In some cases it would, but I think that in other cases it would be a disadvantage, if the State for instance were to put itself in a position of general responsibility for the risks which are incurred by private traders.

Q. That is not my question. I am referring to the feeling on the part of the people that they have the moral support of Government to correct them, as well as to help them, in industrial enterprise?—*A.* If it is only a perfectly general feeling, then it would be a good thing; if it is only a mere sense that the Government is there, fully alive to all the problems, conversant with all the details, and prepared to give help if it can give help, then I quite agree with you, but I do not wish to suggest that it is necessary that people should feel that the Government is going to support them in all their difficulties.

Q. Turning to the question of the gold standard, you say on page 15 that by far the most important economic event was the reform of the currency which after many vicissitudes was completed by the introduction of the gold standard in 1897, thus removing one of the greatest obstacles to trade and to the import of capital with which the country had to contend. Do you think that placed as India is, the adoption of a gold coinage here

also would lead to advantage in the matter of the country's trade.—*A.* I don't think so. You never see a gold coin in Japan.

Q. What coins are there?—*A.* The coins in use are tokens of silver and nickel. There is no such thing as a gold currency for ordinary business purposes in Japan.

Q. You mean for purposes of trade.—*A.* That is what I mean. It is not used. It is paper and subsidiary silver, nickel and bronze coinage just as you have in Calcutta.

Mr. A. Chatterton.—*Q.* Is it the same thing in the United States?—*A.* Yes, very largely, but a good deal of gold currency is used in the United States.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* I find that Japan first started building factories and getting European managers to manage them, before the Japanese themselves were educated in technical matters.—*A.* I think so. Yes.

Q. And then they sent their boys under some conditions to Europe to manufacturers to be taken as apprentices, and when they came out they took up the industries in Japan.—*A.* Yes. You are now referring to the early period of Japan's development.

Q. On what lines do you think that technical education in India should proceed? Should there be factories simultaneously with technical schools.—*A.* I think it is a very important point that the under-graduates in the technical schools should have an opportunity of getting workshop practice at the time they are receiving technical education.

Q. Would that be practicable in India where there are no industries to absorb them.—*A.* That is a difficult point of course. I am supposing that it can be arranged.

Q. Do you think then that the first thing is that primary education should be imparted all over the country.—*A.* I should say that universal primary education is impracticable politics in India at present.

Q. Don't you think that an educated boy can work better even in the mills than a man who has had no education?—*A.* I think so.

Q. In reply to Sir Francis Stewart you said that the tariffs are hampering Japanese export trade.—*A.* I think so, because it has directed capital in the first instance into relatively unremunerative enterprises.

Q. Do you know what is the chief available export of Japan?—*A.* Silk is the chief export, but that is not strictly speaking a manufacture. Apart from silk, cotton goods are the chief export.

Q. How do the cotton goods flourish after the tariff wall was put in?—*A.* You find a decline or arrested progress for a year or two after the tariffs of 1911.

Q. In 1899 the figures for the trade were only 28 millions. It now comes to 18 millions. Has that retarded progress?—*A.* I do not know where you have got the figures. You will see that after the first year or two of the imposition of each of these tariffs, the export of cotton goods from Japan was rather stagnant and was not progressive.

Q. You refer to the year 1911 and 1913?—*A.* 1913 was a very active year. I was looking at the quantities rather than the values.

Q. Don't you think that the tariff has encouraged them to dump on the Japanese market and make profits with a bigger outturn?—*A.* It has secured them the home market perhaps, but I am inclined to think they would prevail there even without a tariff. I doubt whether the tariff helps them at the present time.

Q. Is it a fact that Japanese steamers take these goods, Japanese cotton goods, at a cheaper rate, and that if they did not do so, the Japanese Government would come down upon them?—*A.* I should think that it is possible. It is true, I think, that the Cotton Association have represented to Government that the Nippon Yusen Kaisha have charged more than they were willing to pay, and that Government has suggested that rates should be reduced.

Q. Is the Government spending much money on technical education in the country?—*A.* Not a very great sum. They are now discontented with the extent of their technical education, and they have recently appointed a committee to enquire into the methods of developing it.

Q. What comparison can you make in respect of the cost of living to the labouring classes both in Japan and India? Do they generally eat rice and fish?—*A.* Yes. The difficulty in making comparison between Japan and India is due to the fact that India is not a homogeneous country.

Q. Do you consider that the cost of living is higher?—*A.* I should say it is 50 per cent higher.

Q. You say that the railway gave much assistance to enable industries to obtain foreign markets. Do you think they gave and still give concessions in the matter of railway freights?—*A.* I think so certainly. It is very difficult to find out what special rebates are given. It is a matter of agreement with particular firms and shippers.

Q. About the cottage industries, how does the Government help them? Are there co-operative societies? Are there big financiers?—*A.* I do not think the Government helps the cottage industries directly.

Q. About the hosiery, how do they manufacture it in the villages?—*A.* If a firm wishes to place a large order for knitted goods, it will communicate with a number of smaller factories who in turn would know the cottage workers in the various villages. The knitting machines are often hired out by the central firms or some intermediate man to the cottage workers.

Q. There is no such system as that of the Sowcars?—*A.* No. It is all done by the bigger firms. It is done more or less on rational business methods. It is done without the intervention of the moneylender. As you know, one of the effects of this war has been to bring to Japan large orders for a particular type of goods, and the demand for uniformity of quality has led to these orders being carried out in factories which have been recently organised, thus causing hosiery to become a factory instead of a cottage industry.

Q. And then people will have to pay higher prices?—*A.* When they are manufactured on a large scale, the economies of large scale production will be much greater than those of small scale production.

Q. What other cottage industries are there?—*A.* The biggest is the silk-industry.

Q. You mean the manufacture of silk?—*A.* Silk reeling and silk-worm breeding as a cottage industry. The next biggest industry is, I should say, matting. Next comes straw braid.

Q. About insurance companies, is there any special Act? Are the Japanese insuring?—*A.* I have not seen the Act. Insurance is rather a new habit with the Japanese, particularly fire insurance. In the first place, fire is so prevalent that until recently no one was willing to undertake the risks, and they will now insure only the permanent structures. European structures are developing. The habit of insurance is growing.

Q. After your experience in Japan, what scheme would you suggest for India in order that she may also develop industrially?—*A.* I am afraid it is impossible to answer that question except in a very vague and general way. I have said already that the immediate lesson which I should draw from my study of Japan is that it is necessary for Government to take up a very much more active and forward policy in relation to economic affairs. If you ask my opinion as to whether the Government of India should imitate Japan in any specific particulars, I should say that there are certain instances in which India might copy Japan with advantage. Take the spread of education for instance. There is great need for practical elementary education in India. Government again can do much in the way of industrial experiment and by rendering expert knowledge available to the man of business. It can help to increase the fluidity of capital by means of industrial banking. I do not think that it is within the sphere of this Commission to discuss the question of tariffs. So we can leave that out. There is another direction in which India ought to advance, and that is in the matter of increased taxation and the use of the revenue for the capital development of the country. I believe India is a very lightly taxed country speaking broadly, although I know that it is a poor country. The habits of the Indian people have not led to the growth of capital, and that could be brought about if the Government enforced accumulation by taxation for use in capital improvements of the country both locally and in respect of other forms such as railways and so on.

Q. About the museums, have you seen any of the museums in Japan?—*A.* I have seen the commercial museums in Kioto and Tokyo.

Q. Have they got specimens of foreign goods?—*A.* They have got a certain number. They send out their agents to foreign countries such as India and China, and those agents pick out such articles as they think Japan might supply.

Mr. A. Chatterton.—*Q.* Before the industrial revolution began in Japan, she had developed her native industries and her commerce to a high level. In consequence of this when the people turned their attention to industrialism, they had a very large class of artisans to draw upon?—*A.* There were a number of craftsmen. But you could not call them artisans. One of the reasons alleged in the various reports as to the causes of the failures of the early Government experiments was that they had to rely very largely on untrained men, untrained local labour. They had to introduce mechanics from Germany and England.

Q. There is this difference in the conditions of Japan and India, that whereas the old Japanese arts flourished right up to the beginning of the modern era, in India during a period of half a century the indigenous arts had deteriorated?—*A.* I should think that is so, speaking broadly. But it is my own opinion that the connection between these arts and the industries in Japan is not a very close one, and I do not think myself that the decline of the arts in India would have any important effect in hindering the industrial development of India. Neither do I think that the maintenance of the art excellence of Japan would be an important reason for the rapid development of the manufactures of Japan.

Q. Do you know of any reasons why Lever Brothers were induced, during the last two or three years, to establish a large soap factory in Japan?—*A.* I went to Lever Brothers and had several talks with the manager. They were induced to start a factory when the tariff was put on in 1911 and there was a big rise in the price of soap in Japan. They thought that by planting a factory in Japan they would be able to take advantage of the high prices in the home market. They find that the home market in Japan helps them very little. They are doing a good export trade from the Japanese factory.

Q. Do they receive any special inducements?—*A.* None whatever. There was a little difficulty in first getting their site. The same thing applies to the Dunlop Rubber Company. They also went there under the same conditions. The Managing Director told me that they were also disappointed in their expectations of a good internal market. The competition of the small scale Japanese local man keeps down profits to a minimum.

Q. These small scale factories that you mention, are they able to turn out articles of good quality?—*A.* No. I think not, particularly in the case of bicycles and bicycle tyres and soap and so on. The Jap being a poor man wants a cheap article. They turn out things which are quite good enough for him at a very low price.

Q. Do these cycle factories import all their parts?—*A.* They do import a great many of the parts. They make also many at their own foundries.

Q. Have you any special information about the dyeing industry which has been subsidised by the Japanese Government?—*A.* None except what I have stated. The actual factory had not started. It had not been formed and the Act had been passed granting a subsidy. It had not started operations. It has been in a state of suspended animation.

Q. What is that due to?—*A.* I think the supply of the products of tar distillation is not forthcoming from the local mines.

Q. I see that in your note you do not give any information about the methods of carrying on business in Japan. Have they got any system corresponding to the Indian system of managing agencies?—*A.* No. There are foreign houses doing an import or export trade, but their business is declining before Japanese competition. These firms do not however manage productive enterprises as in India. I should say that about 16 per cent of the foreign trade of Japan is in the hands of foreigners.

Q. This transfer of business from the foreigner to the native Japanese, is that due to the natural growth of the Japanese in industrial and commercial matters, or is it largely due to the indirect efforts of Government by making it difficult to carry on business satisfactorily in Japan?—*A.* I hardly found a single foreigner in Japan who did not admit that business was becoming unprofitable, and that it was hardly worth while staying owing to the increasing competition and the direct business done by the Japanese houses. I should say that the reason for the growth of the Japanese houses is partly due to their ability and their own efforts, and partly to certain artificial aids which they get from the fact that Government will always prefer to buy through the indigenous agencies, and also because of the fact that the Japanese firms extend more credit to their customers than foreign firms. With regard to import trade the British firms are definitely handicapped by their unwillingness to give credit. The Germans are rather cutting out the British in that respect. If the Japanese buyer wanted to buy imported goods from a British house, that house will probably want cash against goods, but if he goes to a German house or a Japanese house, he will give a promissory note for 6 months. Then there is this other fact. Supposing that the British firm gives credit and that the Japanese buyer fails to pay when the proper time arrives, it is very difficult to recover the money. It is generally contrary to the sort of social practices that obtain in Japan to pursue a man for debt in the courts of Japan. If you do, you may not succeed in getting the money. The methods for recovering debt are bad. The Japanese firm will probably be able to recover its money sooner or later, while the British firm will give it up.

Q. What does the German do?—*A.* In such a case the German would probably bring diplomatic pressure to bear, whereas we never do it, the German attempts to put pressure through his foreign legation.

Q. On page 39 you give certain statistics regarding trading companies, showing them under the various heads of agricultural, industrial, commercial and transportation, and these figures are large. Do these figures convey exactly the same meaning as similar figures in regard to companies registered in Great Britain or India?—*A.* I am afraid I do not know how they will compare. These figures are quoted from the report of the Commerce and Industry Department as showing the growth of commercial trading.

Q. Is it not a fact that these are private partnerships?—*A.* These do not include private partnerships.

Q. Is it necessary that private partnerships should be registered?—*A.* This is a point on which I am not very certain.

Q. Is the industrial development in Japan proceeding on the joint stock basis, or is it growing mainly as the result of the efforts of individuals? Is it going through a stage similar to what British industrialism went through in the 19th century when small men started for themselves and gradually built up big industries and became great men?—*A.* At present you have a very large number of men who start in a very small way, in many cases people working in their own homes or cottages with very little machinery. Many such men strive to pass from the class of those working on the contract system to the position of entrepreneurs taking direct orders. Many fail, but some build up large business. In time these may become limited companies. But very many of the new undertakings start as limited companies at the outset.

Q. There is a lot of evidence to show that the cottage industries in Japan are very highly organised in regard to the development of the system of sale of their products. We want to see if we cannot introduce something of the same sort in regard to the smaller cottage

industries of India, and we want to ask you whether Japanese experience will help us much in that matter?—*A.* My own feeling is that it points to the right direction in which one wants to develop. There is a fairly well co-ordinated system in Japan by means of which the cottage worker is connected with the capitalist exporter or distributor. In India you have nothing of the kind. The cottage workers are more or less in the grip of a group of middlemen or mahajans. They are not efficient as business organisers, and often have a depressing effect on the cottage industries.

Q. We have in certain parts of this country systems analogous to those of Japan in the matter of these cottage industries. Where they are flourishing is in the export trades, and apparently one gathers from your note that the export business in Japan is much more organised than the local business?—*A.* I think there is in Japan a large amount of cottage industry, the market for the products of which being a restricted local area, there is no need for a highly developed organisation. But Japan being smaller and means of communication good, there is more specialisation than in India.

Q. Do the Japanese for their clothing in Japan depend upon the hand-loom weavers, or is it all entirely machine-made?—*A.* Entirely machine-made products. Of course I am not talking of silk goods.

Q. You mean for the poorer sort of people also?—*A.* Yes. They all use machine-made goods.

WITNESS No. 185. *Hon. Mr. W. A. Ironside.*

HON'BLE MR. W. A. IRONSIDE, *Merchant, Partner in the firm of Messrs. Bird & Co., Calcutta.*

Extract from ORAL EVIDENCE—*vide* page 891 of Volume II of the Minutes of Evidence.

* * * *

Dr. E. Hopkinson.—Q. Speaking about the timber industry, you say 'I trust that the Commission will secure the opinion of the leading practical men engaged in the timber industry, for it is capable of almost indefinite expansion. You told us when we were at the engineering works that you had a timber proposition now being developed in Assam?—*A.* Yes. A small saw mill and forest proposition offered opportunity for expansion, provided leases of large areas of suitable forest land could be obtained from Government at a reduced, or I should say on a more equitable system of royalty. These we hope to secure and thus enable us to find the necessary timber to keep a mill of commercial size in regular employment. Being in the midst of the tea district, we believe that a large demand can be found for plywood tea chests, the whole of which are at present imported—the mill already turns out about a quarter of a million ordinary boxes annually, and if we could obtain the necessary plant, the quantity could be largely extended. We have carried out experiments with local timber and it appears that some of it at least is quite capable of use for plywood manufacture. This machinery is already on the way.

Q. You have actually ordered?—*A.* Yes. To turn out 350,000 boxes annually working 54 hours weekly. We hope to make a decided effort to capture the imported tea box trade. Some of these timbers are at present unknown to the cabinet trade, but it is a matter to which we shall sit down and endeavour to exploit after we have got the machinery.

Q. So that you have got the whole of the cabinet trade to look forward to and not the tea boxes only?—*A.* We do not expect to be successful at once. As far as we know, we have taken every possible precaution, and we have been much assisted by the Forest Department who have placed the results of their scientific knowledge at our disposal.

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WITNESS No. 186. *Mr. W. Maxwell.*

MR. W. MAXWELL, *Kamrup Government Farm, Nalbari, E. B. Railway.*

NOTE:—*Witness did not submit written evidence.*

ORAL EVIDENCE, 17TH JANUARY 1917.

Mr. C. E. Low.—Q. I understand the position in Assam is this; that the local Government wish to prove the practicability of growing large areas of cane having a decent yield from the agricultural point of view, and they are undertaking to put a certain area, 1,000 acres, I think, under cane, within a certain number of years, and when that is done, or after three years I think it is, you have an option to come in and start the factory.—*A.* I start the factory now, but I undertake to take their cultivation over after three years.

Q. In the meantime, in order not to waste the cane, you undertake to convert it into gur?—*A.* Well, it is really a sugar factory.

Q. At any rate, at the worst, you undertake to take it over at a certain price, and make it into gur?—*A.* That is correct.

Q. It has been put to us by certain witnesses that it is an unduly favourable arrangement, and that it is unfair to other sugar factories that anybody should have so favourable an arrangement?—*A.* That is remarkable. That crop would have been lost if I had not done it.

Q. Quite so. It is not a criticism on you, but on the Assam Government.—*A.* I have not heard of that. I think the arrangement quite satisfactory and good from both sides. Who would work the cane off if I had not done it, I wonder?

Q. I am neither supporting the view nor refuting it, but I want to know.—*A.* The Assam Government did exactly the right thing, because there was no other body that would have done it except myself.

Q. Do you know if it was put before the public?—*A.* Yes, they advertised, but nobody turned up. Everything was done in the matter. I applied as it was advertised. Nobody in this country could have done it but myself. Nobody had a sugar factory at their disposal. It is a mistake to think that a gur factory is different from a sugar factory. I use the triple effect, and don't evaporate in the open. It is a factory costing at least Rs. 3,00,000. By the word "gur" one imagines a very trifling factory, but this is not so.

Q. I don't think any criticism was directed to the fact that you were making gur as an initial operation. Clause 10 of the contract, which has been sent us confidentially, reads, "If the Secretary of State is desirous of selling the factory, etc." (Reads section.) I suppose the objection raised in certain quarters to the Assam Government making this contract with you would be based on the fact that Government are doing the cultivation for you in the first instance, and selling you the cane at a certain price which works out roughly about to 4 annas; it would, in pre-war times, work out to 4 annas?—*A.* May be; perhaps.

Q. That is about the average price of cane in Bihar?—*A.* A little more than that. It depends upon the price. If the price is Rs. 8, it would be about 5 annas.

Q. It is probably rather better cane than the Bihar cane; what are they putting down?—*A.* Mauritius.

Q. It would be better than any cane except canes grown in Java. What personal experience have you had of sugar manufacture?—*A.* I have built about 16 large sugar factories in Java, and I have been to most sugar-growing countries, and know Java to be the best as regards cane and everything. Cuba yields nothing like Java. Hawaii yields a larger crop. The cost price of the sugar is about the same in the two lands, because Java has to replant each year, and Cuba only once in five or six years.

Q. Have you had any actual experience in the running of factories?—*A.* Most undoubtedly. How could I construct and build factories without it? I am a Colonial man.

Q. You have actually managed cane factories in Java?—*A.* Yes, superintended and managed.

Q. Have you had anything to do with the construction or management of factories in this country?—*A.* Certainly. Babnowli, belonging to the United Provinces Sugar Co.

Q. That is the factory to which Governme nt gave an advance of Rs. 7,00,000?—*A.* Yes.

Q. We have not been able to get any definite information as to what is happening about it?—*A.* I can give you all the information.

Q. Apparently the factory has not been a success, at any rate for some time. When was the advance made?—*A.* Excuse me, it is a marked success. Government has been paid their money back.

Q. Government wanted something more than getting their money back; they wanted it to be an object lesson. Do you remember in what year the advance was given?—*A.* About four years ago.

Q. Was it not before the Delhi Durbar?—*A.* I really don't know. I think it was about four years ago. The factory was erected rather late, and the first year was only an experimental year. They made 540 tons of sugar. The second year they made 1,650 tons of sugar, and the third year they made 1,100; this year probably about 2,000. A sugar factory in British India cannot make more than 2,000. A Java factory would be bankrupt if it made only 2,000. They must make 15,000 to 20,000 tons per season. This country is totally different to all others; large factories should not be made here. Babnowli is about the maximum. You had Mr. Ironside saying to-day that it was the failing of the factory that it was made enormously large. I know factories to cover 100 miles.

Q. It is a private concern, not a public company?—*A.* It is a private concern. It has been a complete success in every possible way, financially especially.

Q. The owners are satisfied and have made money, and have been able to clear off their loan?—*A.* We have only to pay Rs. 20,000 a year of the loan back.

Q. Including principal and interest?—*A.* Rs. 20,000 *plus* interest. We are registered in England, and half of our profit goes to the British Government. We are paying about

Rs. 40,000 per year to Messrs. James Finlay & Co., which comes out of the profit. There are other things which it would be very wise if Government investigated. Messrs. James Finlay & Co. got in and are having an enormous commission. That is one of the things I warn you against; if ever Government give a loan again, let them look out that these men are not allowed to plunder. The usual commission on the selling of the sugar is 2¼ per cent. In England James Finlay's demanded and received 4¼ per cent on the selling price of the sugar, on the selling of 2,000 tons (56,000 maunds). Then they have here Rs. 350 per month as agents of the company. They have in London Rs. 312 per month acting as secretaries. One of their managing partners receives about £400 a year. This is what I want to warn Government against; Government should always retain the power to prevent such things taking place.

Mr. A. Chatterton.—*Q.* Are not Messrs. James Finlay & Co. the recognised agents of the company?—*A.* It is for this they receive the Rs. 350 a month. They cannot sell the sugar; they have no right to take it; they have to sub-let it to Messrs. Bird & Co. They pay Messrs. Bird & Co. 2¼ per cent for selling the sugar.

Q. Messrs. James Finlay & Co. were the managing agents of this Babnowli concern before the loan was granted?—*A.* No, after.

Q. Did they negotiate the loan?—*A.* They had absolutely nothing to do with it.

Q. At the time the loan was granted, who were managing agents?—*A.* There were no managing agents at that time. There were private proprietors. They are deeply indebted to Mr. James Finlay, and that is how they put the wedge in.

Mr. C. E. Low.—*Q.* Who is responsible for the design and erection of the machinery in this factory?—*A.* The Sugar Machinery Manufacturing Co., London.

Q. Who designed it?—*A.* My son, Mr. Maxwell.

Q. Since when did your connection begin?—*A.* Before the sugar factory was put up. I had then one-fourth share and since then have bought one-eighth more.

Q. You or your son were concerned with the erection of the machinery *ab initio*?—*A.* Yes, from the beginning.

Q. Who is managing the factory now?—*A.* Mr. Mackinnon, and a certain Mr. McGlashan.

Q. Since when was that arrangement made; when did these two gentlemen manage it?—*A.* Mr. Mackinnon always managed it from the first, and Mr. Maxwell worked two crops off. He worked the first difficult crop of 530 tons, and the second of 1,650. The third crop of 1,100 tons was worked off by Mr. McGlashan, and the fourth crop is being worked off now. It is more than four years since the money was obtained.

Q. It is the only instance, as far as I am aware, in which Government has given a big loan. We have no information before us, and have been unable to obtain any definite information as to what Government did to look after it and see that the loan was properly applied, and that the object of Government, *viz.*, the increase of knowledge, was achieved.—*A.* It is very far away from all communications, but the concern is a complete and absolute success financially.

Q. Is anything done by way of taking in apprentices, or was any such condition made?—*A.* They are welcome no doubt to go there, but I don't think it has taken place yet.

Q. There is a Government Sugarcane Engineer in the United Provinces, but I don't think the Commission was able to see him.—*A.* Is that Mr. Hulme? He is supposed to be not exactly in the United Provinces, but further away.

Q. He is certainly attached to the United Provinces, but has he had anything to do with the concern?—*A.* Nothing. I don't think he exactly possesses the knowledge to be able to do so. It is a large factory, and I don't think he could do that.

Q. But Government being considerably interested financially in the concern, one would naturally imagine that they would take some steps to ascertain whether the cane was going on all right, through their Sugar Engineer. He would be competent to form an opinion as to how it was going on?—*A.* So long as this Rs. 20,000 is paid, *plus* interest, the Government I don't think have much direct power. They may do it no doubt; why should they not? they have every moral right to do it.

Q. It is a little difficult to judge about the desirability of this policy of making loans, when so little information exists practically in connection with the only example.—*A.* I am against loans, because they get into the wrong hands generally. It is often a question of influence and not of ability. For instance, in this case, I really believe if I had not been in it, it would have resulted in a very great fiasco, because a zemindar who is used to collecting rents all his life knows nothing about it. That is Mr. Farquhar Mackinnon. Then there is Mr. John Macdonald. It is a question of influence, it does not come into the right man's pockets. Here it has turned out trumps, as Government will get their money back easily. It is quite safe, but it might have been different.

Hon'ble Pandit M. M. Malaviya.—Whose influence was it that obtained that money?—*A.* I believe it was the influence of Mr. F. Mackinnon, because he is an Honourable. He was on the Board there in Sir John Hewett's time. He could not give it to me because I had no

landed estate in India. It is a long story. I sent Mr. John Macdonald out here to try and find a place to put a sugar factory on, for myself. I approached Sir John Hewett and asked him to assist, not necessarily with a loan, I forget, it might be more in the way of land. I wanted it because I did not know the agricultural circumstances in India at that time. But he could not give it to me because I had no landed property here, and Messrs. John Macdonald and F. Mackinnon knew all about my attempt to get this money. They said, "We have landed property, give it to us," and so Sir John Hewett said "Good, I will give you the Rs. 7,00,000." They approached me and I bought a quarter share, and since then a certain Mrs. Macrae, who owned one-eighth share, wanted to sell it at a rather higher price, and I bought it. That is the whole thing. The money is all right. The first year we paid off part of the loan, it was Rs. 1,13,000. The first payable year we were not asked to pay. Since then we have had to pay one-twentieth of Rs. 7,00,000, *plus* interest.

Q. What interest do you pay?—*A.* 5 per cent. Next year we will pay more, and I propose to pay Government back much more rapidly to show our appreciation.

Q. When the loan was given to Mr. Mackinnon, you were not a partner of the firm?—*A.* I was not a partner in the estate, but they wanted me, and afterwards they sold me a quarter of it.

Q. Had they been doing a sugar business?—*A.* Never before. On principle it was quite all right. On principle they wanted to establish sugar in the United Provinces on a proper European basis, and their object has been reached.

Q. Mr. Mackinnon had not been doing a sugar business before that?—*A.* No.

Q. What was it that led the Government to advance him seven lakhs to start a sugar industry?—*A.* The Government did that because they wished to begin the sugar industry in the United Provinces—a very praiseworthy undertaking on their part. That was the only way that Sir John Hewett saw it could be done, and he told them "Try and get Maxwell in," and they did.

Mr. A. Chatterton.—*Q.* At that time there were several sugar factories in the United Provinces?—*A.* No.

Q. There was one in Cawnpore?—*A.* Is that not a gur factory?

Mr. C. E. Low.—*Q.* There is a gur factory in Champaran, and a sugar factory at Mohara. That is part of the same concern, Begg, Sutherland & Co.?—*A.* Mohara was stopped at that time.

Q. Mohara is going on now. There was trouble about it because they could not cultivate their own cane,—*A.* I believe you can take it that there was no sugar factory in the United Provinces.

There was the Rosa factory also in the United Provinces.

Mr. A. Chatterton.—*Q.* At Unao?—*A.* Unao is a refinery. In any case Sir John Hewett made an effort and he succeeded, and the financial result is all right; better than any sugar factory that was ever made in India.

Mr. C. E. Low.—*Q.* Government having advanced this money, did they make no conditions about getting information as to results?—*A.* No, but you can have all the information that is necessary. They can get every information they require; they can walk into the factory and make themselves at home.

Q. That is supposed to be the idea with regard to Babnowli, but I don't know whether any proper agreement was drawn up in the case of Babnowli.—*A.* Government can have everything they want; they can make the agreement now if they wish.

Q. It was not a thing we thought the owners would be likely to be sticky about, but we should ourselves like to see the extraction results and the working. Could you let us have those?—*A.* I could not, because I am fire and water with Mr. Mackinnon. I detest the man and am afraid I cannot get anything for you. You could get the information, but it would not be reliable. I have asked for it very often but have not got it. I am satisfied with the financial results, but the information from Mr. McGlashan is of a very eighth-rate order. He is supposed to keep a certain financial control, but he does not do so; in fact if I did get them I would not trust them, I am sorry to say.

Mr. A. Chatterton.—*Q.* I did not understand the position. You are $\frac{3}{8}$ owner; have you no voice in the control of the factory?—*A.* Because I am $\frac{3}{8}$, the $\frac{5}{8}$ people have it in hand altogether. Mr. James Finlay has it in hand, because he has a quarter share of Mr. Mackinnon's. Mr. John Macdonald imagines himself poor and all sorts of peculiar things, and is irresponsible. He is unfortunately a Director and Chairman, and Mr. James Finlay is on the Board and has power over Mr. Mackinnon. The other, Mr. Macdonald, is only $\frac{1}{16}$ shareholder. It is rather a disagreeable mixture, but the chief thing is that the financial results are very good. I may say that those seven hundred thousand rupees were not nearly enough, as it has cost 10 lakhs. We have had to issue applications. Mr. Mackinnon got deeper in debt with Mr. Finlay.

Mr. C. E. Low.—*Q.* On what was that seven lakhs loan based? I think the United Provinces Government asked for 5 lakhs at first, and very soon afterwards—a few weeks afterwards—they wrote up to say that five lakhs was not enough and wanted seven. Do you know whether either of those sums was based on any estimate?—*A.* Yes, they sent several Government officials, Mr. Hulme was one of them. They decided that the value was there in the estate.

Q. I mean the cost of the factory.—*A.* They estimated above a million. The difference was only in the amount that the estate could find. The Government estimate was not exceeded.

Q. But the actual cost of the factory and working capital had been carefully estimated?—*A.* Not the working capital.

Q. The cost of the making of the factory and the capital required had been estimated carefully before their application was made?—*A.* Undoubtedly; there were several gentlemen there, I forget their names.

Q. And the variation in the amount and their success was simply due to the inability of the owners to find their own finance as they expected?—*A.* We all found it.

Q. Why did they change the estimate within a few weeks, from five lakhs to seven?—*A.* I don't know. I had nothing to do with that. But seven hundred thousand was little enough; they found five hundred thousand was absurd.

Q. My point is this; a man comes up and asks Government for a loan of five lakhs. Before granting the loan, I presume the local Government has seen that a pucca estimate was made out?—*A.* Government do not do such things. The local Government did not do it; they simply asked Mr. Farquhar Mackinnon what he wanted. He said five lakhs; then afterwards he asked for seven.

Q. So far as the local Government knew, there might have been an estimate or not?—*A.* The Government sent for his estimate after the seven hundred thousand was consented to.

Q. My point is, was that estimate made when they asked for the loan from the Government of India?—*A.* It was made after they asked for it. Then the seven hundred thousand was found insufficient, and we added the three hundred thousand.

Mr. A. Chatterton.—*Q.* You designed this plant for the Babnowli factory?—*A.* My son.

Q. What size rolling mill have you got there?—*A.* 30″ × 60″.

Q. An eleven-roller mill?—*A.* A nine-roller mill; that is the largest that should ever come to India. The capacity is 400 tons for 24 hours. They do about 350.

Q. You do not know whether this business was negotiated through the Department of Land Records and Agriculture?—*A.* It was not negotiated through anybody at all. The money was simply given. It is very fortunate that I had the spending of that money, but unfortunately Mr. James Finlay got the better of me. I would like the Government to get us out of the hands of Messrs. James Finlay & Co. We give half our profits to the British Government at home. I made a profit of £11,000 and after subtracting 6 per cent on the capital, I had to pay the British Government 50 per cent exactly. Messrs. James Finlay & Co. receive a certain commission on the gross sale of the products of that estate. I say that James Finlay's have absolutely no right to the commission upon that, because it is the British Government that has caused this war, at least the German Government, and it is an act of theirs, but they are quite well entitled to this 50 per cent. But James Finlay's have no right to the commission upon that because our product is not sold for that amount, but that amount less what we pay to Government.

Q. Are you under agreement with Messrs. James Finlay & Co. to keep them as agents?—*A.* No, but Mr. James Finlay has got the power because Mr. John Macdonald is a lunatic, and is not responsible for his actions.

Q. You as a partner with a $\frac{3}{8}$ share have no voice? Do you not have a Memorandum of the Articles of Association, and as a shareholder have you no right to vote?—*A.* I am overruled by the majority. The $\frac{5}{8}$ share have the power.

Q. Do they keep up this arrangement with Messrs. James Finlay & Co.?—*A.* Yes, because Mr. Mackinnon is hopelessly in debt and Mr. John Macdonald is not responsible for his actions. That is the reason for it. Anyway, the Government money is all right, but when the Government money, about Rs. 40,000, goes into the hands of Messrs. James Finlay & Co., I say it is not fair.

Mr. C. E. Low.—*Q.* Turning to this Assam question, have you got any figures for the actual yield which the Agricultural Department in Assam are getting for cane per acre?—*A.* It does not exist. You are asking too soon for these things.

Q. They have been growing it for two years, and they had trouble with the floods one year.—*A.* They have done their best, and it is a wonder they have that 300 acres there. The crops are all right and look about 25 tons per acre. The Government approached me too late. I have done this in record time in four months. I signed the contract on the 4th September, and the factory will be under steam at the end of this month, but I am not ready. I require seven months to do this. I will be able to begin at my contract time, *i.e.*, 30th January, but we should begin now. There is no doubt about it that next year I will begin on the 1st of January.

Q. What plant have you got there?—*A.* Three mills, nine-roller, which are quite up-to-date.

Q. Do you think that the output of 25 tons is capable of being bettered when you have got things more under swing?—*A.* They are making more per acre.

Q. You put down no manure?—*A.* No, virgin soil. That will go on for some years. We will hold rattoons next year.

Q. It is rather an important matter, because there seems a prospect for considerable extension in the manufacture of cane sugar in these virgin areas, and we would like all the information we can get?—*A.* You are rather soon for that.

Q. Now is the time as far as the country is concerned.—*A.* I have taken immense responsibility in this thing because I don't know whether there is any sugar in the cane or not. This factory may stop in another three years. Then I will have my 350 tons factory there doing nothing.

Q. As regards labour?—*A.* It is very difficult.

Q. How do you think it can be tackled?—*A.* I have the worst labour in the world and pay an awful price for it.

Q. The Government have got steam tackle?—*A.* That is for ploughing, but there is a lot of work that cannot be done by mechanical means.

Q. What labour are you getting at present?—*A.* Mine are fitters.

Q. When you have to take on the agricultural side of it, have you any idea as to how you are going to get your labour?—*A.* In the same way that they do, but I cannot pay what they do. My ideas of Assam are not great.

Q. Are there any tea gardens in the neighbourhood?—*A.* Not in the neighbourhood, probably 50 miles away. It is direct north from the station, Nalbari, 12 miles from Nepal before you come to Gauhati.

Q. It is not very distant or in an inaccessible place?—*A.* No.

Q. Is there more land like that available?—*A.* There is plenty of land.

Q. With reference to future industries of the same sort?—*A.* You have too many difficulties there. I would not like to begin sugar there.

Q. Somebody began tea there and solved the labour difficulty?—*A.* I do not like it at all. I would not do it without Government assistance.

Q. Of course it is a pioneering enterprise and you naturally find more difficulty for your labour. The thing might be put on a more satisfactory basis in a few years' time. Do you contemplate getting your labour in the same way as the tea gardens?—*A.* We have free labour at present and pay seven annas a day, but get only work worth half an anna.

Q. Is your idea to give them a piece of land to cultivate themselves?—*A.* They have given me 500 acres for that purpose. My idea was to bring over Java cane.

Q. Which one, 33?—*A.* 33 is fibre cane; 247 is a very good one. 33 is very fibrous, and more suitable for Bihar. I want real Java cane. 33 was condemned long ago in Java.

Mr. A. Chatterton.—*Q.* Have you seen the lands in Bengal?—*A.* I have moved a good deal along Bengal.

Q. Do you think the country round here would be suitable for growing sugar-cane?—*A.* Yes, I am sure it is.

Q. Do you think it is a practical proposition to pump water from the rivers in Bengal on to land which is sufficiently irrigated to give proper drainage and grow sugar-cane here?—*A.* Certainly, but it would not pay if you grew 15 tons of sugar.

Q. The question of the weight of crop you get per acre in a place like Bengal depends upon the manuring?—*A.* In Java we manure at £4 sterling per acre.

Q. What manure are you using there?—*A.* Sulphate of ammonia, nitrogen.

Q. At these factories you are building in Assam, do you propose to make gur or sugar?—*A.* Gur just for a year. The second year we will make white sugar. I would expect 7 per cent *rendiment* from the cane in making white sugar, and 12 per cent in making gur.

Q. Is there not a fairly big local market for gur?—*A.* Yes, but it is better to have it in your power to make white sugar.

Q. Can you produce a gur that could be clarified in Bengal?—*A.* Yes, it is simply a matter of purification.

Hon'ble Pandit M. M. Malaviya.—*Q.* Do you think you could compete with Java sugar in price?—*A.* We will never make it for the same price.

Q. Can you put your sugar in Assam at as low a price as Java could bring it?—*A.* To Assam, but not to Calcutta.

Q. How then do you expect your industry to succeed?—*A.* It will not succeed. Supposing the price went down to Rs. 5 a maund, we would be bankrupt all over the world.

Mr. C. E. Low.—*Q.* Java can make it locally at Rs. 5 a maund?—*A.* Java would make it perhaps for that, but they would be losing on the capital.

Q. They cannot pay capital charges.—*A.* No, they could not do that.

Hon'ble Pandit M. M. Malaviya.—*Q.* How do you expect to compete with this sugar?—*A.* I hope the price will never go down to Rs. 5 a maund. If it did, I would immediately close down the factory.

Q. Up to what price will you be able to compete?—*A.* Rs. 7 to Rs. 8, and make a slight profit.

Mr. C. E. Low.—*Q.* How much sugar could you sell in Assam itself?—*A.* Practically nothing. It would all have to come down.

Mr. A. Chatterton.—*Q.* You are contemplating making gur this year. Are you going to use your triple effect and your vacuum pan?—*A.* My triple effect is there but cannot be used, and I have therefore to use evaporation.

Mr. C. E. Low.—*Q.* They were thinking of making gur in Java some years ago?—*A.* No. We stopped it 20 years ago.

Q. But it was discussed?—*A.* It was never discussed recently, because we ended it 20 years ago.

Q. Why did they turn it down?—*A.* There is a certain amount of sugar from the palm tree which is practically speaking gur in Java. That supplies the natives with sugar and all the Java white sugar is exported.

WITNESS No. 187.

(1) HON'BLE MR. J. DONALD, I.C.S., *Secretary to the Government of Bengal, Financial and Accounts Department.* — *Messrs. J. Donald, J. A. L. Swan, A. R. Murray and G. H. W. Davies.*

(2) MR. J. A. L. SWAN, I.C.S., *Secretary, Board of Revenue, Bengal.*

(3) MR. A. R. MURRAY, *Member, Provincial Industries Committee, Bengal.*

(4) MR. G. H. W. DAVIES, I.C.S., *Officer on special duty, Industries, Bengal.*

NOTE ON THE INDUSTRIAL ENTERPRISE IN BENGAL,

BY

MR. G. H. W. DAVIES.

I.—FINANCIAL AID TO INDUSTRIAL ENTERPRISES.

The first set of questions propounded by the Commission deals with the financing of industrial enterprises. In considering this subject industries may conveniently be divided under three heads:—

(1) Established industries. (2) Struggling industries.
(3) Cottage industries.

(1) The first head includes the leading industrial enterprises in the country. Such concerns are usually started under conditions which ensure a reasonable probability of success. The business side is well managed: the industrial side is capably organized. These concerns experience no difficulty in raising capital, which is principally drawn from owners or shareholders of concerns already engaged in industrial enterprise and friends having faith in their judgment. They create such confidence in their capability and integrity that they have no difficulty in raising money in case of a temporary emergency.

(2) Struggling industries are those which commence operations in circumstances that usually do not commend themselves to the prudent investor. They are as a rule either imitations of established industries, or else they form some new departure in a field which the promoters believe to contain some hidden source of profit. Through ignorance, bad management or lack of support from the public, they usually start with insufficient capital. In order to secure money to carry on their business, they are compelled to borrow at high rates of interest, and a considerable portion of the profits has to be expended in meeting the interest. It has been represented that Indian concerns frequently commence work when only a small part of the nominal capital has been paid up. The shareholders expect immediate profits and object to further calls. Hence the Directors have to look for outside assistance. When the Rangpur Tobacco Company was in financial difficulties, the money-lenders of Rangpur refused to grant advances. The Directors then established the "Rangpur Bank" in which they themselves became the chief shareholders. This Bank granted loans to the Company on a mortgage of the whole property, though the Company was running at a loss: and the Directors occupied the peculiar position of being debtor and creditor in the same person, and running a borrowing Company at an enormous loss. This illustrates the straits to which a Company can be pushed by lack of capital, and the unbusinesslike habits of the Indian Company Manager, to reform which is part of the work of the Commission.

The British Indian Oil Mills Company, Limited, for the manufacture of castor oil, after erecting their plant had a working capital of Rs. 10,000 only. The result was that they could not wait till the market was favourable to purchase raw materials and had to work from hand to mouth. A promising European concern was thus forced to go into liquidation.

Other instances, *e.g.*, certain Indian Coal Companies, could be quoted to show the difficulties experienced by Companies which have to look for outside finance.

(3) Cottage industries are largely hampered by lack of finance. Instances are (*a*) *cotton weaving*. The great majority of the weavers are in the hands of the mahajan or middleman. He advances the yarn and they return the same weight in cloth. They are then paid for their labour.

(*b*) The Bankura *brass workers* are similarly handicapped. They receive raw material, return the finished product, and are remunerated for their work.

(*c*) *Silk weavers* are usually in the grasp of the mahajan, but they are better off as they take advances in money.

The remedy suggested is in co-operation. Societies should be organised not merely for the purpose of making advances to members, but also for the purposes of making wholesale purchases of raw materials and of finding favourable markets for finished products.

The question remains as to measures for financing industries falling under the second head. It is undoubted that they have extreme difficulty in getting assistance from Banks in existence, which direct their business to financing commercial transactions, not to financing industries. In fact, Banks under the English banking system are Exchange Banks, and they do not consider the financing of industries to be safe business. Further, in financing commercial transactions, they are stiff and unbending. It is alleged that they are usually unwilling to advance money when small amounts are involved, as they do not consider it worth while to be troubled with petty matters, and that they insist on unreasonably safe security. The German Banks were much more enterprising and accommodating. A German Bank which was recently liquidated in London had huge sums of money lent out on securities which it was reported no English Bank would touch. Yet their loss in bad debts was only $\frac{1}{8}$ per cent over a period of years. But no sound scheme of establishing an Industrial Bank has been laid before the Provincial Committee; in fact, only vague generalities on the subject have been made.

Regarding the various methods of giving direct Government assistance, it is very difficult to dogmatise. Each case must be governed by its own peculiar circumstances, and hard-and-fast rules are not desirable. Generally speaking, the first three methods referred to in question 5 —

(1) money grants-in-aid,

(2) bounties and subsidies,

(3) guaranteed dividends,

are not advisable. The last mentioned removes the chief incentive to individual exertion. It would attract capital, but would not improve the management, and, in spite of the guaranteed dividends being paid, the factory might be working at a heavy loss. There are cases in which—

(4) loans with or without interest

might be recommended, but loans should take the form of debentures forming a first charge on the property and assets.

Similarly—

(5) Supply of machinery and plant on the hire-purchase system might be made to assist a promising industry. But it would be advisable that the prospects of the business should be favourably reported on by a committee of enquiry.

(6) Guaranteed Government purchase of products for limited periods is a suitable method of assistance, when the products are required by Government Departments, are of a quality sufficiently good, and when the price is not more than a small percentage higher than the market price of imported articles.

In any case, it is inadvisable that Government should nominate directors or take any active part in the management of an aided industry. In method (4) above there should be regular audits by auditors appointed by Government. There must also be provision for inspection by Government inspectors of machinery and plant supplied on the hire-purchase system, or which formed part of the security for money advanced by Government.

Government aid should not be granted to particular parties to the detriment of others. When there are several competing concerns of a kind in which Government assistance is deemed essential, the same measure of help should be given to each, and should cease to each when the concern has become self-supporting or has proved a failure.

There should, however, be no limitation to Government aid to a new enterprise which has a reasonable prospect of success in competing with an established foreign trade. The question how far Indian industries should be assisted against competing industries within the British Empire depends on the trade relations established after the war.

Pioneer industries.

In Bengal we have no experience of Government pioneer factories. There are circumstances in which Government should pioneer industries, *e.g.*, when available raw materials are being exported in large quantities and are being manufactured abroad (as in the case of hides).

A pioneer factory should be closed as soon as it has proved a failure. If proved to be a commercial success, it should be sold as soon as any person or company is willing to purchase at a fair price. Pioneer factories should not be retained permanently in Government hands unless they produce articles required purely for Government purposes or articles of which it is important that the supply should be largely under Government control, *e.g.*, the Cawnpur Saddlery Factory.

II.—TECHNICAL AID TO INDUSTRIES.

Questions 17 & 18.—Experts might be lent to private firms by Government when considered advisable. For instance, an expert might be lent free of charge as a consultant or to overcome some special difficulty under which an industry is labouring. Where the expert is paid for by the firm, his services should be considered as belonging to the firm, and the results of his researches should be private. When the expert continues to receive his pay from Government, his researches should be published for general information.

Questions 19 & 20.—There is room in this province for the demonstration of certain improved processes in tanning. A proposal on these lines has recently been made to the Local Government; and if half-tanning could be shown to be feasible in Bengal, there is little question that the hide trade would benefit enormously.

Apart from this, attention should rather be given to demonstrations of improved processes in cottage industries. Suggested instances are the use of the fly-shuttle in weaving, and of the lathe and hydraulic press in brass work. The experience gained in the attempts to introduce improved methods of weaving in East Bengal has, however, proved that casual demonstrations will prove infructuous. It is very difficut to overcome the innate conservatism of the cottage worker and his suspicion of anything new; and demonstration must be brought to his very door. For example, in the case of weaving, the demonstrator with his improved loom should reside for at least a couple of weeks in one place among the weaving community, and must clearly demonstrate not only that his methods lead to improved results, but also that they are practicable for the ordinary weaver.

III.—ASSISTANCE IN MARKETING PRODUCTS.

Questions 28 & 29.—Commercial museums must be made more accessible to the public than the Calcutta Museum. Bow Bazar or the New Market would be a more suitable locality than Council House Street. The atmosphere should be one in which the red-coated chaprasi would not thrive.

Question 30.—The establishment of sale agencies for the products of cottage industries is strongly recommended. A beginning might be made by starting a small emporium in Calcutta, helped by Government, and in charge of a person in Government pay with experience of business. If this proved successful, similar establishments might be set up in other large trade centres. When the system of co-operation is more fully developed, sale agencies might be established and managed by the various co-operative societies interested. It is however advisable that no start should be made in this direction until a Director of Industries has been appointed and until he has obtained an insight into the conditions and possibilities of our cottage industries.

Questions 31-33.—Industrial exhibitions are of distinct value when they are held at industrial centres and have for their chief aim the bringing together of buyer and seller.

The ordinary industrial exhibition held at a district head-quarters is a waste of money. The people regard it as a "tamasha" and no industrial benefits accrue.

Question 34.—It is advisable that trade representatives should be appointed to represent the whole of India in Great Britain, and in certain of the colonies and foreign countries.

Their duties would be to exercise a watchful supervision on the imports and manufactures of these countries, with a view to advising India on possibilities of fresh markets, expansion of trade, dangers of competition, or disabilities under which Indian exports were labouring.

The trade representative would require no special qualifications beyond sound judgment and common sense, though a man versed in business and trade would be desirable. Such a man might well be attached to the Consulate.

Question 36.—The time is not yet ripe for inter-provincial trade representatives. The Directors of Industries can do all that is required at present. Periodic conferences of these officials should be sufficient to keep the various provincial developments in touch.

Questions 37 & 38.—The measures indicated by the Commission that the principal Government Departments which use imported articles should publish lists of these articles and should exhibit them in commercial museums are both desirable. They should also

publish scales of their average requirements, or rather it would be advisable that lists and scale should be prepared by the authority who indents directly for the stores.

Question 39.—Co-operation will provide increased facilities for marketing indigenous products. A co-operative society would advance money on finished articles, which need not be sold until a favourable market was obtained.

IV.—OTHER FORMS OF GOVERNMENT AID TO INDUSTRIES.

Question 40.—Government should assist new or struggling industries by the supply of raw materials on favourable terms, when Government has a monopoly of the supply, and when the other necessities for manufacture are so far available as to raise a reasonable hope that the industry will be successful. An instance in which such assistance has been, and might usefully continue to be, extended is the supply of wood by the Forest Department for the manufacture of bobbins.

Question 41.—The provisions of the Bengal Tenancy Act by which raiyats are entitled to grow whatever crops they please on their holdings injure industrial development, as they make it very difficult for a sugar or indigo factory to get control of sufficient area to run a going concern. In the general interests of society it would hardly be possible to recommend that this should be changed. Again, raiyats are liable to forfeiture of their holdings if they use them for purposes other than agricultural. This increases the difficulties of persons wishing to take a lease of land for industrial purposes, as they usually have to indemnify several interests.

Question 42.—Government should grant concessions of khas land for the establishment of new or the development of existing industries on the same lines as grants of land for growing tea have been made, *i.e.*, leases at specially low rates for a term of years.

V.—TRAINING OF LABOUR AND SUPERVISION.

Question 50.—Industrial schools must certainly be under the control of the Department of Industries; otherwise technical education will be divorced from that practical association with industrial affairs which is absolutely essential. This was the opinion of the District Administration Committee, and it is now favoured by the Government of Bengal. The appointment of an educational officer in 1910 as Superintendent of Industries has not proved a success from the industrial point of view.

The question as to the measures to be adopted to secure unison between the two departments is an administrative detail to be worked out in practice by the Directors concerned.

Question 52.—A certain proportion of State technical scholarships might usefully be reserved for supervisors, managers and technical experts of private firms; and the Association for the Advancement of Scientific and Industrial Education of Indians would be well advised to assist men of this class rather than promising youths, who may be unable to secure employment on their return to India. On the other hand, there is no doubt that private firms will send their managers and experts to study improved methods in other countries if they think that such acquired knowledge will prove profitable. For example, the Calcutta Pottery Works has sent Mr. Deb, the Manager, to Japan and to Germany for this purpose. As the experience obtained abroad is mainly an asset of a private firm, direct Government assistance in training private experts should not be given, but the British representative in a foreign country should be prepared to put persons of this class into touch with the sources from which the training may be provided.

Question 53.—As a general rule, Government assistance should be rendered mainly to industries in their infancy or to established industries merely to overcome some difficult problem. In such concerns there would be no scope for the training of experts.

VI.—GENERAL OFFICIAL ADMINISTRATION AND ORGANIZATION.

Question 56.—There is no provincial organization in Bengal for the development of industries. In 1909 Government created a post of "Superintendent of Industries and Inspector of Technical and Industrial Education," but the energies of the officers holding this post have been practically confined to educational matters, and the industrial side has remained a dead letter. This Government has recently applied to the Government of India for the creation of a post of Director of Industries directly under the Commerce Department, but the functions and limitations of the post have not yet been defined. If a man of the proper stamp is obtained, he will be the best person to suggest what his functions should be.

Questions 57-61.—There should be a Board of Industries, consisting mainly of prominent business men. For the present its functions should be purely advisory, and it should not have executive powers.

The Director of Industries should be, at any rate at the outset, a non-expert official. An expert would have no knowledge of administration; a successful business man would not condescend to the post. The qualifications required are common sense, judgment, administrative ability, and above all a strong personality.

The Director of Industries should work directly under the Commerce Department of the Local Government. The functions of the Board of Industries should be purely advisory.

Question 62.—As regards the direct functions of the Directors of Industries, their activities and responsibilities must be provincial. The formation of an Imperial Department under a single head is not desirable. We must rely on periodic conferences of the Directors to prevent overlapping and to correlate the separate activities of the various provinces.

There must, however, be some organisation to receive and analyse trade returns and the reports submitted by the trade representatives abroad, and to communicate the results of the Local Governments. This work might be done by a branch of the existing Department of Commerce and Industry of the Government of India.

VII.—ORGANISATION OF TECHNICAL AND SCIENTIFIC DEPARTMENTS OF GOVERNMENT.

Question 63.—There is no provincial organisation for the technical and scientific advancement of industries in Bengal. There are departments at work for the development of agriculture, which is the chief "industry" of this province.

In 1913 Messrs. Nathan, Küchler and Everett prepared a scheme for the establishment of a Technological Institute in Calcutta. Their proposal was that the Principal of the Institute would be Director of Industries (subordinate to the Director of Public Instruction). The various departments of the Institute were to be under experts, who would have laboratories equipped for industrial research. But up to the present no action has been taken on this report.

Question 64.—The time is not yet ripe for the formation of new Imperial scientific and technical departments. We do not want the roof before the walls are erected.

Questions 67-70.—An expert whose services are lent by the Imperial Department to the Local Government must be entirely under the orders of the Director of Industries during the period of his deputation.

The Local Government should engage its own experts for any subject which offers a prospect of considerable industrial expansion. Such experts should work under the control of the Director of Industries. He should similarly be in control of any departments created by the Local Government for the development of a particular industry. Experts should be employed on contract for the period for which their services would be likely to be required.

Questions 80-81.—It is generally felt that there is scope for improved training in commerce in this province. The existing Commercial Institute in Bow Bazar has not been a success, mainly because it has not been managed efficiently. Recent proposals have been in the direction of establishing a Faculty of Commerce in the Calcutta University, or granting a degree in commercial subjects in the Faculty of Arts.

The diffusion of an improved knowledge of business affairs is bound to be beneficial to industrial development. In the past inefficient management has been one of the chief causes of the failure of *swadeshi* concerns. Anything that will correct this must tend to improvement.

VIII.—GOVERNMENT ORGANISATION FOR THE COLLECTION AND DISTRIBUTION OF COMMERCIAL INTELLIGENCE.

Questions 82-83.—Under the present system, piles of facts and figures are slung at the head of the public without sufficient examination and analysis. The manufacturer requires to know where he can find a market for his goods, or why the market in a particular place has fallen off. If the Director of Statistics and the Director-General of Commercial Intelligence devoted more attention to the study of such matters, the efforts of their departments would be more appreciated by the commercial world.

Question 87.—The publications referred to should be more widely disseminated for the benefit of persons interested. The information contained therein should be presented in a more popular form. An expert about to publish a monograph on some industrial subject might with advantage consult some practical industrialist as to the treatment of the subject.

IX.—OTHER FORMS OF GOVERNMENT ACTION AND ORGANISATION

Questions 89-90.—It would be dangerous to recommend any system under which Government would assume the responsibility for granting such certificates.

Questions 91-92.—As a rule, traders are able to defend themselves, and adulteration recoils on the head of the person who adopts such methods. No ground for interference by Government has been made out, except in the case of articles of food and drink.

Question 96.—Disclosure of partnerships is highly desirable. It is a frequent complaint against Marwari firms that the real partners are never divulged, and that persons dealing with them are not aware to whom they must look to fulfil their contracts.

Question 98.—Complaints regarding railway freights are almost universal. Various examples could be quoted, *e.g.*, that freights on wheat and flour from up-country to Calcutta are so nearly equal as to militate against the flour mills in Calcutta; that freights for full wagons of timber are charged irrespective of the weights actually carried; that the freight on denatured spirit from Calcutta to Jessore is so high as to prevent the establishment of a celluloid factory in the latter place; that the freight on reeds from Midnapore to Jessore was so excessive that the Jessore mat industry had to be stopped; that tariffs differ from line to line, and the scale is so complicated that the consignor is, for all intents and purposes, in the hands of the booking clerk. The chief complainants are, however, those who demand large rebates in freight on raw materials for local manufacture, on machinery and on locally manufactured articles. To a large extent this is a cry for a form of protection. When it is pointed out that owing to the comparative lowness of shipping freights imported articles can often be put on the local market at cheaper rates than articles of indigenous manufacture, it is forgotten that all over the world similar conditions prevail (*e.g.*, fruits from parts of France can be put on the London market cheaper than fruits from certain parts of Kent), and that the cheapness of inward shipping rates to India results largely from the fact that the balance of trade is in her favour. The subject of railway freights is highly technical. They are fixed by competition with other railways and with other forms of carriage. The most intelligent body of public opinion claims that railways should be run on a commercial basis (*e.g.*, to show a profit) and under Company management. Hence the problem is to fix their tariffs at the highest rate which will attract the greatest volume of trade. The Traffic Managers of Indian Railways are usually men of considerable experience, and in the interest of their Companies it is not likely that they would fix rates which would be unduly high, so as to stifle a nascent industry and to cut off a large source of profit to themselves. It is clear, however, that cases of hardship do occur, and possibly the fixed scales of classification made by the Railway Board are too rigid. That body is too inaccessible to the public at large. More frequent conferences in which its members might be brought into contact with the opinions of manufacturers are desirable. Something might be done in the direction of the simplification and unification of rates over various railways. Cases in which particular railways, which have no competition to face, charge high rates require particular examination, and the general question of pushing home industries might receive more sympathetic consideration.

Question 97.—There is no doubt that improved road communication is wanted in many districts of Bengal. There are practically no roads in Eastern Bengal, but the lack of roads is made up by ample communication by water. In Western and Northern Bengal an improvement to the present road system would be of great benefit to the coal and tea industries.

In the Terai and in other parts of the Darjeeling district, improvement to existing roads and bridges and the construction of new roads of easy gradient would be to the benefit of the numerous tea gardens in the district, though this would not help much towards further development. In the Dooars certain roads are now being improved and new roads constructed; some of the more important rivers are being bridged. An extension of the programme of improvements to the roads to the east of the Rydak river would tend to further development of tea gardens.

Question 99.—Several projects for railways have been proposed which will tend to facilitate the transport of jute, the most important of which are the lines, *viz.*, Malda to Santahar and Mymensingh to Serajganj.

Question 102.—There is one hydro-electric plant working in the province at Darjeeling. The Darjeeling Municipality have in contemplation the extension of this plant to supply power to Kurseong. It has been suggested that the Darjeeling-Himalayan Railway might join the scheme by taking energy to electrify their line and workshops. The Electric Inspector to Government reports that there is little use in making further investigations on the question of developing hydro-electric power in Bengal.

Several of the Darjeeling tea factories use turbines, and one Calcutta firm has a project for starting timber mills and paper pulp manufacture near the Himalayan forests, in which hydro-electric power would be utilised.

Question 103.—No difficulties in the working of the Mining and Prospecting Rules (1913) have been brought to our notice.

Questions 105-107.—The fact that there are no pure forests in Bengal is very detrimental to industries in articles of timber, *e.g.*, pencils, matches, bobbins, etc. Complaints are also made against the forest system of letting out areas to contractors. It is alleged that this system renders it impossible for manufacturers to get supplies of the kinds of wood which they require. It is difficult for manufacturers to get into touch with these contractors, and the

contractors charge high prices for providing woods of particular kinds. Manufacturers claim that with better organisation the Forest Department might easily arrange to give supplies of particular woods for indigenous industries at favourable rates. The question largely concerns the economical management of the Forest Department.

Question 108.—There have been many complaints about lack of forest transport. One Calcutta firm has suggested that at least 5 per cent of the revenue derived from forests should be expended in making roads.

Question 109.—The Inspector-General of Prisons reports that there are no complaints regarding competition by jail industries. His note is reproduced:—

"The question to be answered is,—" Have you any complaints to make regarding competition by jail industries?"

The reply must be in the negative as the following facts and figures will show:—

There are only two factories in the Jails of Bengal—one the Jute factory in the Presidency Jail at Alipore and the other, recently started blanket factory in the Dacca Central Jail. I will deal with these two industries separately.

Jute mill.—No objection to this industry has been raised in recent times, but objections were made from time to time up to the year 1886. In 1886 the Indian Jute Manufacturers' Association complained of this industry to the Government of India (*vide* the said Government letter No. 1084, dated the 31st July 1886, forwarded to this office with Bengal Government endorsement No. 1699-P., dated the 17th August 1886). Sir Alfred Lethbridge's reply, No. 1328-M., dated the 27th September 1886, is a complete reputation of all the charges made by the aforesaid Association against the Jail mill. The Presidency Jail Jute Mill was started (in 1865) when the gunny industry of Bengal was in its infancy. Most of the private jute mills in Bengal were created long after the Jail mill had worked successfully. The Jail Department has thus been the pioneer of a very successful industry in India. The amount of jail interference is so small that it can be entirely left out of account. From a reference to the Government Administration Reports for the last five years it will be seen that the number of Jute mills in this Presidency is constantly on the increase. The total outturn of gunny cloth in the Presidency Jail in the year 1915 was 585,334 yards only and the number of gunny bags sewn and supplied during that year was 501,430 and 521,002, respectively. The outturn of gunny bags was even less than that of the year 1885, *viz.*, 572,030, the figures quoted in Sir Alfred Lethbridge's letter above referred to. It further appears from that letter that five or six years before (*i.e.*, about 1880) a managing partner of Messrs. Graham & Co., the then President of the Chamber of Commerce of Calcutta, had made an enquiry into the subject and arrived at the conclusion that the Jail outturn was so insignificant that it could not possibly affect the market. The chief consumers of gunny manufactures of this jail are at present (1) the Supply and Transport Department, (2) the Medical Department, (3) the Railway Mail Service Department, and (4) the Military Department. Since the outbreak of war the Jail has not been able to sell any large quantity of gunny-made articles in the open market.

Dacca Jail Blanket Factory.—This was started only last year. Since the separation of the Bhagalpore Jail from this Presidency, difficulty was felt in supplying suitable blankets to the various departments of this Government. The blankets manufactured by the Rajshahi Central Jail, with hand-looms, are very coarse and are unfit for use by any one except prisoners. Besides, they have not proved sufficiently lasting. With a view to supply the prisoners with a better sort of blankets, as well as to a less degree to satisfy the demand for blankets by the other departments of Government, it was found necessary to start a blanket factory in the Dacca Central Jail on an improved method. The total outturn of blankets by this factory is about 20,000 per year, roughly 90 per cent of these blankets being required for this department. Since its start the Jail factory has been entirely occupied with making blankets for the Military Department as a war measure. There is only one private blanket factory in this province.

Besides the above, the jails in this province manufacture certain textile goods such as durries, prison clothing, jharans, etc., and mustard oil, and also carry on wheat-grinding for the prisoners. The durries are generally made for the public and departments to order. The mustard oil is chiefly manufactured, as a penal form of labour, for prison consumption, but it is also sold to the public, though at a much higher price than that in the local markets. The jharans also are sold to the public, but though these and the mustard oil are highly priced, they find favour with the public on account of their good quality. No complaint has, however, ever been made against the sale by jails of these articles. The atta made out of wheat is not usually available for the public, as almost the whole of the outturn is required for the consumption of the prisoners.

The above remarks also apply to some other petty industries carried on in our jails. They sell their articles at the jail gate. But when they cannot, they send their surplus to the jail depôt at Calcutta, which manages to dispose of these articles. The said depôt is a small concern, as it will be seen from the Jail Administration Report for the year 1915 that the cash and credit sales done by it during that year amounted to Rs. 44,079 only.

It is a generally accepted principle that in the interest of the Indian taxpayer prisons should be made, as far as possible, self-supporting. The Government of India in their Resolution No. 10—605—18, dated the 7th May 1886, have further laid down that jail industries must be adapted as far as possible to the requirements of the public consuming departments, as long as they can be supplied of the same quality and at the same price as in the open market. The jails of this province have strictly observed these instructions, and no complaints have since 1886 been made against any jail industries on the ground of competition.

The Home Prison Committee of 1894 observed that industrial labour is morally and physically beneficial to the prisoners. I would add that in selecting industries for jails, only those should be selected which would prove useful to the prisoners after their release. Unless a discharged prisoner finds work soon, he is very easily tempted again to commit crimes.

The question of competition by jails with private industries was last raised by the Government of India in their letter No. 153, dated the 10th August 1906. A reference is requested to this office letter No. 11-M of 12th January 1907 in this connection, which deals with this matter fully."

X.—GENERAL.

Question 111.—The following have been suggested as "new industries" for which India seems particularly suited:—

Tanning of hides.

Glass manufacture.

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Date-sugar refining.
Paper-pulp from bamboos.
Wooden articles—boxes, bobbins, pickers, etc., matches.
Paints and dyes.
By-products from coal.
Bone and horn products.

Question 112.—The use of forest products is hindered by the system of the Forest Department (*vide* 105) and by freight (*vide* 98).

Question 113.—The following suggestions have been made:—

(*a*) Bamboos for paper-pulp—from Darjeeling Forests and Chittagong Hill Tracts.
(*b*) Gazari wood for paper-pulp—from Mymensingh and Dacca Forests.
(*c*) Kaolin deposits in Birbhum, Bankura, Hill Tippera and the Sonthal Parganas.
(*d*) Extract of starch from the roots of the *Sati*—Dacca, Chittagong and Tippera.

In summing up the situation, it is to be observed that the problem which confronts the Commission is to devise sound methods for developing Indian industries as classified under the three heads—

Established industries
Struggling ,,
Cottage ,,

The first class are well able to look after themselves. They require some measure of scientific assistance, as many of the difficulties in advanced industrialism cannot be solved without the help of science. They require a better system of commercial intelligence, more information as to the sources of raw material and the markets of the world. They require a better quality of labour and competent supervision at cheaper rates. These demands are included in the requirements of struggling industries and call for no separate treatment. The claims of cottage industries, though crying and urgent, are also comparatively few in number. They may be limited to training in improved methods, provision of improved tools or machinery, cheap supply of raw materials, and good markets for finished products. Agencies to secure these are already in action; means by which they might be ameliorated have been indicated above. The subject on which the limelight has played during the Commission's visit to Bengal is the development of struggling industries. We are asked to prepare a scheme for drawing capital from Bengal, instilling business acumen into the Bengali and training managers and workmen to carry on going concerns. It is admitted that some time must elapse before all these desiderata may be obtained, and in the meantime the programme must be cast so that Government may figure as the protagonist. For the present Government must be prominent in raising capital, in advising on matters of business, and in directing work. The reply that rises to one's lips is that Government is not qualified to take this part. Hence the appointment of a Director of Industries is urgent and imperative in order that the curtain may go up. But a further objection occurs. It takes an actor some time to learn his rôle. Similarly, the Director of Industries must study his part before he is competent to devise an organization for the ends above indicated. Whoever is appointed will require some period in which to familiarise himself thoroughly with the situation. His functions will largely consist in giving advice and in directing advice; and ignorant advice and ignorant direction are the crown of folly. It would be unwise to lay down at the present juncture any hard-and-fast rules defining the duties and responsibilities of the Director; but some of the matters with which he will be expected to deal are adumbrated. He will be called upon to give advice to start sound industries and to prevent the establishment of unsound industries. He may be expected to deliberate in the actual promotion of enterprises and to express his opinion as to the amount of capital which is required for profitable and economical working. It may be necessary for him to say what measure of Government assistance should be offered and in what way it is to be bestowed, and in this connection it must be remembered that one failure in which Government is concerned will do more to retard industrial progress than 20 *swadeshi* fiascoes. Infant companies will look to him for counsel in business management. He will have to control experts and to direct schemes for the training of labour and supervision. This list is sufficient to show that it is idle to expect a Director fully equipped to spring from the soil. Yet until there is a Director competent to organise and administer matters falling under these heads, no effective results can be achieved.

The question of an Industrial Bank is less pressing, because experience has shown that Indians are ready to invest if they consider the investment to be promising. Enquiries elicited that natives of India held shares to the following extent in three light railways:—

Kalighat-Falta	over 50	per cent	of	subscribed capital,
Mymensingh-Bhairab	,, 32	,,	,,	,,
Sara-Serajganj	,, 65	,,	,,	,,

from which it may be argued that if confidence can be assured in the ability and integrity of their industrial leaders, money will probably be forthcoming for the development of industries.

The conclusion is that the Director is the key of the situation. The foundation must be firmly laid before the industrial fabric can be raised.

NOTE ON THE INDUSTRIAL DEVELOPMENT OF BENGAL,

BY

MR. A. R. MURRAY.

The following notes may be of assistance when considering questions regarding the industrial development of Bengal. They contain information extracted chiefly from census and other official reports and statistics, and deal with the distribution and occupations of the inhabitants of this province, indicating some of the results arising from the introduction of organised industries and manufactures within recent years.

Though somewhat smaller in area than Great Britain, the Presidency of Bengal contains nearly a million more inhabitants than the whole of the British Isles.

With an average density of 551 persons to the square mile, according to 1911 Census Report, Bengal is more thickly populated than any European country, with the exception of Belgium and of England taken by itself.

The density per square mile of other countries and provinces is as follows:—

Scotland, England and Wales.	Germany.	France.	Bombay.	Madras.	Bihar and Orissa.	United Provinces.
460	311	189	145	291	344	427

persons per square mile.

In Bengal three-quarters of the population are supported by agriculture as will be seen from the following figures from the 1911 Census Report:—

Occupation or means of livelihood.		Total.	Percentage.
A.—Production of raw materials—			
(1) Agriculture, pasture, fishing		35,225,000	
(2) Coal mines, 114,693, other minerals, 1,184		116,000	
		35,341,000	78
B.—Preparation and supply of material substances—			
(3) Industry	3,421,000		
(4) Transport	952,000		
(5) Trade	2,300,000		
		6,673,000	15
C.—Public Administration and Liberal Arts		1,167,000	2
D.—Miscellaneous		2,302,000	5
In British Territory		45,483,000	100
In Feudatory States		823,000	
Total population of Bengal Presidency		46,306,000	

Of the 35,225,000 classified under head A (1) above, only 305,000 subsist by means of pasture and 643,000 by fishing, leaving 34¼ millions supported by agriculture.

In other countries and provinces the pressure on the soil has been so great as to force large numbers of the inhabitants to engage in industrial occupations for a living or to emigrate to foreign countries and provinces in search of work. In Bengal the position is the very reverse of this. Not only do the inhabitants multiply and thrive, but large numbers of people have to be imported from other provinces to assist in the cultivation and marketing of the crops. In many of the districts of Bengal, according to the 1911 Census Report, "the people are so prosperous that they can afford to look down upon menial work and leave most of it to immigrants from Bihar and the United Provinces who serve as earth-diggers, palki-bearers, domestic servants, boatmen and general labourers." Again quoting from the same report, "the well-to-do Bengali cultivators depend largely on the annual influx of labourers from Bihar and Orissa for reaping their crops, and complaints are frequent of the inadequacy of the supply of local labour."

In the circumstances, therefore, it is not surprising that organised industrial and manufacturing concerns have had to depend for labour on workers imported from other provinces, and this is a factor which must be kept sight of in discussing the possibilities of future industrial developments.

So far as Bengal is concerned, the extraction of minerals, according to the 1911 census, provided a means of livelihood for 116,000 persons only, of whom 65,000 were actual workers, the rest being dependents.

Of these 116,000 persons, all but 1,200 depended on coal-mining in the Raniganj field the output of which in 1911 was 4 million tons and by 1915 had increased to 5 millions.

Including Bihar and Orissa, coal-mining in 1911 was the means of livelihood of 242,000 persons (in both provinces), of whom 155,000 were actual workers. In 1901 this industry supported only 84,000 persons, so that there was an increase of 158,000 or 188 per cent in the ten years ending 1911. In 1901 the output from both provinces was only 5½ million tons; by 1911 it had been increased to 11¼ million and by 1915 to 15½ million tons.

According to the 1911 Census Report, "the daily output per miner is very small compared with that of England, both because the miners are not so hard-working and skilful and also because they work for fewer days; one result is that a mine in Bengal requires 2½ times as many underground workers as an English mine. The Indian miner will not give his whole time to mining. He seldom works more than four or five days in the week, and observes all holidays; the man who gets most wages works the least number of days."

An examination of the returns of castes of workers in coal mines shows that one-fourth are Bauris and nearly the same number Sonthals, the remainder being chiefly semi-aboriginals or low Hindu castes.

As regards the workers in the Raniganj field, two-thirds of the coal-miners in Burdwan are local labourers, while one-sixth comes from the Sonthal Parganas and about one-tenth from Chota Nagpur.

Of the 1,200 persons in Bengal dependent for a living on the extraction of minerals other than coal as above referred to, 900 are returned as engaged on quarries of hard rocks, 200 on salt and less than 100 in the extraction of saltpetre, alum, etc.

Turning from the production of raw materials, the Census of 1911 shows that in Bengal 6⅔ millions or 15 per cent of the population were dependent for a living on the preparation and supply of material substances. Under this head are grouped all the persons engaged or dependent on the following branches, *viz.*:—

	Actual workers.	Dependents.	Total.
Industry	1,664,000	1,757,000	3,421,000
Transport	501,000	451,000	952,000
Trade	961,000	1,339,000	2,300,000
TOTAL	3,126,000	3,547,000	6,673,000

It is not necessary to do more than refer to transport as providing for nearly a million inhabitants, of whom little more than half are actual workers. Nearly a third of these are employed in transport by water, the bulk of them as boat-owners or boatmen, chiefly in the water districts of the Dacca and Chittagong Divisions. More than half the number find employment in transport by road, the remaining sixth being required for railway transport and for the post office, telegraph and telephone services.

Of the 2½ millions subsisting by trade in Bengal, not more than 42 per cent are actual workers. Of these, nearly two-thirds deal in articles of food or drink. Not more than a fourth or little over 200,000 workers are actually engaged in trading in articles that come within the scope of the present enquiry, such as textiles (76,000), skins (32,000), wood (21,000), pottery (13,000), chemical products (7,000), metals (5,000), and in carrying on the businesses of banking, money-lending and insurance (42,000), and of brokerage, commission, etc. (15,000).

The occupations or means of livelihood of those inhabitants of Bengal who are dependent on industries have been subdivided under the following heads in the 1911 Census Report:—

	Actual workers.	Dependents.	Total.
British Territory—			
Textiles	453,000	415,000	868,000
Hides, skins, etc.	21,000	32,000	53,000
Wood	168,000	199,000	367,000
Metals	70,000	114,000	184,000
Ceramics	115,000	111,000	226,000
Chemical products	53,000	80,000	133,000
Food industries	329,000	149,000	478,000
Industries of dress and the toilet	210,000	305,000	515,000
Furniture industries	6,000	4,000	10,000
Building industries	98,000	129,000	227,000
Construction of means of transport	13,000	26,000	39,000
Electricity, lighting, etc.	3,000	2,000	5,000
Industries of luxury, etc.	98,000	169,000	267,000
Ditto concerned with refuse	27,000	22,000	49,000
Total	1,664,000	1,757,000	3,421,000
Actual workers—			
Males	1,124,000		
Females	540,000		
Feudatory States—	11,000	8,000	19,000
GRAND TOTAL	1,675,000	1,765,000	3,440,000

It will be noticed that textile industries are still the most important of the industries in Bengal, the number dependent on them forming a quarter of the industrial population.

Cotton spinning and weaving alone provide for 459,000 persons, of whom, however, only 189,000 are actual workers, and of these only 11,000 are employed in 14 cotton mills, the remainder working at home. In spite of the stimulus given to this industry by the *swadeshi* movement and by the efforts of Government to introduce improved and more profitable methods of work, there has been, says the 1911 Census Report, a serious decline since 1901 in the number who subsist by the produce of their looms. The actual decrease in the provinces of Bengal and Bihar and Orissa is a quarter of a million or 23 per cent, the combined figures being—1901, 1,071,000; 1911, 820,000.

There are only 4 cotton-ginning mills of any size in Bengal, employing about 1,300 persons altogether.

Jute-pressing, spinning and weaving, however, attract a growing number of workers. The aggregate of those dependent on the manipulation of jute in both provinces rose from 143,000 in 1901 to 344,000 in 1911, an increase of 201,000 or 140 per cent. This is pre-eminently an industry of Bengal where it provides for 328,000 persons, of whom 216,000 are actual workers. Of these, over 200,000 were employed at the date of the 1911 Census in the 50 jute mills lining the banks of the Hooghly, and 14,000 were working in 109 jute presses established all over the province.

According to the latest published 'List of Factories and other large Industries' which, however, deals only with concerns employing generally 50 or more persons, there were in 1913 actually 59 jute mills at work on the Hooghly, giving employment to 216,000 workers, and 124 jute presses with 32,000 workers. Since then further increases have taken place and the jute presses each employing less than 50 persons have also to be taken into account.

There are only 3 ropeworks of any consequence, *viz.*:—in Howrah, employing about 800 hands only, although there are a dozen other small ones in 24-Parganas.

Silk-spinning and weaving in Bengal provides for 49,000 persons only, 27,000 of whom are actual workers. The industry was stationary between 1901 and 1911, but many have declined since owing to the closing of several filatures of the Bengal Silk Company in Rajshahi in 1909. The industrial census taken in 1911 showed 33 silk filatures and mills employing 7,000 persons, all but four of which concerns employed over 50 persons each. On the other hand, the latest list of factories showed only 22 silk filatures still at work in Bengal in 1913, giving employment to 2,200 persons, and only one silk mill at Ultadanga, belonging to the Bengal Silk Mills Company and employing 145 persons.

Of the 21,000 persons actually employed on work in "hides, skins and hard material from the animal kingdom," 15,000 are entered as tanners, carriers, leather dressers and dyers, 3,000 as makers of leather articles, such as trunks, water-bags, etc., and 3,000 as bone, ivory, horn and shell workers. The industry has not yet been organized and developed by modern methods. According to the industrial census statistics, in 1911 there were 10 tanneries, 4 leather factories and 1 gut factory, employing altogether 2,000 persons. The latest published list of factories shows 5 bone-crushing mills in Bengal, employing 739 workers, and 2 tanneries with 458 workers.

Of the 168,000 workers engaged in the wood industry, just over a half are employed as sawyers, carpenters, turners and joiners, the remainder being makers of baskets, mats and bamboo articles.

Of the 70,000 persons employed on work in metals, 40,000 are blacksmiths and 18,000 workers in brass, copper and bell metal, the majority of the latter residing in the Burdwan Division, chiefly at Midnapore. In Mr. J. G. Cumming's 'Review of the Industrial position in 1908' it is stated that the latter industry is better organised than any other in the province. The masters in the Midnapore district are enterprising and wealthy; they obtain the material in economically large quantities—tin from the Straits Settlements and copper from Japan, and so on; they distribute the labour, pay by piece-work and have a steady demand from Barabazar in Calcutta.

Other metal industries are also fairly well organized. At the time of the census there were 131 manufactories or workshops in Bengal, employing 32,000 persons, of whom 7,500 worked in iron foundries, 2,000 in iron and steel works and 12,000 in machinery and engineering works, while 6,000 were employed in Government arms factories.

According to the latest published 'List of Factories and other large Industries,' there were in 1913 actually 32 iron and brass foundries in Bengal, each of which gives employment to over 50 hands. The total employees numbered over 18,000, 5,000 of whom were employed in the Bengal Iron and Steel Works at Kulti, 4,000 in Burn & Co.'s Howrah iron works and 2,000 in the Howrah foundry.

Under the head of ceramics are grouped persons employed in the manufacture of pottery, earthen pipes and bowls, bricks and tiles, glass and crystal ware, porcelain and crockery, etc., all of which provide the means of subsistence of a quarter of a million persons, half of whom are actual workers. Potters and earthen pipe and bowl-makers number 89,000 and brick and tile-makers 24,000, leaving little more than 1,000 engaged on the manufacture of the other articles.

There are only 2 pottery works in Bengal worked by mechanical power—1 at Raniganj employing 1,000 persons and 1 in Calcutta with 100 workers. According to the 1913 'List

of Factories' there are 3 brick and tile factories in Bengal worked by mechanical power, employing 400 persons only, but there are many other brick and tile works giving employment to over 10,000 workers.

Chemical products include manufactures of varied classes as follows :—

	Actual workers.	Dependents.	Total.
Vegetable and mineral oils	48,000	75,000	123,000
Paper, card-board, etc.	2,000	1,000	3,000
Soap, candles, lac, drugs, etc.	2,000	2,000	4,000
Matches and explosive materials	700	900	1,600
Dyes, paint and ink	500	500	1,000
Aerated and mineral waters	200	200	400
Total	53,400	79,600	133,000

Of these, the manufacture and refining of oil is by far the most important, although in 1911 there were only 118 oil mills registered giving employment to 4,000 workers, more than half of them in Calcutta. The returns made against paper are subject to amendment, as at the time of the census there were 3 paper mills in Bengal giving employment in normal times to about 4,000 workers.

According to the 1913 'List of Factories, etc.,' giving employment to 50 or more hands there were only 11 oil mills in Bengal of any size, giving employment to 800 hands in all but this list does not include the Gourepore Oil Mill. There are only 2 chemical works employing 330 persons, one dye works with 125 hands, 1 soap factory very little larger, and 2 lac factories with 600 workers. The Shalimar Paint Works gives employment to about 600 persons also.

Under the head of 'Food Industries' nearly half a million persons are returned as workers and dependents, two-thirds of them being actual workers, which is very different from most industries. But this is explained by the fact that 295,000 persons are employed as rice pounders and huskers, flour grinders and grain parchers, of whom 284,000 or 96 per cent are females. The only other class worth referring to are the makers of sweetmeats, jams and condiments who number 13,000.

According to the 1913 'List of Factories,' there were only 1,200 persons employed in 9 flour mills in Bengal and 700 workers in sugar works at Cossipore. Over 1,500 persons worked in cigarette factories, 1,200 of them in the East India Company's place in Dum-Dum Road.

Under the head of 'Industries of Dress and the Toilet' over half a million persons are returned as workers and dependents, 40 per cent of them being actual workers. Curiously enough, of the 210,000 workers, no less than 178,000 or 85 per cent are males—the opposite of what obtains in the food industries. Practically all belong to 4 main classes, *viz.*, barbers, washermen, tailors and shoemakers.

Furniture industries give employment to less than 6,000 persons, half of whom are engaged as cabinet-makers, carriage-painters, etc., and the other half as upholsterers, tent-makers, etc.

More than half of the 98,000 workers under the head of 'Building Industries' are masons and bricklayers, the balance including thatchers, tilers, painters, etc., and some 3,000 lime-burners and cement-workers.

Of the 13,000 persons employed in the construction of means of transport, 9,000 or more than two-thirds are boat-builders, chiefly in the Dacca Division.

The special census of industrial concerns employing 20 or more persons showed 35,000 persons engaged in the construction of means of transport in 1911. According to the latest published 'List of Factories and other large Industries' employing 50 or more persons, there were in 1913 eight dockyards in the 24-Parganas and Howrah giving employment to almost 10,000 workers and 16 railway workshops in Bengal with 19,000 employees. About 1,000 persons too are employed in tramway workshops and more than that number in coach-building works in Calcutta.

Of the 3,000 persons engaged in the production and transmission of physical forces (heat, light, electricity, motive power, etc.), 2,700 are employed in the Calcutta area.

Industries of luxury and those pertaining to literature and the arts and sciences include a miscellany of occupations ranging, according to the Census Report, from editors of newspapers to lingam-makers, from jewellers and watchmakers to toy-makers and book-stitchers, from theatre managers to jockeys. Of the 98,000 persons so returned, 73,000 are workers in precious stones and metals, imitation jewellery-makers, gilders, etc., 7,000 are makers of bangles, necklaces, etc., 9,000 are printers, lithographers and engravers, and 4,000 are book-binders, etc.

Although the 1911 Industrial Census shows 103 printing presses in Bengal employing 12,000 persons, the 1913 'List of Factories' details only 22 presses of any consequence, giving employment to 7,000 persons.

Industries concerned with refuse matter give employment to 27,000 sweepers, scavengers, dust and sweeping contractors, nearly half of them working in the Calcutta district.

The figures noted above and relative remarks regarding the occupation or means of livelihood of persons dependent on industries are more or less general. For instance, over 10 per cent of the males returned as engaged in industry are also agriculturists. This is partly because factory labour is, to a large extent, occasional and not permanent. Nothing is commoner than for men to work in the mills during the slack agricultural season and to return to their holdings after a few months.

In addition, therefore, to the ordinary census returns, special statistics were compiled furnishing detailed information regarding the number of persons actually employed in different manufactures and industries at the time the 1911 census was taken. These show that there were 1,466 industrial and manufacturing concerns in Bengal, including mills, factories, mines, etc., in each of which at least 20 persons were employed at the time of the census, the total labour force being 606,000. Of these, not less than one-third were employed in the jute mills, nearly another third in the tea gardens of Jalpaiguri and Darjeeling, and the remaining third in various industries and manufacturing occupations, of which coal mining was the principal. Indeed, the predominance of the jute, tea and coal industries is very marked; if they are left out of account, there were only 163,000 persons finding employment in other forms of labour.

The concentration of organised industries and manufactures in Calcutta and the metropolitan districts of Calcutta, Howrah, Hooghly and the 24-Parganas, is another noticeable feature. They contain two-thirds of the industrial undertakings in the province, while the operatives at work in their mills and factories constitute over half of the total number. Outside this area there are only two industrial centres, *viz.*, the district of Burdwan with its coal mines and the tea garden districts of Jalpaiguri and Darjeeling. In the remainder of the province with an area of 70,000 square miles and a population of 38¼ millions, there are only 201 works with 35,000 employees—not even 6 per cent of the total industrial labour force.

Curiously enough, although the Dacca district with 1,066 persons per square mile is, after Howrah, the most thickly populated district in Bengal, the Dacca Division is the most backward part of the province so far as industrial enterprise is concerned, giving employment to 6,276 persons only in 59 works, two-thirds being jute presses in which nine-tenths of the workers are employed.

The following abstracts of statistics taken from the 1911 Industrial Census may be of interest :—

A.—*Particulars as to ownership of factories, etc.*—

Total number of factories			1,466
I.—Number owned by—			
(1) Government		45	
(2) Companies of which the Directors are—			
(*a*) Europeans and Anglo-Indians	474		
(*b*) Indians	65		
(*c*) Of both races	33		
		572	
II.—Number privately owned by—			
(1) Europeans and Anglo-Indians	180		
(2) Indians	669		
		849	
			1,466

B.—*Caste or race of managers of factories*—

Total number of factories			1,466
(1) Europeans and Anglo-Indians		675	
(2) Indians		791	
			1,466

Note.—The Indian-managed factories consist chiefly of—

	No.		No.
Brick and tile factories	153	Tea plantations	47
Oil mills	114	Jute presses	45
Printing presses	71	Surki factories	33
Collieries	63	Rice mills	24

Total number of factories—	
in British territory	1,454
in Cooch Behar (11 jute presses)	12
	1,466

3.—*Particulars of persons employed—*

Districts.	Factories.	Total number of persons employed. Male.	Female.	Total.	Of whom employed in direction, supervision and clerical work.	Age under 14.
Hooghly	77	32,559	7,749	40,308	814	3,707
Howrah	124	71,412	8,781	80,193	2,238	6,223
24-Parganas	175	137,115	24,523	161,638	4,519	14,617
Calcutta	495	51,054	2,417	53,471	4,539	1,900
	871	292,140	43,470	335,610	12,110	26,447
Tea plantations in—						
Jalpaiguri, Darjeeling, Chittagong	240	97,784	93,502	191,286	2,020	44,187
	1,111	389,924	136,972	526,896	14,130	70,634
Others	355	63,751	15,658	79,409	3,355	7,050
	1,466	453,675	152,630	606,305	17,485	77,684
Persons employed in direction, supervision and clerical work		17,397	88	17,485		
Skilled work		154,603	6,245	160,848	of whom all but 1,079 Indians.	
Unskilled labourers—						
Age 14 and over		232,209	118,079	350,288		
Under 14		49,466	28,218	77,684		
		281,675	146,297	427,972		
Total		453,675	152,630	606,305		

Another noticeable feature of modern industrial conditions in Bengal is the extent to which its large manufactures and industries depend on other provinces for their labour supply. According to the 1911 Census Report, the industrial expansion of Calcutta and its neighbourhood has created a demand for labour which the Bengalis have not been able to meet. The inadequacy of the number of local artificers, mechanics and labourers and to some extent their inefficiency, have made it necessary to employ an increasing number of workers from other parts of India. In the jute mills only a minority of the operatives are Bengalis. In his report on labour in Bengal in 1906 Mr. Foley wrote: "Twenty years ago all the hands were Bengalis, but they have gradually been displaced by Hindustanis from the United Provinces and Bihar. These men have been found more regular, stronger, steadier and more satisfactory generally, so that at present in most of the mills two-third of the hands are composed of up-country men." Since these words were written the proportion of immigrant labour has increased to such an extent that the Bengalis now form only about a tenth of the jute mill labour force.

In the tea gardens of Jalpaiguri and Darjeeling the Bengalis form an insignificant minority. In the coal mines, according to the Census Report, semi-Hinduised aboriginals or pure aboriginals, such as Bauris and Sonthals, predominate. In the cotton mills, Uriyas contribute largely to the ranks of the operatives, and one is astonished to see how many Uriyas there are in the jute presses and what heavy loads they carry. The same tendency is seen in other branches of industry, where the *personnel* is gradually changing, as the Bengali gives place to immigrants. The manner in which the latter are filling the labour market may be illustrated by an extract from a speech delivered a few years ago in the Bengal Legislative Council by a member, who was himself a large employer of labour with long experience of the country:—

"It is certainly a fact which my experience has proved, that the Bengali carpenter is being slowly, but surely, supplanted by his Chinese competitor. Again, speaking from my own experience, this gradual dying out of the Bengali carpenter is very materially due not only to his lack of training, but also to the disinclination of parents to let their children follow the calling of mechanics. I have known several instances of Bengal carpenters in my own employ bringing their sons to me to be taken on as clerks in my office, with an Entrance or First Arts qualification. Twenty-five years ago our workmen were nearly all Bengali Hindus, and there was not a single Chinaman in our employ and only one or two Muhammadans. Now we have a large number of Chinamen, and among the Indians the Bengalis are in a very small minority. The Chinaman, it is true, get larger wages, but he earns his money to the hilt, works steadily, takes only one or at most two holidays in the year, is sober, punctual and intelligent, and does not need to be continually urged to his work. The Bengali, I am constrained to say, is very much the contrary. He gets small wages certainly, but he earns for his employer even less than he gets. As a rule, he takes little or no real interest in his work, and if not carefully watched, will scamp his job" (*vide* 1911 Census Report, paragraph 1047).

At the time the last census was taken in 1911, there were living in Bengal 1,839,000 immigrants from other parts of India and 131,000 from outside India, in all 1,970,000 persons, of whom 780,000 or 40 per cent were resident in Calcutta, 24-Parganas, Howrah and Hooghly.

On the other hand, the number of emigrants from Bengal who were enumerated in other provinces and countries in 1911 was 584,000 only, of whom 64,000 or just over 10 per cent were born in the four industrial districts above mentioned.

The immigrants in Bengal exceed the emigrants by over 1¼ millions, the excess having increased considerably during the last decade.

In connection with migration, the contrast between Bengal and the neighbouring province of Bihar and Orissa is most marked, the positions being completely reversed as the following figures show:—

	Emigrants to other parts of India.	Immigrants from other parts of India.
Bengal	553,000	1,839,000
Bihar and Orissa	1,901,000	410,000

According to the 1911 Census Report, the difference between the two provinces is due partly to racial characteristics, partly to climate, and partly to economic and industrial conditions. The Bengali has a very different character from that of the Bihari and in particular of the Bhojpuri people who have been described as "an alert and active nationality with few scruples and considerable abilities." The second great cause is the higher standard of prosperity attained by the Bengali. It is on this account that he can employ foreign labour instead of working himself. Some allowance must also be made for the weakening effects of the climate. Lastly, the industrial development of Bengal has naturally created a great demand for labour, which is not fully supplied from local sources. The labour force of the large organized industries in Bengal is being drawn more and more from the United Provinces, from Bihar and Orissa, and even from Madras, and the native-born Bengalis are yielding place to immigrants.

Bengal gains no less than 1,087,000 persons by the balance of migration between it and Bihar and Orissa. The number of Bengali emigrants present in the latter province at the time of the Census was only 165,000, whereas the immigrants to Bengal from the province were nearly eight times as many, amounting to 1,252,000, among whom there were eight males to every female.

Bengal also gained 380,000 persons from the United Provinces, to which it sent only 26,000 of its inhabitants, although 406,000 persons made their way from that province to Bengal in quest of lucrative employment, which more than half of them found in Calcutta and the industrial districts of Hooghly, Howrah and the 24-Parganas.

Other provinces also contribute to the labour force of Bengal which has been further augmented by immigration since the Census returns were made, and so far the Bengali shows no sign of taking any active part in the industrial development of the province.

The following abstracts from the 1911 Census returns showing the position as regards immigration and emigration in the industrial and manufacturing area which includes Calcutta, 24-Parganas, Howrah and Hooghly may be of interest.

IMMIGRATION.

[000's omitted.]

District where enumerated.	Born in that district. Male.	Female.	Total.	Born in other districts in Bengal. Male.	Female.	Total.	Born in other provinces and countries. Male.	Female.	Total
Bengal	22,425	21,910	44,335	...	...	...	1,378	592	1,970
Hooghly	448	456	904	54	63	117	53	16	69
Howrah	373	380	753	46	34	80	80	30	110
24-Parganas	1,030	1,002	2,032	90	67	157	185	59	244
Calcutta	137	120	257	183	100	283	288	69	357
	1,988	1,958	3,946	373	264	637	606	174	780
Other districts	20,437	19,952	40,389						

EMIGRATION.

[000's omitted.]

District of birth.	Enumerated in that district. Male.	Female.	Total.	Enumerated in other parts of Bengal. Male.	Female.	Total.	Enumerated in other provinces and countries. Male.	Female.	Total.
Bengal	22,425	21,910	44,335	...	...	...	378	206	584
Hooghly	448	456	904	78	57	135	10	4	14
Howrah	373	380	753	18	14	32	5	3	8
24-Parganas	1,030	1,002	2,032	65	62	127	7	5	12
Calcutta	137	120	257	30	28	58	18	12	30
	1,988	1,958	3,946	191	161	352	40	24	64
Other districts	20,437	19,952	40,389						

It will be observed that among a population of 5,363,000 there are 780,000 immigrants from outside Bengal, only 1 out of every 5 of whom is a female. This indicates that the men have been attracted to these industrial centres, leaving their families behind in other provinces and countries to await remittances from the wage-earners. A statement of the amount of money-orders issued by the post offices serving the Calcutta jute mills shows that remittances to the value of Rs. 94,02,588-11-2 were made during the year 1915. According to Mr. Foley's Report on Labour in Bengal, already referred to, over Rs. 31,00,000 were received by money-order in the Shahabad district of Bihar alone in the years 1903-04 and 1904-05. It is quite evident, therefore, that so far as labour is concerned, it is not the local Bengalis who are benefiting from the large sums spent in wages by industrial concerns, but immigrants from other provinces.

The 1911 Census Report refers to the general rise in the standard of living of the present generation and the effect of high prices on those members of the middle classes who are dependent not on agriculture, commerce and industries, but on the fixed salaries which they obtain in clerical and professional employment. To them high prices mean straitened circumstances, if not actual privation. The landless labourers, formerly the most destitute of all, are not much affected. Those who are ready to travel can find ample employment in the coal mines, mills, factories, etc., where wages have risen and are far higher than in the rural areas. The change which has taken place must be mainly attributed to the greater mobility of labour which again is the result of the extension of railway communications. When scarcity is felt, a larger proportion of the people leave the district and obtain labour elsewhere, remitting their savings home. According to the Census Report, the one section of the community which appears to be stationary consists of the professional middle classes (*bhadralog*) of Bengal who do not engage in commerce or industries. They do not reduce their expenditure on the social and religious ceremonies incidental to their position, though the expense of maintaining that position has increased. At the same time their ranks are swelled and competition is rendered keener year after year by the growing number of recruits from schools and universities.

Unless the Bengali middle classes are to take a more active part in industrial enterprise, it is difficult to see how their position can be improved by hastening the industrial development of the province. According to the 1911 Industrial Census, out of 606,305 employees in the 1,466 factories in Bengal, only 17,485 persons—14,570 of whom were Indians—were employed in direction, supervision and clerical work. This is the only class of work that appeals to the educated Bengali, but as only 2 out of every 100 persons employed in the factories are required in this connection, it is useless to raise hopes of better times to come for the *bhadralog* unless they are prepared to do a fair share of manual labour.

Even assuming that the Bengali shows more inclination to become an operative in industrial and manufacturing works, it does not necessarily follow that he will be able to stand up against the competition of the more virile immigrants from up-country provinces.

During the decade 1901-1911 outside labour steadily found its way into the industrial area round about Calcutta, there being 350,000 more immigrants in 1911 than there were in 1901 in the manufacturing districts of Calcutta, 24-Parganas, Howrah and Hooghly, most of them coming from outside the province. In the 24-Parganas in particular the increase was most marked, the number of immigrants having risen by 176,000 or almost 80 per cent in the ten years and now constituting one-sixth of the total population.

Nowhere, according to the Census Report, has there been a greater burst of manufacturing and industrial activity than in the 24-Parganas, where the number of factories rose from 74 to 124 between 1901 and 1911, and the number of operatives from 94,186 to 169,310. The mill towns along the banks of the Hooghly showed a most extraordinary growth of population which is accounted for by the influx of labourers, illustrated as follows :—

Towns.	Increase of population, 1901-1911.		Increase of operatives, 1901-1910.	
	Actual.	Per cent.	Actual.	Per cent.
Bhatpara, Naihati, Halishar	36,763	81	30,835	215
Titaghur	29,106	181	21,649	162

The character of the population has changed so greatly owing to this influx that some mill towns are now practically foreign towns planted in the midst of Bengal. In Bhatpara 4 persons speak Hindi to each person speaking Bengali. In Titaghur 75 per cent speak Hindi, 8 per cent Telugu and 4 per cent Uriya, while 11 per cent only speak Bengali.

The increases in mill towns on the banks of the Hooghly are quite phenomenal. Bhatpara has increased five-fold since 1881 and has more than doubled its population during the last decade, rising from 21,540 to 50,414. The expansion of other mill towns is equally remarkable, the aggregate population of seven in the 24-Parganas having risen by 87 per cent since 1901. Titaghur has nearly trebled its population, Garulia has an addition of 57 per cent, and Bhadreswar on the other side of the Hooghly of 61 per cent.

At the time of last census Titaghur, with over 30,000 persons per square mile, was the most densely populated town in Bengal, more so even than Calcutta with its 28,000. Since 1911 the population of Titaghur shows a further considerable increase. It is difficult to realize that Titaghur was nothing but a patch of jungle until 30 years ago when the erection of the Titaghur Paper Mill and the Titaghur Jute Mill, employing between them about 2,000 workers only, started the place on its industrial career. For the next decade it did little more than mark time, but within the last 20 years eight other jute mills have been erected, until now there are 6,000 looms running, giving employment to over 40,000 persons.

Further interesting statistics are available showing the lines on which the population has increased in the three mill towns last abovementioned within recent years. In November 1902 the managing agents of four mills in Garulia (2), Bhadreswar and Titaghur took a census of the workers manning the 2,299 looms then running. In September 1916 another census was taken of the same concerns, increased meantime to seven mills in Garulia (2), Bhadreswar (3) and Titaghur (2), containing 4,343 looms. The following abstract shows where the labour employed in these concerns is drawn from now as compared with 14 years ago :—

CENSUS OF WORKERS.

Shamnagar, Titaghur and Victoria Jute Mills.

District.	November 1902.								September 1916.							
	Garulia, Shamnagar (2 mills).		Bhadreswar, Victoria (1 mill).		Titaghur (1 mill).		Total (4 mills).		Garulia and Bhadreswar, Shamnagar (3 mills).		Bhadreswar, Victoria (2 mills).		Titaghur (2 mills).		Total (7 mills).	
Number of looms.	886		633		780		2,299		1,572		1,053		1,718		4,343	
	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.	No. of workers.	Per centage.
Bengal—																
Local	1,473	23	1,055	22	1,282	22	3,810	22	988	8	480	6	683	5	2,151	7
Immigrants	360	6	209	4	434	8	1,003	6	436	4	218	3	343	3	997	3
Total	1,833	29	1,264	26	1,716	30	4,813	28	1,424	12	698	9	1,026	8	3,148	10
Bihar and Orissa.	3,753	58	2,825	59	2,927	50	9,505	56	6,336	55	4,812	65	7,325	57	18,473	58
United Provinces.	825	13	738	15	1,217	20	2,780	16	2,920	26	1,188	16	2,677	20	6,785	21
Central Provinces.	...	...	...	...	...	...	...	...	45	...	...	...	...	...	45	...
Madras	...	...	...	...	...	...	...	...	722	7	748	10	1,912	15	3,382	11
Others	9	...	2	...	1	...	12	...	...	...	...	...	8	...	8	...
Total	6,420	100	4,829	100	5,861	100	17,110	100	11,447	100	7,446	100	12,948	100	31,841	100

No change has been made in the type of machinery used, the goods manufactured or the management, but there is a marked difference in the class of labour employed as is shown by the following comparison of percentages :—

	Bengal.			Bihar and Orissa.	United Provinces.	Madras.	Total.
	Local.	Immigrant.	Total.				
1902	22	6	28	56	16	...	100
1916	7	3	10	58	21	11	100

It will be noticed that while in 1902 Bengalis formed 28 per cent of the whole labour force, they are now reduced to 10 per cent, their places being filled to some extent by increased importations from Bihar and Orissa and the United Provinces, but chiefly by immigrants from the province of Madras now numbering 11 per cent of the total. In the two Titaghur Mills referred to, Madrassis represent 15 per cent of the employees and the Bengalis 8 per cent only. Not only is the proportion relatively smaller, but the actual number of Bengalis employed in the jute mills is absolutely less than was the case 14 years ago.

It may be interesting to add that among the 31,841 workers enumerated in September 1916 in the group of mills above referred to, four out of every five persons are males.

It is easy therefore to understand the statement in the 1911 Census Report that in the mill towns of the 24-Parganas, such as Bhatpara, Garulia and Titaghur, the males outnumber

females by two to one, whereas in non-manufacturing towns the sexes are equally represented or the female element predominates.

Of the 31,841 workers, less than 10 per cent are children under 14 years of age, three out of every four of whom are boys. Of these 3,000 odd children, only 390 or 12 per cent are returned as belonging to Bengal, 28 being girls. This is in marked contrast to the proportion of the sexes of the children from the other provinces, 1,600 of whom come from Bihar and Orissa, nearly 500 from the United Provinces and over 600 from Madras. As above indicated, the overhead average is three boys to every girl, but taking them individually, the proportions are as follows :—

Bengal	13 boys to every girl employed.
Bihar and Orissa	4 „ „ „ „ „
United Provinces	3 „ „ „ „ „
Madras	1 boy „ „ „ „

A remarkable feature of the introduction of Madrassi labour to jute mills is that there is one female employed for every male, and that physically the women are much better specimens than the men and do the work allotted to them much more satisfactorily.

Of the 31,841 mill workers above referred to, 73 per cent are returned as Hindus as against 27 per cent Muhammadans. Of the total, 71 per cent are shown as Hindi-speaking, 11 per cent Telugu, 9 per cent Uriya and only 9 per cent Bengali.

It would be interesting to ask representative Indians why the people born in the neighbourhood of Calcutta do not take advantage of the opportunities already given them of taking an active part in the industrial development of Bengal. Why do more of them not enter the jute mills, cotton mills, engineering and other manufacturing works on the banks of the Hooghly?

Take the case of the jute mills which give employment to all classes of labour. Statistics compiled at last census show that altogether 71 castes, each with over 100 representatives, were found amongst the mill employees. Of these, most numerous are the Mussalman groups of Sheik and Jolaha which between them account for 61,000 of the 206,000 listed. The most numerous Hindu castes are mainly low castes, but there are nearly 9,000 Brahmans. The Chamars, numbering nearly 22,000, account for one-tenth of the workers and one other caste, *viz.* :—

The Chasi Kaibarttas, contribute	12,000
Then come in order Brahmans, as above with	9,000
Tantis and Tatwas	7,000
Telis and Tilis	7,000
Bagdis	6,000
Muchis	6,000
Dosadhs	6,000
Goalas	5,000
Kayasthas	3,500

As already indicated, only two out of every 100 employees in factories, etc., are required for direction, supervision and clerical work. Of over 200,000 persons returned as employed in 1911 in the 50 jute mills in Calcutta, 24-Parganas, Howrah and Hooghly, less than 4,000 were engaged in that class of work, 3,370 of them being Indians. Seeing that Brahmans and other Hindus of good castes are employed in much greater numbers in the mills, it is evidently not caste difficulties that stand in the way of Bengalis engaging more freely in industrial work, and it would be interesting to know, why they are so backward where commerce and industry are concerned.

Even though new industries are started to-morrow and new avenues of employment opened up for Indian labour, there is nothing to indicate that the Bengali will be able to hold his own against his Indian neighbours far less against foreign competition. In the case of industries requiring organisation and management on modern lines, the natural tendency will be for new enterprises to be located in the vicinity of Calcutta within easy reach of the river Hooghly. The result will be a further influx of immigrants from other provinces, whose arrival will increase the cost of living and make the struggle for existence on the part of the Bengali *bhadralog* harder than ever. Even in advanced Central Bengal, extraordinary as it may appear, the outflow from the three districts of Murshidabad, Jessore and Nadia to the industrial centres is comparatively small in spite of their proximity ; only one-tenth of those enumerated outside the districts in which they were born had found their way to Calcutta and the 24-Parganas with their important commercial and industrial interests at the time of last census.

Foreign competition may be met by high import tariffs, and Indian industries may be nursed into active life by the aid of bounties or subsidies of sorts, but nothing can be done to help the people of Bengal to face competition from other Indian provinces, the inhabitants of which, in the past, have shown themselves to be more adaptable to the changing conditions of industrial life and, indeed, have done far more to help on the development of textile and other manufacturing industries in Bengal, than the Bengalis themselves.

Even though it be admitted that the position of India as regards raw material, labour and financial resources is such as to justify special steps being taken for development of manufacturing and other industries, it does not necessarily follow that the speeding up of industrial development in Bengal will result in increased prosperity to the people of that province.

From a labour point of view, it has still to be shown that the Bengalis are prepared to forsake agricultural and professional pursuits to take part in industrial enterprise, and if any fresh impetus in this latter direction is to result merely in the starting of new industries, manned by imported labour and controlled by outside agencies, the last state of the Bengali middle classes will be worse than the first.

Oral Evidence 18th January 1917.

Note.—Messrs. J. Donald, J. A. L. Swan, A. R. Murray and G. H. W. Davies were examined orally in a Conference.

President.—*Q.* There are one or two questions that occur to me in the note that do not seem to agree with some of the evidence we have had. For instance, in Mr. Davies' note reference is made to the forms of Government financial help. Mr. Davies says that guaranteed dividends would attract capital but would not improve the management, and that in spite of the guaranteed dividends being paid, the factory might be working at a heavy loss. I understand that he would not advise the giving of dividends, but some of the witnesses, including Mr. Ironside yesterday, rather favoured guaranteed dividends as the least harmful of all Government forms of help. If the guaranteed dividend was sufficiently small, it would surely be an incentive for the factory to do its best in order to produce something beyond the Government-guarantee dividend. I understand that the only reason for guaranteed dividend is to produce a form of confidence which will enable the people to invest their money. A guaranteed dividend of 4 or 5 per cent would not encourage me to be content with that when an industry could make 15 per cent. But it would be a great encouragement to me to put my money if I was quite sure of 5 per cent. Do you think that 5 per cent would be sufficient to justify anybody sitting down and taking things easy?—*A.* (*Mr. Murray*). In Bengal, generally most of the money of the natives is invested in land on which the return is about 5 per cent.

Q. In that case, would 4 per cent attract money sufficiently well, and at the same time prevent the factory people sitting down and taking things easy?—*A.* I do not think that 4 per cent would attract money for industrial concerns.

Q. But it does for railways?—Yes. Hitherto it has been the only land of guaranteed dividends that has been open out here and that only to a limited extent.

Hon'ble Sir R. N. Mookerjee.—*Q.* Without this guarantee the railways in Bengal and other Provinces would never have been floated, and it has done some good to the country. Every one of them is paying 7, 8 or 9 per cent, but if there was no guarantee, it would have been very difficult to raise the required capital.—*A.* Quite so, but railways are on quite a different footing from any commercial enterprise. The real difference is that a railway is granted a practical monopoly. Foreign competition cannot affect it. If similar conditions are established for industrial enterprises, no doubt capital could be obtained on the same guarantee.

Q. It has been proved that by giving guarantees money has come into the railway industries, and may I know what is the objection to give guarantees to industries which are for the public good?—*A.* You mean perpetual guarantees?

Q. Guarantees for a period of five or six years or seven years as the case may be. We see from the evidence that other Governments have guaranteed or have given pecuniary help, and that has impetus to develop some industry, but Bengal seems to be lacking in giving any such encouragement, practically doing nothing?—*A.* What would happen supposing the company was not making money? You have to stop the guarantee.

Q. If it is the genuine wish of Government to encourage to develop industries, then to lose Rs. 30,000 or Rs. 40,000 in five or six years is nothing.—*A.* It seems to us that the Government will have to bear all the odium for the loss.

Q. If Government guarantees interest at the rate of 5 per cent for four or five or six years, that does not mean that the Government will be responsible for the capital.

Mr. A. Chatterton.—*Q.* Is there not an essential difference between an industrial company and a railway, in that with the railway nearly the whole of the capital is invested in permanent plant, whilst in an industrial concern the working capital may be considerably greater than the amount locked up in plant and machinery. If Government were to give assistance to an industrial enterprise at the beginning to encourage confidence, would it not be better to give a lump sum down as a grant-in-aid rather than to guarantee interest on capital. The grant would indicate that Government had investigated the project and had some confidence in it?—*A.* (*Mr. Donald.*) I prefer myself the principle of loans.

Q. But in many cases a company will have to spend a considerable amount of money in building up what ultimately becomes the goodwill, and I think that Government might legitimately make a grant and a very large one.

Sir F. H. Stewart.—*Q.* I do not read your note as opposed to Government financial aid, and it merely differs as to the form in which the aid is to take place.

President.—*Q.* Would you agree that guaranteed dividends would attract capital, but would not improve the management and would remove the chief incentive to individual exertion?—*A.* (*Sir F. H. Stewart*)—I do not think it would affect management in that way. My own idea is roughly that the people to be accorded this aid should be carefully chosen. You just enable them to tide over the initial difficulties and to raise their capital. I think it is all dealt with at the end of the note where Mr. Davies says that the Director is the key of the situation.

Witnesses.—The whole of the note expresses our views generally.

Hon'ble Sir R. N. Mookerjee.—*Q.* There are many concerns where the managing agents are responsible for the management, and the managing agents' allowance is only the bare expenses of the office, but they get a percentage on the profits of the concern. A railway with 75 lakhs of rupees capital allows only a sum of Rs. 500 a month to the managing agent. If Government gives a guarantee and appoints proper managing agents, and if the allowance to the managing agents after paying actual office establishment is made in the shape of a certain percentage on the profits of the company, it will be the interest of the managing agents to see that the company earns money; otherwise they have to do work for nothing, and therefore it will not degenerate the management of the company, because the managing agent must see that the company makes profit?—*A.* In that particular case, yes. But it is common knowledge there are other profits that come to the managing agents. In such a case probably the managing agents will not only supply the working staff to the railway, but also the coal from a colliery for which they are agents. They will take the percentage on both transactions. Managing agents have even been known to make large profits by selling the machinery, etc., of a bankrupt company, of which they were agents, to themselves. They have many sources of profit besides their pecuniary allowance. To take one instance, there is a firm which are agents for many tea-gardens. These are also agents for a company which manufactures tea-chests, and they sell tea-boxes to managers or managing agents for the tea-gardens. Doubtless they make the usual profit on the transactions. They are quite entitled to do so, but I am only pointing out that the managing agents have many other sources of profit. Any industry assisted by Government should not be handed over to managing agents. The companies should look after their own management.

Q. You may insist on a similar condition if the Government gives guarantee to any industry? The Government must approve of the managing agent and also the terms of his appointment. If that is satisfactory, what is the objection to Government guarantee? Before Government gives a guarantee, the Government should insist on seeing the prospectus of the company, and the terms of the managing agents, and everything else, as the Railway Board does, and will enquire about the prospects of the industry too. The Railway Board does not give a guarantee, or allow any promoters to float a company, unless the terms are first settled in detail. Even the agreement and the prospectus have to be settled before it sanctions the company?—*A.* If the company is not a success?

Q. Our suggestion is only for limited periods. If it does not succeed, the Government must lose a few thousand rupees.—*A.* I do not think the Government looks at the question from the point of view of loss of revenue.

Q. The Railway Board goes further than that and it actually lays down that it is not responsible for mistakes in estimates, or mistakes in the prospectus, and before the Government gives a guarantee, it may put down all the conditions clearly so that by giving guarantee it is not responsible at all for the capital and for what would happen after six or seven years?—*A.* As regards railways, the Government or anybody can fairly well weigh up the chances of success of a railway, but as regards industrial concerns it is different, it is speculative very often.

President.—*Q.* But that is exactly the point. It is so speculative that the people are now shy of putting their money in, and we want to divide that speculative element between the Government and the public. The Government will enquire carefully into the prospects of the enterprise. They have the Director of Industries and experts to look into the whole of the project. As regards the alternative suggested by Mr. Donald, that is, loans, there would be a temptation on the part of the Government to pay the loan and go away. But in the case of guaranteed dividend, there would be a more continued interest on the part of Government in the concern. Government would follow it and, if necessary, foster it and prevent it from falling into mistakes. But none of your remarks have raised the real difficulty, and that is, that the guaranteeing of dividends to a new industry might cut into private enterprise already established. There is hardly a single case that can be thought of, where Government guarantee of dividend will not cut into private enterprise in some way or other, directly or indirectly. We want tanneries dealing with the enormous quantities of hides available, and yet there seems to be no chance of their spreading rapidly by ordinary private enterprise and the Government have to develop them in some way if we are to save those hides from export. That is a case where private enterprise will develop with some kinds of Government help.—*A.* (*Mr. Donald.*) That difficulty is less likely to arise in the case of an industry not yet started in any form in India. But a guarantee of purchasse would be preferable to a guaranteed dividend. Government might, *e.g.*, place orders withr a hide

concern for their requirements of leather in this country and Great Britain, and guarantee the purchase of certain quantities for a certain period. The Calcutta Pottery Works would be developed if Government guaranteed to purchase all the insulators the Telegraph Department requires. There would, I think, be a greater incentive to better management under such an arrangement than under a system of guaranteed dividends. With a certain assured output and sale, the effort to secure profit and to expand would be greater than under the other system.

Hon'ble Pandit M. M. Malaviya.—*Q.* In case the Government guarantee interest on a certain enterprise, apart from the possibility of any loss, have you any other consideration present to your mind?—*A.* Government may incur the blame if it becomes a failure.

Q. Government did help railway enterprise very much with guaranteed interest for years together, and there were failures in railways?—*A.* But there is a permanent dividend.

Q. But let us take the case of dividend for a certain number of years which is better than permanent dividend. When the scheme did not succeed for years together, nobody blamed Government for it. Do you know that anybody did?—*A.* Why should they? They still got the dividend.

Q. Generally speaking, the Indian railways which have about 465 crores of rupees in capital did not pay anything until nearly 1900?

Hon'ble Sir R. N. Mookerjee.—*Q.* There are instances of railways in which they are not getting anything, and the public never blamed the District Boards for giving a guarantee. The shareholders did not blame the District Board, but blamed the management.—*A.* What would happen if the District Board had withdrawn its guarantee?

Q. They have given guarantee on certain conditions, and they cannot go back upon their words. They should have considered this in giving the guarantee.—*A.* Assume that they had given the guarantee for a certain time and then stopped, what would happen?

Hon'ble Pandit M. M. Malaviya.—*Q.* If there had been an industrial development such as Japan has witnessed, or the United States has witnessed, or Germany has witnessed, in the last forty years, the Government revenues would have been three or four times what they are at present. The amount of money that would go to Government in the way of taxes directly and indirectly would be enormous, and the prosperity that would come to the people would be very much greater. The position is this at present. The Indians have not taken to industry as they should have done, and we are told that the Europeans here are doing a good deal of business and that European enterprise does not want any financial help. But the Indians have not taken to industry, and unless they take to industry as they should, you cannot expect a really large development in the country. The Government are asked to help in the way of guaranteeing dividends, more because of the moral encouragement that the projects will receive than from the point of view of securing a certain amount of profit, but that element is not absent and it is like this. The Government take upon themselves a certain amount of risk and that in itself is an assurance to the public that the Government have weighed the project, and the people will say, "The Government guarantee interest for five or seven years and we shall go into this", and if the project should fail they will not blame the Government. Besides, you know that many Government projects have come to grief, but have the people blamed the Government? We entirely share with you your desire that the public money should not be wasted, but we feel that if a certain amount is even wasted, the corresponding advantage will be so great that it is worth while to incur that expenditure.—*A.* You must not assume that we are against assistance.

Sir F. H. Stewart.—*Q.* I think we should get on to the main point. The last sentence of Mr. Murray's note is—"From a labour point of view, it has still to be shown that the Bengalis are prepared to forsake agricultural and professional pursuits to take part in industrial enterprise, and if any fresh impetus in this latter direction is to result merely in the starting of new industries, manned by imported labour and controlled by outside agencies, the last state of the Bengali middle classes will be worse than the first." That is the crux of the whole matter, that Government help should be given where they are not prepared to take to industrial enterprise?—*A.* It may be an experiment worth making. In the case of works of public utility, I can understand guaranteed dividends.

Q. You talk of works of public utility, that is railways, lighting corporations and tramways, and would you not also extend that a little further and say new enterprises which have not been taken up yet?—*A.* (*Mr. Murray.*)—I do not know of any industry that has not been touched.

Sir F. H. Stewart.—*Q.* Let us consider again the reasons given against guaranteed dividends. It is with regard to those reasons that some of us are not convinced. Do you think that is the general view of the Bengal Government?—*A.* (*Mr. Donald.*)—I do not think we can express it. We have not got it formally.

Q. Mr. Murray in his note brings out clearly what to my mind is the real crux of the situation, the unwillingness of the middle class Bengali up-to-date to take to industrial enterprise and the fact that skilled labour is practically all imported?—. (*Mr. Murray.*)—My note was written more from the labour point of view than capital or revenue point of view.

Q. By way of making an effort to interest the Bengalis at this moment in industrial enterprise, we want to know whether you have any special suggestion to make?—*A.* Teach them elementary and technical and industrial education more than they are being taught at present.

Q. Your experience is very large at any rate in one direction. Do you see any sign of their being more willing to go?—*A.* None at all. When I came out here first, most of the jute business was done by the Bengalis, and to-day this business is done by the Marwaris.

Q. What is the reason of it?—*A.* I cannot tell you. I cannot explain it, but they have dropped out. When I came first of all, it was chiefly the Bengalis who were at the mills. Of course, extension in the trade has been rapid and we had to import labour from Bihar and Orissa and Madras. Bengal has gradually dropped out. Formerly we used to buy fifty per cent of our jute from Bengalis and to-day we do not buy even five per cent. It is practically all bought from Europeans and Marwaris. I can only state the fact.

Hon'ble Sir R. N. Mookerjee.—The evidence of every Bengali witness is that the Bengali has lately taken more to industries than they did ten years ago. Mr. Swan's note has stated that.

Hon'ble Pandit M. M. Malaviya.—*Q.* As a matter of fact, you do find that the Bengalis of all classes are taking more to industries than they did. You see Dr. Sircar's tannery and things like that?—*A.* He is a Bengali; but the labour that is employed is chiefly imported labour. A good deal is local labour, but there are no *bhadralogs*.

Q. In several factories I found several Bengalis employed there, but I have noticed this also, the unintelligent and uneducated manual labour is imported from Bihar and unfortunately from my Province, but the Bengali is a more intelligent workman than the people from Bihar and Upper India, and I found Bengali artisans employed in what you may call work where there is more use for intelligence. That is what I have seen in several places, and I have found Brahmin boys coming in without any hestitation. In some cases we find *bhadralog* classes coming in.

President.—One realises that these are isolated cases and men like Dr. Sircar have taken the thing up as a duty and not as a thing by which to get a living.

Hon'ble Sir R. N. Mookerjee.—Agriculture in Bengal is so paying that the people do not go to any other occupation.

Hon'ble Pandit M. M. Malaviya.—*Q.* Is it not the fact that you get more cheap labour from Bihar, the United Provinces and the Central Provinces, because the conditions of agricultural holdings in these Provinces are not so good as in Bengal?—*A.* Yes. There is also the pressure of the population on the land.

Q. I have seen some of these Bengali agriculturists, and I can tell you from my own experience of my Province, that the conditions in my Province are very much less fortunate than they are in Bengal, and that largely to my mind accounts for the flow of labour from the United and other Provinces. Don't you think that that shows that the cheap labour of the United Provinces and other Provinces is being exploited for these industries at present, and that only because there is no work available to these men in their own Provinces, and I will give you an instance. Take the Tata's Iron Works at Sakchi. I was told there that a good deal of labour used to be exported from that place and from the surrounding country to Assam and even outside India, and very little of it is going out now comparatively because they are now employed in the Tata's Works. If there is work available in the United Provinces, the men of that Province will not run so far as Calcutta, and so also in the case of Bihar, and if the Bengali does not go out to labour manually in the mills at present, that is because the conditions in which you employ this labour are not acceptable to him. You have got to pay the Bengali more. He is above his compeer labouring class in intelligence and means, and if you want to attract Bengali labour, the conditions must be more attractive.—*A.* We do not want to pay away more money in making conditions attractive merely to get Bengali labour.

Q. You cannot depend upon this supply of labour from other Provinces?—*A.* Then we may have to pay the Bengali labour more to attract it.

Q. If there are industries started which will pay the Bengali labour more, I am sure he will be attracted.—*A.* But it will give greater attraction to the up-country man also.

Q. I should like your general impression of the relative merits of the two groups of labour. How is the local labour compared in efficiency?—*A.* The Bengali is much more intelligent.

Q. You find him worth more?—*A.* I do not say so. He is clever with his head and hands. Even now in the turning shops and in the mechanical departments, it is the Bengali mistries that we use or Chinamen (but there are very few Chinamen, and nearly all the mistries are Bengalis to this day), but the spinning hands, weaving hands, etc., inside the mill are all upcountry men.

Q. Are the Bengali labourers in the mill more efficient than the imported people?—*A.* I believe they are. They are more intelligent people, and they are clever people.

Q. What is the class of people in Eastern Bengal that might come to the mill?—*A.* The cultivator.

Q. If that is so, then we may look to the future without any misgivings, because, if you cannot get this labour from outside, presumably you would get what is more expensive, but more efficient labour locally?—*A.* It is only a question of the development of Bengal industrially. I wish to point out that we get our men from outside provinces, and I can say that in my own particular trade the Bengali has not taken advantage of his opportunities.

Mr. C. E. Low.—*Q.* Is it not the case that the Bengali asks higher wages, because he gets a jute crop and the price of jute has risen in comparison with other things?—*A.* Yes.

Hon'ble Pandit M. M. Malaviya.—*Q.* Is it not also a fact that the Bengali agriculturist feels that he has in addition to agriculture some other pursuits which will bring him money—some home industry, some trade or commerce?—*A.* I cannot speak from personal knowledge.

President.—*Q.* Does not that slightly modify your final paragraph "From the labour point of view, it has still to be shown that the Bengalis are prepared to forsake agricultural and professional pursuits to take part in industrial enterprise, and if any fresh impetus in this latter direction is to result merely in the starting of new industries, manned by imported labour and controlled by outside agencies, the last state of the Bengali middle classes will be worse than the first"? Don't you look forward now to a time when, if industries develop in other provinces as a counter in the way of attracting labour, the Bengali will take to industrial enterprise here as he finds that it pays him better than now? *A.* Industrial developments will take place more in Bengal than in any other Province. We are near the sea board and on the Hooghly and the transport of labour and other things is cheap. Besides, everything will have to come to Calcutta or go to Bombay to be exported, and on this side of India the natural tendency will be for industrial development to take place in Bengal. I should think that with the cheap transport we have for labour unless the Bengalis were to take a more active share in it, they would be ousted by upcountry workmen.

Q. With the increase of industrialism in the districts under present conditions, more money will be available in the districts, and consequently larger prices will be paid for agricultural products and so the Bengali will stick to his land. You import a great deal of labour. Does it settle down in the neighbourhood of your mills?—*A.* We have got coolie lines. I cannot say that they have settled down. They are developing into an industrial class, but they go home periodically. They like to go away, say for two months, to their native homes and come back to work.

Q. They do not bring their wives and families here?—*A.* They have their families here, but they do not settle down here. They do not make this their home. They earn a certain amount of money and then go home.

Q. You are not going to form an industrial class in that way?—*A.* I cannot say. Take Titaghur. There is a population of thirty thousand or forty thousand people, and a very large percentage of them go away and come back yearly, certainly every second year, while the older people go home for good.

Hon'ble Pandit M. M. Malaviya—*Q.* Am I correct in saying that if these labourers who come to the mills in Calcutta could get fifty per cent of what they get here nearer home, they would not come to these parts, judging from their keen desire to go back to their homes, and not make this their home? Taking all these facts into consideration, don't you think that if they could get work which would bring them 50 or 60 per cent of what they would earn here, they would stay back nearer their homes?—*A.* Probably true. For the same reason that if I could get 60 per cent of what I get here, I would stay at home too.

Q. What is the average he gets here?—*A.* Rs. 3-8-0. A weaver gets Rs. 6 a week. A little boy gets about Rs. 1-8-0 or 1-12-0. The average works out to Rs. 3-8-0.

Q. Looking at the question as a whole, you attract labour from the United Provinces and Bihar and the Central Provinces because the possibility of earning the same wages there as are earned here is much less at present. When industries grow in those parts, this supply of labour is likely to be restricted as it has been in the case of the Central Provinces, and at present in the United Provinces the industries which are growing are few, but as industries multiply there, as I hope they will, the United Provinces labourer will find work nearer home and he will not care then to go to Bengal?—*A.* Very probable.

Q. But one thing more. Do you find the Bengali labourer when he is employed, so far as physical exertion is concerned, does as much hard work as the United Provinces labourer?—*A.* I do not think so.

Q. I am talking of the Eastern Bengal men?—*A.* We have not many Eastern Bengal men.

Hon'ble Sir R. N. Mookerjee—*Q.* The Bengali labourer generally suffers from malaria?—*A.* Medical statistics show that. The cases we have in our books chiefly consist of malaria.

Q. Is it more among the Bengali labourers than among other labourers?—*A.* I cannot tell you. The biggest percentage of illness is due to malaria.

Hon'ble Pandit M. M. Malaviya—*Q.* But that is due to want of sanitary conditions,

Calcutta used to be a malarious place many decades ago, but is now one of the healthiest cities in the country. Take, for instance, the European quarter of this place ; it is free from malaria?—*A.* Yes.

Q. So that it is a question of improving the sanitary conditions to make the Bengali labourer quite as good as the labourer from any other province?

Q. You say, "If any fresh impetus in this latter direction is to result merely in the starting of new industries, manned by imported labour and controlled by outside agencies....." Don't you know that the Bengali gentlemen who have now started industries are controlling the industries themselves?—*A.* The number is small.

Q. You find, for instance, many Bengali engineering firms in Calcutta, many more than you find in any other place?—*A.* Formerly, we did all our repair work ourselves, but now we can give some of it to others. Those who have served an apprenticeship and learned trade in the mills move out, and are now developing shops of their own up and down the river. I can point to a lot of these who do repair work, and it is easier for us to go to outside people than do it ourselves.

Q. Generally speaking, I have noticed that the work done by artisans in Bengal compares very favourably with the work done in other parts ; I think it is superior in workmanship?—*A.* Our Bengali mistries can do first class jobs.

Q. As industries grow, owing to technical education that the Bengali young men are receiving particularly at the present time—you know that several youths have gone to different parts of the world, Japan, America, England and Germany—they become better able to control industrial enterprise now so far as scientific and technical training goes, than the youths in other parts of India, and judging from that, don't you think that they are likely to control more businesses in the future?—*A.* I do not think it is very good that these boys should go to other parts of the world. It would be much better if skilled workmen were brought from England and other countries to teach our boys, than that our boys should go to Japan, America and other places.

Q. I am entirely in favour of having institutions which will render it unnecessary for our boys to go out. The number of young men who have gone out to different parts of the world to receive technical instruction is larger in Bengal than in any other part of the country, and don't you think, from that circumstance, that these educated scientific young men are better able to control business enterprise here than the youths of other provinces?—*A.* Relatively they are. But big firms like Messrs. Bird & Co., and Martin & Co., get a start if there is anything worth developing, and it will be a very slow process for the small man to rise up to compete with these.

Q. You are not taking into account the thousand and one industries which do not expect to rise to being a Martin and Co., but can take up button-making and a lot of other things?—*A.* We get buttons cheaply from Japan.

President.—*Q.* There is one other point in Mr. Davies' note. He says, "Commercial museums must be made more accessible to the public than the Calcutta Museum. Bow Bazar or the New Market would be a more suitable locality than Council House Street The atmosphere should be one in which the red-coated chaprasi would not thrive." There is nothing to object to that, but I give you one little bit of experience. The only visitor with me to the museum was a Jap who was taking notes very vigorously, and we have had brought to our notice that the commercial museum in that way is more likely to be a source of usefulness to the competitor than to our own industries in the country, One would like to know what your views on commercial museums are.—*A.* (*Mr. Murray*) It is quite true. But all the same if a Japanese or anybody else wants to get any particular thing, he does not need a commercial museum. The commercial museum that we want is one in the Bow Bazar which will show to the natives who want the same article, that they can get native articles as good, and probably as cheap, as those made in Japan or elsewhere.

Q. What you would like is instead of a commercial museum a sort of retail sales agency?—*A.* Yes.

Q. It would be a good thing to have such a thing as sales agency in the New Market?—*A.* I do not see anything against it. It depends to some extent upon the articles.

Q. You know the committee formed to help the pushing of home industries, to consider the organisation of something like a sales agency?—*A.* I think the idea is good.

Q. I am personally of the impression just now that that would do much more good than anything like a commercial museum. I do not want to go to the commercial museum unless I have got a real business. But if you go to the Swadeshi Stores in Bombay, the things there are nicely displayed and it is an attractive shop, and a good shop is always an attractive place. There is another difficulty. You know that the prices are not constant from day to day, not even in the same day nor sometimes to different buyers. I do not see how you can publish the price in a museum?—*A.* Every trade has got a price.

Q. They would serve no good obviously unless the prices are kept rigorously up to date by experts in particular lines, but we cannot have experts in every line. The prices might become misleading. Some people would put a false price for very good business reasons, sometimes above or below what they are actually selling at?—*A.* Yes.

Q. There is another point that strikes me in your answer to questions 64 and 67 to 70, 80 and 81. You say, "The time is not yet ripe for the formation of new Imperial scientific and technical departments. We do not want the roof before the walls are erected." Are not all industries dependent on technical and scientific research, and scientific and technical organisation does not constitute the roof but the foundation?—*A.* (*Mr. Davies.*) I would correct that.

Q. You say that the existing Commercial Institute in Bow Bazar has not been a success, mainly because it has not been managed properly, and you propose the establishment of a Faculty of Commerce before you have a Commercial Institute, and there you put up an ornamental roof without the foundation?—*A.* (*Mr. Donald.*) This Faculty is a University proposal. We do not say that we recommend it.

Q. You say, "The Local Government should engage its own experts for any subject which offers a prospect of considerable industrial expansion." If you are going to get your expert from home, if you are going to get a Rs. 400 or Rs. 500 expert, it is going to be costly?—*A.* At present we want really to have an industrial survey before we get these.

Q. My impression in going round the country is that this employment of experts by Local Governments has been a curse to the country—imported cheap and nasty men who do a little bit of work and then go away and leave the country helpless. They are not scientific men at all. They cannot adapt themselves to new conditions in this country because they know nothing of technology, but purely know how to work in the particular industry they engaged in under home conditions. These cheap technical experts are doing a great deal of harm in this country. Imperial scientific and technical departments are not new things. You have got the Geological Survey. You have not employed your own geological expert in Bengal, but some of the other Local Governments tried it and made a mess of it. They tried in Madras and in Bombay and the result was unsuccessful.—*A.* I quite agree. But I do not suppose you want this developed system all at once.

Q. If you are going to employ scientific men, you can employ a full staff covering all the varieties or sub-divisions of the ordinary natural group of sciences. These scientific departments can only be organised by the Government of India, else you will have to put the Local Governments to excessive expense. The minimum of officers that can handle a subject like geology is 20, that is, one for each sub-division of geology, and making allowance for leave, casualties, and a certain number for administrative and office work, it amounts to 20 which is the absolute minimum. No Local Government can afford to do that. Eleven Local Governments would have eleven Geological Surveys?—*A.* (*Mr. Donald.*) We want experts occasionally only for temporary periods.

Q. You won't get short period experts from outside India?—*A.* I agree.

Q. He must be a service man in India that you can draw and send back to the Imperial reservoir?—*A.* Could we not have a certain number of experts permanently?

Q. If you have got an Imperial scientific department, they can spare you the men and these men could be put under the orders of particular Local Governments for any particular work?—*A.* Yes. There is no objection. But we are not quite ripe for it yet. I may say, as far as Bengal is concerned, that we do not want it at once, but we want a Director of Industries, and we want him to find out what Bengal wants.

Q. I do not think that any of us are going to dispute your claim for a Director of Industries. I want to ask you whether in addition to the local Director of Industries, there should be a sort of Government of India Director-General of Industries. I understand that you do not want that?—*A.* I do not see the necessity for that, at present at any rate.

Q. You think that that could be got over by conferences of Directors?—*A.* Yes The system of Inspectors-General in certain departments was given up.

Q. It does not necessarily follow that it was a great mistake?—*A.* I would like to examine this again. I am not sure that a controlling Director will not ultimately be essential.

Mr. A. Chatterton.—*Q.* In discussing the question of Government aid to private enterprise, have you considered the various forms in which the Government may assist the development of private industry on a comparatively small scale, for instance, in the development of rice mills in the rice-growing districts?—*A.* That will come under the supply of machinery.

Q. Supply of machinery on the hire-purchase system?—*A.* Or even in some cases making a grant for machinery.

Q. Have you considered the possibility of developing the rules under which takkavi advances are given?—*A.* I have mentioned this already—loans similar to those for agricultural improvement.

Q. Is anything of that kind being done at present in Bengal?—*A.* Bengal has done nothin g

Messrs. J. Donald, J. A. L. Swan, A. R. Murray and G. H. W. Davies.

Q. In answer to question 56, you say, "If a man of the proper stamp is obtained, he will be the best person to suggest what his functions should be." You propose to get a man from home, and do you think that he would be the best person to suggest what his functions should be? Do you think that the Board of Industries would be of much advantage to him?—*A.* (*Mr. Donald*). Personally I am not much in favour of a Board of Industries. I do not think that a Board of Industries would be of any practical assistance to him. The Board would seldom have a quorum. Our application to the Government of India for a Director is before you, and the first essential is to obtain a thoroughly competent Director of Industries and after that the situation would develop itself. Our letter to the Government of India is dated the 8th May 1915, and the matter has been held up on account of this Commission. I think the principal qualities required in a permanent Director are driving power, a capacity for assimilating information, and imagination. You are not likely to find him among business men, as any man with these qualities would naturally make a fortune in business.

Q. You say, "The Director of Industries should be at any rate at the outset a non-expert official." Don't you think that some expert knowledge in engineering and science and so forth is necessary?—*A.* (*Mr. Murray*) No, I don't think it is essential. I have no prejudice against any man. I only want the best man. It depends upon the man to a great extent. I do not think that you can import a man from home and set him down as Director of Industries. It is a question of taking the best man that you can get under the circumstances. There is as much chance of getting a capable man from the I. C. S. as outside of it.

Q. Don't you think that a man with some experience of workshops and workshop mangement is necessary?—*A.* It would be a very great advantage.

Q. Is it not essential?—*A.* I do not think so. He can always get expert advice on all important points.

Q. The Director of Industries is created to carrry out this work himself, and he cannot always be dependent on highly-paid experts. The Director of Industries has got largely to deal with comparatively small industrial undertakings, and he will have to take a hand in the work himself. A large industrial undertaking would be managed by big commercial firms or companies and they would employ their own experts, but there is a vast amount of work to be done in the country which involves a knowledge of mechanical engineering and elementary knowledge of a good many other things?—*A.* When you come to that stage, you would bring in experts.

Q. If you have a non-expert official dealing with a department such as you propose without a knowledge of these things, is he not likely to make the organisation too elaborate to deal with the particular work that he will have to take up?—*A.* It depends on the man.

Q. Yes, if you get this exceptional man without the preliminary technological training; but taking things as they are, is it not better to let the department grow gradually than that he should come in with a cut-and-dried scheme?—*A.* If something like that is to be done, it will take a long time to move.

President.— Q. We have heard a lot of evidence showing great satisfaction with the work that has been done by Mr. Silver. He is not an engineer or an expert, but purely a business man, and from the point of view of the commercial community as well as of minor industries he has produced greater satisfaction than any one else.—*A.* A man who has been out here for 19 or 20 years is not the best man to choose in Bengal. If a man is successful in business, he is not likely to take a Government job, and if he is unsuccessful, the Government would not want him.

Q. We are dealing with first class men and you can afford to give them first class pay?—*A.* Yes.

Q. Is the Government first class pay going to attract first class business men?—*A.* We have put down Rs. 1,500 to 200, and that is the least that is likely to attract. We would pay him the same as the Chairman of the Improvement Trust, that is Rs. 3,000 to 3,500.

Q. One advantage of the Director-General will be, if you have such a thing, the higher pay which will attract professional men and keep ambition before them. And the Government of India man may correlate the activities of these different Directors who run in all sorts of different lines—some of them very wild lines which they succeed in burying as quickly as they can—and they would not be able to bury them so rapidly if there were Imperial men watching them.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q. What is your objection to the Advisory Board helping the Director of Industries? We have got a Board in Bombay?—*A.* (*Mr. Donald*) I do not object to it. I think the Director will get better advice without it.

Q. If you have a Board with members drawn from the Chamber and other bodies, they can give good advice?—A. We had a Provincial Committee to deal with the evidence for this Commission, and it was with difficulty that we got a quorum. Only three of us and Dr. Sircar attended regularly. It was only a small board of seven.

Q. We are nearly ten and we generally agree and do a lot of things.—*A.* We do not object, but I think he will get on better without one.

Q. You say in answer to question 81, "It is generally felt that there is scope for improved training in commerce in this province." Do you think that a College of Commerce like the one at Bombay will serve the purpose?—*A.* I do not think that is very necessary.

Messrs. J. Donald, J. A. L. Swan, A. R. Murray and G. H. W. Davies.

Q. You say, "The provisions of the Bengal Tenancy Act by which raiyats are entitled to grow whatever crops they please on their holdings injure industrial development, as they make it very difficult for a sugar or indigo factory to get control of sufficient area to run a going concern. In the general interests of society, it would hardly be possible to recommend that this should be changed." Do you think that it is all right—the Bengal Tenancy Act?—*A.* (*Mr. Murray.*) There are a good many alterations to be made in the Bengal Tenancy Act to suit the industrial requirements of the present day. It is very difficult to buy land now near the banks of the Hooghly. We have bought some land up the river and we have got to pay the rent in 144 parts.

Mr. C. E. Low.—Q. You say, "Raiyats are liable to forfeiture of their holdings if they use them for purposes other than agricultural." Do you think it is a sound provision? Do you think there is any need for retaining that?—A. (*Mr Davies.*) I think it is based, on the idea of the permanent settlement. It was originally, it seems, the idea that even zamindars had agricultural rights only, but as a matter of fact, decisions have altered that idea, and it is now apparently held that they have got mineral rights as well as agricultural rights. But I think that particular clause relating to raiyats results from the agricultural feeling of the country.

Q. The same thing exists in other provinces. The idea is an agricultural fetish?—A. Yes.

Q. It does not help anybody. There is no reason why it should not be done away with?—*A.* But I think you will have the landholders of Bengal up against you if you take away that privilege.

Q. What is the privilege? The landholder gives permission now-a-days?—*A.* Yes, on receipt of *salami*.

Q. That privilege can be provided for and preserved in legislation?—*A.* Yes. But I think its abolition would be regarded in Bengal as an infringement on the vested rights of the zamindars. I do not suppose that there is any reason for it except that it is part of the custom of the country.

Q. Vested rights can be preserved in the Act.

Mr. A. Chatterton—Q. The permanent settlement was made on the understanding that the land was granted for agricultural purposes?—*A.* I do not know about that. Many authorities thought that the zamindar was given only agricultural rights at the time of the permanent settlement, but the Secretary of State sent a despatch in 1881 in which he said that the Government had abandoned their claims to mineral rights because of their failure to assert them, and since then it had been held that the zamindar owns the mineral rights.

Q. It was stated the other day by a witness that in respect of Orissa in particular there was some legal provision called the Khasmahals Act, under which the Government could not allow lands to be alienated for industrial purposes. Is that correct, and if so, does it apply to Bengal?—*A.* (*Mr. Swan.*) There is no such thing as Khasmahals Act here.

Q. In Khasmahals can the Collector or any other authority give a lease or pass a sale of land for a mill?—*A.* Yes. It will probably have to go to the Government for the sanction of the terms. Orissa has got different laws.

Q. Mr. Ironside suggested yesterday that some sort of settlement survey of mineral rights should be made, that some sort of record should be made and claims should become time-barred after a certain length of time. Has that proposal ever been considered by the Bengal Government, so far as you are aware, in the past?—*A.* (*Mr. Davies.*) I have never heard anything about it.

Q. You have no record-of-rights of any mineral district.—*A.* No.

Q. And therefore the question of inserting mining rights in the record-of-rights has never arisen?—*A.* I am sure that under the Bengal Tenancy Act you could not insert it in the record.

President.—Q. What is the opinion of your present Legal Remembrancer on the question of mineral rights? Is he still of opinion that the previous decision on the question is sound that the Government definitely and finally have relinquished all claims to minerals?—*A.* Have you seen Mr. Finucane's note about it? The Secretary of State's despatch was about 1881, and Mr. Finucane examined the case about 1895, and his opinion was that Government could not assert the claim even apart from the Secretary of State's despatch, but I think that it was based mainly on grounds of default.

Mr. C. E. Low.—Q. The law with regard to the record-of-rights is that if no suit is brought within two years of the making of entry therein, the entry stands?—*A.* Generally speaking, if no suit is brought within 3 months of final publication, the entry stands as presumptive evidence.

Q. It cannot be amended unless a suit is brought within three months.—*A.* An entry in the record-of-rights is only presumptive evidence in a court of law.

Q. And the other man has got to prove against it?—*A.* Yes.

Q. Which, in practice, is rather a valuable asset to the other side?—*A.* It is an asset, but I do not think it is anything like final. I am sure the civil courts every day upset entries.

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Q. The record-of-rights is nothing more than a register?—*A.* It is not a judicial decision at all. There are certain entries in it which are judicial decisions because they go to a judicial stage in the course of preparation of the record, but the ordinary entry is only a record of presumptive value.

Q. Mr. Ironside's suggestion is the appointment of a sort of Mining Commissioner who would make a kind of mineral settlement survey and settle once for all claims as to mineral rights.—*A.* I do not think it can be done under the Bengal Tenancy Act. I do not know how you can make such a record under the Bengal Tenancy Act.

Mr. C. E. Low.—Q. In answer to questions 82 and 83, you say, "Under the present system piles of facts and figures are slung at the head of the public without sufficient examination and analysis. The manufacturer requires to know where he can find a market for his goods, or why the market in a particular place has fallen off. If the Director of Statistics and the Director-General of Commercial Intelligence devoted more attention to the study of such matters, the efforts of their departments would be more appreciated by the commercial world." How does the Director of Statistics come into it exactly? How would it be within his proper functions to find a market for goods, or to say why the market in a particular place has fallen off?—*A.* (*Mr. Murray*).—I think he can do a lot independently.

Q. He is supposed to compile statistics in the way they are required, but any direction as to the way in which they should be compiled from the commercial point of view ought to come from the Director-General of Commercial Intelligence.—*A.* The point is that there should be more co-ordination between the Director-General of Commercial Intelligence and the Director of Statistics.

Q. As regards your answer to question 63 where you allude to the establishment of the Calcutta Technological Institute, is that Institute still expected by the Bengal Government?—*A.* (*Mr. Donald.*) I am not sure. The scheme is at present in abeyance.

Q. You would like the technical and industrial schools to be under the Director of Industries, but that committee recommended that the Principal of the Institute should be Director of Industries subordinate to the Director of Public Instruction?—*A.* That is the opinion of educational men.

Q. You say, "There have been many complaints about lack of forest transport. One Calcutta firm has suggested that at least five per cent of the revenue derived from forests should be expended in making roads." Is not more than that spent already?—*A.* We have got the Forest Department saying that the timber for tea chests is scattered, but I have talked to planters and they say that there is plenty of timber in the Forests, and they want only roads and ropeways. We want to push roads into the middle of the forests and spend more than five per cent,

President.—Q. Over this question of forest and the obtaining of local timber for the manufacture of tea chests, the managing agents are not very enthusiastic about it, because they get a certain amount of commission by importing tea chests.—*A.* Yes, and at present rates of freight ordinary tea chests could not compete with the patent article. If we are to make tea chests here they should be three-ply. I know that it is a great complaint that the tea garden managing agents get these chests from outside and say that there is no timber in this country. What we want is to push the forests in this country and have roads right into them.

Hon'ble Pandit M. M. Malaviya.—Q. You say in your note, "It would be interesting to ask representative Indians why the people born in the neighbourhood of Calcutta do not take advantage of the opportunities already given them of taking an active part in the industrial development of Bengal. Why do more of them not enter the jute mills, cotton mills, engineering and other manufacturing works on the banks of the Hooghly." We have discussed the question of labourers. Apart from the labourers what opportunities have the people born in the neighbourhood of Calcutta in any of the jute mills?—*A.* (*Mr. Murray.*) They come in only as labourers.

Q. Your remarks apply to labourers?—*A.* Yes.

Q. But apart from labourers do you know of many Bengalis who are employed in these works?—*A.* Only on the clerical staff. There are none of them on the staff on a pay of more than Rs. 200.

Q. Do you know not a single Bengali in these concerns who gets a salary of Rs. 200?—*A.* In our own mill establishments no Bengali gets more than Rs. 200 as salary.

Q. You do not know of any mill in which any Bengali is getting more than Rs. 200?—*A.* None, so far as I am aware of.

Q. Your remarks apply only to the cases of labourers and sirdars?—*A.* Yes. I was looking at the thing from the labour point of view.

Q. Have the Bengalis been tried as assistants to Europeans?—*A.* We have them as clerks.

Q. They have not been tried as assistants to Europeans?—*A.* They are in a way. They are the right hand men of the Europeans, that is as clerks in the various departments.

Q. My remarks are confined to appointments above the grade of clerks. Have you ever tried a single Bengali in your firms or concerns?—*A.* No. But he is a little more than a clerk. He is in charge of the department.

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Q. I want to know whether you have offered any appointments to educated Bengalis similar to those held by assistants of the European staff?—*A.* No.

Q. You cannot say that they have had an opportunity in these matters—in these higher appointments?—*A.* We have a lot of Bengali boys and clerks. None of them have shown themselves capable of taking the places of European assistants.

Q. But have you ever advertised for men who might take up such appointments?—*A.* There is just now in the local newspapers an advertisement from a jute mill for a Head Babu, and they are prepared to pay Rs. 300 to 400. There are hundreds of applicants, but not one suitable.

Q. I am speaking of men who work as assistants, as chemists or superintendents.—*A.* We have 31,000 hands and we have only 90 Europeans. In a mill employing 6,000 hands we have now only 15 Europeans working.

Q. Not one Indian working along with these Europeans on the same grade?—*A.* No, for the pay of the Europeans is about Rs. 400 to 600 and none of the natives get more than Rs. 200.

Q. You cannot say that these educated Bengalis have had an opportunity yet of finding employment in the higher grades of your mill staff?—*A.* I cannot say that.

Q. You say, "Even though new industries are started to-morrow and new avenues of employment opened up for Indian labour, there is nothing to indicate that the Bengali will be able to hold his own against his Indian neighbour far less against foreign competition." That will not prevent new industries being started by Europeans or Americans or Japanese?—*A.* No.

Q. If new industries will be started, whether Bengal does or does not benefit, some other people will benefit?—*A.* Yes.

Q. And your remarks from the labour point of view that the Bengali middle class will be worse off will still hold good?—*A.* Yes.

Q. Therefore if the Government can devise some system by which the Bengal capitalists or educated men will be drawn to these industries, that will be an avantage?—*A.* Yes, and give employment to Bengali labour too.

Q. Even if the Bengali labour is not employed, if the Bengali capitalists and educated men are employed in these mills, that will be an advantage?—*A.* Yes.

Q. You would not wish that Europeans of non-friendly classes or Americans or Japanese should come and establish business in Calcutta, and Bengal should not be induced to take up that business? In view of the fact that Americans and Japanese are coming into the trade, do you not think that it is the duty of Government to do something to induce the Bengali capitalists to invest?—*A.* Yes.

Q. You say, speaking of struggling industries, "It is undoubted that they have extreme difficulty in getting assistance from banks in existence, which direct their business to financing commercial transactions, not to financing industries. In fact, banks under the English banking system are exchange banks, and they do not consider the financing of industries to be safe business. Further, in financing commercial transactions, they are stiff and unbending. It is alleged that they are usually unwilling to advance money when small amounts are involved, as they do not consider it worth while to be troubled with petty matters, and that they insist on unreasonably safe security. The German banks were much more enterprising and accommodating. A German bank which was recently liquidated in London had huge sums of money lent out on securities which it was reported no English bank would touch." Evidently you are in favour of an industrial bank being established because you say, "But no sound scheme of establishing an industrial bank has been laid before the Provincial Committee; in fact, nothing but vague generalities on the subject have been made." If a sound scheme is laid before Government, Government will be willing to consider it favourably so far as you are aware?—*A.* (*Mr. Donald*) I cannot say.

Q. You speak here of the Provincial Committee. The Provincial Committee would be in favour of a scheme of industrial bank judging from the remarks which I have drawn your attention to? You say that the question of an industrial bank is less pressing?—*A.* We did not get any information about what was intended by an industrial bank.

Q. I confine myself to the remarks made in your note. You say that the present banks are modelled on the English banking system, and they do not consider the financing of industries to be safe business, etc. From these remarks coupled with what follows, do I understand that you are in favour of an industrial bank if a sound scheme is put before the Provincial Committee?—*A.* It would depend on the scheme.

Q. Would you recognise the need of such a bank which would help industries in a larger way than the existing banks can do?—*A.* I might almost say so. But the argument is that there are difficulties of finance that we think might be removed.

Q. You think there are difficulties which require to be removed, but you have not got any definite scheme before you which you can put before the Commission?—*A.* Yes.

Q. You recognise the need of some banking facilities on a larger scale than are available?—*A.* Yes.

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Q. You speak of the report of Messrs. Nathan, Küchler and Everett, and you say that no action has been taken on that report? Has not that proposal been passed by the Secretary of State?—*A.* No.

Q. Has it gone up to the Government of India?—*A.* I am not very sure. It was mixed up with several things. I do not think it has gone up to the Government of India. One idea was to get the Imperial Secretariat buildings here for the purpose of the College.

Q. No scheme has yet been submitted to the Government of India at all?—*A.* I do not think so.

Q. Can you give any reason for it?—*A.* It was mixed up with the Dacca University.

Q. You say, "Complaints regarding railway freights are almost universal." Then you say, "They are fixed by competition with other railways and with other forms of carriage. The most intelligent body of public opinion claims that railways should be run on a commercial basis (*e. g.* to show a profit) and under company management. Hence the problem is to fix their tariffs at the highest rate which will attract the greatest volume of trade." If the State managed the railways this difficulty would be solved? The State would have no particular interests to serve?—*A.* It is a big question.

Q. You have not suggested any other way of getting out of this difficulty—the want of uniformity and reasonableness in tariffs. You say here that under company management the problem is to fix their tariffs at the highest rate which will attract the greatest volume of trade. That is purely a commercial point of view. If the State managed the railway, the non-commercial point of view, or rather the larger commercial point of view would receive better attention, namely, the interests of trade as a whole and of the travelling public?—*A.* The Eastern Bengal Railway is a State railway, and their rates compete with the river carrying companies.

Q. The presence of evil sometimes suggests evil. The presence of those who are competing for profits might naturally lead the manager of a State railway to think of profits. If all the lines were managed by the State, then there would be an incentive to remove this evil? *A.*—I would not go to that length. In actual practice, the State railways are just as keen to make money as the company-managed railways, and sometimes, as I have seen in the case of the Eastern Bengal Railway, they force a man to send his goods along a longer lead.

Q. The State is not bound to show a profit.?—*A.* You take away the incentive to good mangement. Some years ago the officials of the Eastern Bengal Railway were very lax in their management and a good deal of free travelling was indulged in—although subsequently new brooms were introduced resulting in increased traffic returns.

Q. But that might be due to special circumstances. I am asking you your opinion about the broad question whether the inequality and the unreasonableness of freights would not be remedied to a large extent, if not entirely, if the State managed the railways and not the companies.—*A.* Do you mean that the State will be more charitable?

Q. It will not look to the commercial point of view only?—*A.* But would not the State consider it a duty to look at the commerical point of view.

Q. Not at the expense and inconveniene of the trade and public?—*A.* Then we do away with competition between the various railways.

Q. But that has not proved in practice to be sufficient. It has not pushed down rates. You have taken up nearly three quarters of a page in describing the inequalities and unreasonableness of the existing freights. I ask you if you are prepared to suggest any remedy. *A.*—One remedy is suggested, that the Railway Board might revise their scales.

Q. The Railway Board have failed to achieve proper results. You are not prepared to express any opinion on the larger question?—*A.* I do not think so.

President.—Q. You say that railways sometimes force a man to send his goods along a longer lead, you get the Eastern Bengal Railway doing that. If that is done by a State railway, it might be challenged by the instruments that we have got. We have got the Legislative Councils and questions may be asked on the point. It is quite obvious that it is wrong for a railway to go in for an indirect taxation to such an extent as to discourage the development of industries?—*A.* There are instances of that in the Eastern Bengal Railway where steamer traffic has been affected by the railway.

Q. If the State managed the railway, that would not happen? *A.*— The Eastern Bengal Railway is a State-managed railway.

Q. That has only to be reported to the Government to remedy it.—*A.* They are doing it in actual practice.

Q. A Government servant may commit a wrong, and if you report it to the higher authorities, it will be rectified.

Hon'ble Pandit M. M. Malaviya:—Q. After carefully analysing the conditions, you say "For the present Government must be prominent in raising capital, in advising on matters of business, and in directing work. The reply that rises to one's lips is that Government is not qualified to take this part." Have you considered what attitude the Government should take as a Government with regard to the future development of industries? It is one thing to take up points and another to answer them. Have you looked at it from the

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point of view of Government being responsible for promoting the economic development of the country? Would you wish that Government should stand aside and see Americans and Japanese taking up the business in this country and the Government standing aside and looking helplessly at it?—*A.* I think you have misunderstood the argument. The argument is that Government is not qualified to do it, because it has not got the knowledge at present, but when it has got the Director of Industries, then the Government should take part in these things.

Q. Do I understand you to say that as soon as the Director of Industries has been appointed, the Government should adopt all reasonable ways of promoting industrial development in every line that may seem to be desirable to do so?—*A.* Yes. We want the Director of Industries to find what is wanted in Bengal.

Q. He will find out special cases where help may be needed. Would you wait for the Director to lay down the principles of the policy that the Government should pursue? What is the policy that you recommend? Supposing the Government appoints a Director of Industries, he will require certain principles to guide him? Are you in favour of Government finding out where development is possible and finding out to whom help should be given?—A. Yes.

Q. Government taking up an attitude of helpfulness and encouragement and support, financial and moral, whatever it may be to promote the indigenous industries?—*A.* Yes.

Q. How are you to do it?—*A.* We want a Director. The Director is the key of the situation.

Q. We feel that industries must be developed, and we do not want that other people should take the benefit of them and we want the Government to take up an attitude of help—*A.* Quite so.

Mr. L. E. B. Cobden-Ramsay.

WITNESS No. 198.

MR. L. E. B. COBDEN-RAMSAY, C.I.E., I.C.S., *Political Agent, Orissa Feudatory States, Sambalpur.*

WRITTEN EVIDENCE.

The States of this Agency cover an area of 23,000 sq. miles, the chief industries are mining and timber concessions. The following concessions are worked within these States:—

(1) Haematite at Gurumasini in the Mayurbhanj State by Tata and Sons; it is from this source that the works at Sakchi obtain their supply of iron. This concession is in direct railway (broad gauge) communication with the Company's works.

(2) Dolomite at Panposh on the Bengal-Nagpur Railway worked by Tata and Sons for obtaining flux. This is a quarry situated on the bank of the Brahmini river and has a railway siding to the main line. This is in the Gangpur State.

(3) Manganese.—(*a*) In the Gangpur State the deposit is reputed to be of a very high grade and the works are connected with the Bengal-Nagpur Railway by a steam tramway. Operations on this deposit have been at a standstill for some time owing to mismanagement, and the lease has been cancelled and has recently been given out to others.

(*b*) Other deposits which are not so good but have been worked, and it is hoped that further examination will bring to light other deposits as good or nearly as good as No. 1. There is no rail connection with these workings.

(4) The Bisra Lime-stone Company has had works for some years at Bisra and Rourkela Stations on the Bengal-Nagpur Railway main line in the Gangpur State.

(5) Graphite.—This is being worked in the Kalahandi State and 336 tons were raised up to last October. The graphite is said to be of good quality (needle), but at present appears to be pocketty, but there appear to be grounds for thinking that seams of a more permanent nature will be struck. The lessees have spent a very fair sum of money in the way of machinery for treating the graphite, but the lead to Sambalpur is very heavy being not less than 120 miles by road, an alternative route is down the river Tel and then down the Mahanadi which means a journey of a good 150 miles, and the former river is only usable during the rains and at that time also is a very difficult river to negotiate.

(6) Pot-stone worked on a very small scale by a lessee in the Mayurbhanj State.

(7) There are large timber firms at work in various parts of the State.

(8) There is a cottage industry in tussur weaving, especially in the Sonpur State where the best quality of tussur fabric is produced. The business however is not extensive—all particulars have been furnished to the Imperial Sericulturist who is making a special investigation of the silk and allied industries, and I need not refer to this industry again.

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2. I would now note the concessions that have recently been given or are about to be given—

(I) Mayurbhanj State.—(1) Tata and Sons have received concessions to take out mining leases for iron ore to make up an area with that already held by them of 20 sq. miles, and also hold a prospecting license to prospect over a very large area (*viz.*, 1588 sq. miles) of the State.

(2) Two syndicates hold leases to prospect for minerals or mineral ores, gold and other minerals in this State.

(II) Keonjhar State.—(1) A prospecting license for iron ore has been granted over an area of approximately 90 sq. miles.

(2) Tata and Sons are about to receive a prospecting license for iron ore over an area of 150 sq. miles.

(3) Enquiries have been received from the Bengal Steel and Iron Works tentative to a prospecting license in this State.

(III) Gangpur State.—(1) Tata and Sons have applied for, and are about to receive, a prospecting license for dolomite to prospect in the neighbourhood of the area where they already work dolomite.

(2) The Bisra Lime-Stone Company have recently been granted a concession for lime stone: the works contemplated are on a very extensive scale, and a railway siding of 13 miles (broad gauge) is to be built to the deposits from the Bengal-Nagpur Railway main line near Panposh.

(3) Mining lease for coal in the Hemgir Zemindari of the Gangpur State. This has not been worked, but the concession is held by the same company which is developing the coal mine on the banks of the Ib river in the Sambalpur District a few miles from the Jharsuguda Railway Junction on the Bengal-Nagpur Railway main line. The Hemgir deposit is a few miles distant from that now being worked on the Ib river.

(4) Enquiries tentative to other prospecting licenses have been received from Tata and Sons and the Bengal Steel and Iron Company for lime-stone, iron, manganese and allied minerals in the Gangpur State.

(IV) Patna.—(1) A license to prospect for graphite has recently been granted in the Patna State.

(2) There has recently been further tentative enquiry from other parties for a prospecting license in this State for graphite.

3. The above constitutes the concessions at work—granted or likely to be granted in the States—but these concessions cover only the merest fraction of the mineral wealth of these States, which, I believe, will in the future be found to be of a magnitude not dreamt of at present. I may mention that in Mayurbhanj chromium has, I understand been found and in the vast hill areas of the Mayurbhanj, Keonjhar and Bonai States which form together one vast tract of mountainous country, haematite of very good quality is found, and these hills alone contain vast quantities of iron ore which apparently could supply the requirements of several iron and steel works of magnitude. In other places in the States the iron ore deposits are of special repute amongst the inhabitants and the iron from the Athmallik and Rairakhol States is considered the finest in quality of any throughout the States. Rairakhol lies 40 and Athmallik about 60 miles from Sambalpur and the country is easy for a railway.—the States also have the Mahanadi river at their very doors, and navigation in the rainy season is easy and can be carried on in small boats to end of December; transport by this route is cheap but tedious—the only way to bring boats back is by poling or towing against stream, a very slow and therefore costly process, and it is not possible to tow empty boats up stream by tugs owing to rapids, sunken rocks and sand banks—or rather it might be possible but very difficult and hazardous. Throughout the States there are deposits of iron ore, and there is no reason to presume that a great deal of it is not of very high quality and quite as good as that now operated owing to proximity to the railway line. There is undoubtedly available from the States of this Agency an unlimited supply of iron ore of very high grade, as well as deposits of poorer quality; the supplies would point to the reasonable belief that in time to come several large steel and iron works can be established in profitable competition and works for smelting pig iron could be established.

Graphite.—As noted, this is being worked in Kalahandi and about to be prospected in the Patna State. It is also known to exist in the Athmallik State.

Manganese.—The Athgarh State has recently brought to my notice the existence of deposits of manganese of fair grade.

In parts of Gangpur other than those already being worked for manganese, there are grounds for believing that manganese of good quality exists. It has, I understand, been found of good quality in the Bamra State, but the Darbar is not desirous of having its mineral resources exploited.

Gold.—There are two prospecting licenses for gold already in operation in the Mayurbhanj State as stated above, and a few years back a dredger was at work on the Koel river in the Gangpur State. In the Jashpur State just beyond the border of the Gangpur State, the Jhoras obtain an appreciable quantity of gold from the Ib river.

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Bauxite.—There are vast deposits of this mineral which forms the cap of the numerous plateaux of the vast hill area (1,200 Sq. miles) of the Kalahandi State. The existence of these deposits is of course well known to Government—and they have been reported to be bauxite of very good quality. Beneath the caps of these plateaux innumerable perennial hill streams issue, and it should be a matter of no difficulty to exploit these deposits by hydraulic power—the valleys are at an elevation of about 2,500 feet and the plateaux from 3,000 to nearly 4,000 feet, and the valleys are intersected by numerous streams perennially fed from the hill above.

Coal.—Reference has been made above to the deposits in Hemgir Gangpur State. The very extensive coal fields in the Talcher State are well known. The analysis of specimen of this Talcher coal sent by me to the Director of the Geological Department runs as follows:—

"Moisture	14·45
Volatile matter	29·87
Fixed carbon	53 28
Ash	2·40
	100·00

Does not cake.
Ash buff in colour.

The analysis shows the coal to be of good quality, low in ash, but rather high in moisture, a fault which may improve when material further from the outcrop is worked."

The Chief of Talcher has had these deposits investigated: the analyses of specimens sent by him to other experts entirely confirm the analysis made by the Geological Department. The investigations made by the Chief were on a fairly extensive scale and the report shows that there are apparently seams of workable coal.

Lime-stone.—Good deposits are believed to exist in Mayurbhanj and Bamra States. Generally speaking, it would appear that limestone, manganese and haematite are universally found throughout the States also bauxite and graphite are fairly widely spread. Coal crops up all over the place: China clays are, I believe, found in the Bonai State.

The above remarks describe as accurately as possible the known position of mineral development present and potential as it stands to day in these Feudatory States of Orissa. I would now proceed to answer certain questions as put in the list of questions drawn up by the Commission with special bearing to the circumstances existing in the States.

Qs. 25—27.—The existing knowledge of the available resources of the Feudatory States of Orissa is most inadequate in regard to minerals. The country would appear to be full of valuable minerals, and it is urgently necessary that a regular geological survey be made of this tract—this survey should not be a mere skeleton survey and purely geological, but should be a detailed survey carried out with the special object of locating mineral deposits, or pointing out where various minerals are likely to be found—it should be of a commercial nature, be simple and practical. This survey should be made by Government. The States cannot possibly afford the expense—the large State of Mayurbhanj did carry out a geological survey of part of the State, but the expense was heavy and the result does not appear to have been very practical. The States as a body cannot afford to make such a survey, and if they could, the agency they could employ could not be relied on for honesty and the only possible agency is a Government one. The States could contribute a portion of the cost, but the major part of the cost would fall on Government. In any case the raw product would be brought to British India for manufacture, or the manufactured article would be trafficked in throughout British India, which would benefit greatly by any large industrial development in the States. The results of the survey should be regularly printed and published both in a series State by State and subsequently in monograph forms dealing with particular minerals throughout the States as a whole, and this system of monograph could of course be developed to cover larger areas and if possible embrace all known areas where the mineral in question occurred, or where it was believed to be likely to occur.

Qs. 89—94.—I consider it absolutely essential in the interests of the medical faculty and of the public in general, that all patent preparation of drugs, food tonics and food stuff (including all canned food, vegetable or animal), should bear on their covers the date on which they were manufactured or prepared, and failure to do so should be a penal offence.

Qs. 97—99.—There is the most pressing need in this Agency for the very early construction of two lines of rail. The most important and pressing is the Raipur—Vizianagram line the line was begun some few years ago and 60 miles have been built. The exploitation of the valuable forests of the Kalahandi State are dependent on the construction of this line. The valuable extensive and rich deposits of bauxite in the Kalahandi State could be worked on the advent of this line, the alignment of which runs in close proximity to these deposits. These would develop an entirely new and valuable industry. The advent of this Railway would also render it possible to develop the graphite industry on a larger and sounder footing, and as the Railway also is to go through the Patna State with a branch again through the centre of the State to Sonpur on the Mahanadi and thence to Sambalpur, the graphite deposits of Patna would also be developed. The next line of railway of importance is a line taking off near Kapilas Road on the East Coast line above Cuttack and running through the Dhenkanal State, the District of Angul with a branch to the Talcher coal fields and on through the Rairakhol State to Sambalpur. This line of rail would render it possible to work the coal in Talcher:

transport by the river Brahmini being too difficult and the lead from the coal fields to the river being excessive taking the nature of the transport arrangements possible on this river into consideration. It would also largely develop the transport of agricultural products which now find their way by road to Cuttack, involving considerable expense and a great lead, which is a heavy drawback. It would also render it possible to work the large forest area in the Pallahara State, the forests of which are under preservation and which in another 15 to 20 years will be very valuable.

Q. 102.—In the Mayurbhanj State there are waterfalls of considerable size in the Barabalang river as it issues from the Simlipal plateau. The Westinghouse Company, a few years ago, took out a lease of the hydraulic power of the State and investigated the project, the idea being to build a large reservoir on the plateau—the project did not mature and the lease has expired, but it is one that is deserving of further investigation. In the Bonai State there are two waterfalls of importance which have lately attracted attention, and it would seem advisable that further investigation of these should be made. I have already referred to the streams in the Kalahandi hills as being a possible means of working the bauxite deposits by electrical power.

Q. 103.—Rule 49 of the prospecting and mining rules of 1913. Under this rule the term for which a mining lease may be granted shall not exceed 30 years, but the lease may contain a clause permitting a renewal for a period not exceeding 30 years, etc.

It has been suggested that in the case of undertakings of considerable magnitude, the lease should be at any rate for 90 years: in undertakings of this kind it is necessary that a company in order to obtain sufficient capital should be able to show to intending shareholders that the supply of raw material is at any rate assured for 100 years. The suggestion in such cases has been made that the lease should be for 30 years with a renewal of 30 years at a fixed royalty and for a further renewal of 30 years at a rate to be determined at the end of the first 60 years. It is argued that this is fair to the capitalist who would know he would have the property at a fair figure and the State would benefit by the natural enhancement in the value of its mineral properties. In such cases I would certainly suggest that leases be renewable up to 90 years, the rate of royalty to be decided at each renewal on a sliding scale agreed on beforehand, *e. g.*, that the increase in royalty be in proportion to the average increase in value of the raw material since the lease was entered into or last renewed, or that 75 per cent of the proportionate increase be taken in deciding the royalty. In the coal-fields I believe leases are for 99 years.

Under this head I would like to invite attention to the orders of December 1915 relating to mining concessions in Native States, which contained two provisions which I venture to think impose considerable difficulties to the development of mining operations in the States. These orders are—

(i) That the area covered by any lease or sub-lease shall be such as to leave unallocated a substantial portion of the deposits, within the State, of the mineral affected.

(ii) No lessee or sub-lessee should be permitted to enter into any agreement with any other persons or corporation for the joint control of the price output or sale of the product.

In the present condition of the knowledge of mineral deposits in the States owing to the absence of any regular survey, it is impossible to say if a concession would leave a substantial area unallocated. In any case in regard to the States of this Agency the areas of which in most cases are small, this restriction should, I think, be imposed as applying to the whole group of States. This order, however, has been recently relaxed by the orders of October 1916 which admit of a relaxation of this condition with the sanction of the Government of India in particular cases on good cause being shown. I consider that in view of the special conditions existing in the States, this condition should be liberally interpreted except in the case of very rare or very valuable minerals.

The condition in regard to the control of prices has also been modified by the orders of October 1916, and ordinary contract for forward sales to persons other than foreigners is now permissible. In this connection, I would quote the objections put forward to me in a recent application for a mineral concession of considerable magnitude, and on which it was intended to expend a very large capital. The contention was that the bulk of the output will be despatched to markets outside the State and the conditions imposed are an unnecessary restriction on the operations of the company outside the State. It was clearly stated that the company at the moment did not contemplate entering, nor had it any desire to enter, into any compact or combine with any of their competitors in or out of India. In fact their object and hope was to compete successfully against the same material produced in other parts of India.

Their aim was to sell as much of the material as there was a market for, and the more material the company can sell the more will it be to the benefit of the State. This being so, the company were averse to the inclusion of any clause calculated to interfere with the commercial side of the company's operations. At the same time, it is not an altogether impossible contingency that in the best interests of the company—in certain markets—it might find itself forced to enter into some sort of working arrangement with other producers of the same material. Some such arrangement may be particularly necessary in the case of markets remote from the company's works.

Take the case, by no means suppositious, of some centres where one agent represents producers of the same material. The proposed clause as it stands might preclude the company—though its competitors outside the State would not be so precluded—from selling its produce to such agent, because in effect this agent would control the local price of all the qualities of the material he sold.

It was possible that the company in the future may have several undertakings outside the State, and there is no knowing how far the proposed new clause will hamper the company in its business. In the present case the company may be subject to the severest competition by combined interest outside the State and the company will not be in a position to retaliate by entering into any combination to protect their interests.

It also means that the company will not be able to enter into any agreement, for a period, say a year, with any firm or company in Calcutta or other place in India to sell its produce at a certain fixed price.

Supposing an individual or a company were willing to enter into a contract with the company to take the whole of the output for a year at a very good profit to the company, the clause as amended would prevent it from doing this. Again supposing the company had a small property outside the State and it wished to enter into a contract to sell the whole of its output of this small property to some person or company, it could not do so. It is also doubtful whether the company would be able to enter into any contract with any person or company for the sale of lime or limestone at a fixed price for a fixed period.

The relaxation of the condition in regard to forward sales no doubt meets the company's objection to a certain extent, but it is not clear that the company could enter into the ordinary commercial operations to control prices generally: provided the combination for this purpose were not with foreigners it would seem inadvisable to impose this restriction on what are ordinary commercial operations. Moreover this condition would not apparently apply to a company which took its concession direct say from a Zemindar in British India: that being the case it places the development of mineral operations in the States at a considerable disadvantage and would render them an unpopular proposition in the market.

Q. No. 113.—In the Narsinghpur and Daspalla States of this Agency which have their borders along the Mahanadi river there are limitless supplies of bamboos. The Agency Forest Officer has suggested that the establishment of a paper factory at Cuttack could work these supplies to very considerable profit. The supply of raw material is undoubtedly ample and transport by river most economical—bamboos could be floated down the river direct to Cuttack—the distance by river being only about 70-80 miles—at a nominal cost and the lead to the river bank is inconsiderable. I consider that this proposal is eminently practicable and is most certainly worth any one's investigation. The suggestion was put before a large timber firm which was considering the question of taking a lease of the Daspalla forest, but the matter not apparently being in their line of business they did not take up the idea.

NOTE.—*The witness did not give oral evidence.*

WITNESS No. 199.

MR. J. A. CRAVEN, *Dewan of Gangpur State.* *Mr J. A. Craven.*

WRITTEN EVIDENCE.

The Gangpur State comprises an area of 2,492 square miles and has a population of 303,800. The State is highly mineralized and the following concessions are being worked:—

Manganese.—A mining lease over an area of 10 square miles was worked for over 5 years, but was cancelled owing to mismanagement by the lessees, and has very recently been given to a Nagpur Syndicate. In spite of the mismanagement the net profits derived by the late lessees exceeded 2½ lakhs of rupees per annum. The ore is of the very richest quality, and operations are now being conducted on scientific and skilful lines. The mines are 8 miles distant from the Bengal-Nagpur Railway line and are connected with it by a light tramway. A prospecting license over another area has been worked for the last two years, and applications have been received for a mining lease within this area and prospecting licenses outside it.

Dolomite.—Messrs. Tata & Sons hold a mining lease for dolomite and the main quarry is situated within a couple of miles of the Bengal-Nagpur Railway line with which it is connected by a broad guage siding. The lessees have lately applied for a prospecting license for the same mineral over an area adjoining that already held by them.

Limestone.—The Bisra Lime-stone Company has held a mining lease for several years, and its works are connected with the Bengal-Nagpur Railway by light tramways. The company has now been given a concession over other areas, and its works will be very greatly extended as soon as a broad guage siding of 13 miles from the Bengal-Nagpur Railway main line is completed. The scheme has been sanctioned by the Railway Board, and work on it has been started.

Applications for limestone concessions have been lately received from other companies including Messrs. Tata & Sons and the Bengal Iron and Steel Company.

Coal.—A Bombay company which is now working a mine within the Sambalpur District holds a lease for coal mining within the Hemgir Zemindari of this State, but this lease has not yet been worked and so far only dead-rent has been paid annually.

Mica.—Inquiries are being made in respect of what is believed to be a valuable and workable mica deposit which has lately been discovered within the State.

Iron.—Iron is found in abundance on the surface throughout the State, but smelting is carried on only to a small extent by local blacksmiths for the manufacture of agricultural implements and weapons, such as axes, etc. The State derives no income from this industry. The information available as to the quality of the ore is very imperfect. The State has never been properly explored and the existing knowledge of its available mineral resources is by no means adequate. I am of opinion that a properly conducted geological survey of the State is very necessary but financial considerations preclude the possibility of a survey being conducted solely at the expense of the State, though I feel sure that the Feudatory Chief will gladly contribute to the cost of a survey. The mining policy of the State is modelled on that of the Government of India, and all leases granted by the State are subject to the sanction and approval of both the Local and Imperial Governments. The mining rules of 1913 have, in my opinion, worked satisfactorily, but objection has been taken to certain orders recently issued by Government in connection with the grant of mining leases. I shall draw attention to these presently, but in regard to the rules I should like to say that the system of "pegging out," which the rules provide for, should be enforced in all cases in order to avoid disputes resulting from the imperfect preparation of plans. One case of importance which occurred in this State would certainly have been obviated if the claims had been previously pegged out.

Although the rules do not prescribe a limit to the area which may be granted under a prospecting license, the State exercises a discretion in this matter, and has been obliged in certain cases to restrict the area within reasonable limits.

The orders of Government to which objection is taken are these :—

(1) That the area covered by a lease shall be such as to leave unallocated a substantial portion of the deposits of the mineral concerned: in respect of this order I would point out that unless and until there has been a proper geological survey of the State, it is impossible to say whether the concession will leave a substantial portion of the deposit unallocated, and in the existing circumstances the result of these orders will be that capitalists will find that the fruits of their enterprise in exploring large areas will be reaped by others.

(2) The second order of Government to which objection has been taken by a company which has recently been given a mining lease in this State, refers to the prohibiting of the lessees from entering into any contract, agreement or arrangement with any other person or with any corporation for any joint control of the price, output or sale of the mineral. The lessees contend, and I agree with them, that this restriction will seriously hamper their operations outside the Gangpur State. The order has recently been modified by Government by the addition of the words "without the consent of the Local Government" after the new clause, but in my opinion this is not sufficient, and I think that a proviso should be added to the clause that nothing contained in it shall apply to such contracts, agreements and arrangements as are or shall be usual or proper in the ordinary course of business. Moreover, it is probable that the motive underlying the proposed new clause is connected with the state of affairs existing before the war, whereby individuals and companies were enabled to sell their produce to, or enter into agreements with, alien subjects for the joint control of prices without any restriction; and, if such be the case, I am of opinion that a formal undertaking by the lessees not to enter into any contract or arrangement with any alien in or out of India for the joint control of the price, output, or sale of the product would meet the intentions of Government. I have been asked to invite the attention of the Commission to the recent enhancement of railway freights on manganese ore, which, if maintained, will tend to hamper the industry seriously after the war when it is expected that foreign competition will be resumed.

General. The great majority of the population of the State follow agriculture as their means of livelihood. They are backward and illiterate, and are very much in the clutches of money lenders. I am of opinion that the co-operative banking movement, which has been started in recent years, will tend towards progress and the improvement of the material condition of the people. It creates banking habits and encourages thrift, reduces interest, and stops usury. Banks, however, must, if not always, at least for some years, be under the control of the State for the reason that the people have no leaders whom they would trust, or who have sufficient influence to guide or manage such concerns.

The only other industry carried on in the State which is worth mentioning is the weaving industry. There are weavers in almost all villages who weave a coarse cloth which is very durable and very extensively used in the State. Attempts have been made from time to time to encourage this form of cottage industry but the results have not been appreciable owing to the want of funds. The industry will endure in spite of mill competition, but handlooms of a more modern type than those used are needed, and the weavers, as a rule are too poor to afford them, and mere pecuniary assistance from the State will not be sufficient

In my opinion co-operation among the workers is absolutely necessary, and this needs encouragement and proper guidance.

NOTE.—*Witness did not give oral evidence.*

WITNESS 202. *Mr. A. Ghose.*

MR. A. GHOSE, F.C.S., F.G.S., M.I.M.E., *Mine owner and Economic Geologist, Gooty R.S.*

Extract from WRITTEN EVIDENCE.—*Vide* pages 29 & 33 of Vol. III of the Minutes of Evidence

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(2) *Diamond mines.*—The existence of large deposits of diamantiferous conglomerate has been proved to a very considerable extent. Experimental washings without any machinery have given yields of ½ to ⅛ carat of diamond per load of 16 ft. of conglomerate. These are rockworkings and not alluvial deposits. Only machinery is wanted for winning diamonds on a commercial scale. The estimate for a washing plant (without engines and boilers) to treat 500 loads per day, which I obtained from the Wilfley Company, amounted to about £6,000. Working capital of 2 lakhs of rupees will place these mines on a producing and paying basis. If this business can be financed to this extent, a new industry will be established. These mines can supply all the diamond requirements of India, if worked on the scale indicated by me. If Government supply the capital or assist in the formation of a company, this is a better proposition than many pioneer factories.

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(5) *Barytes mining in the Ceded Districts.*—I have discovered a number of barytes deposits in the Kurnool and Anantapur districts. The barytes samples sent to England for the examination of a number of buyers, have been found of high quality. Most of these buyers want the barytes only in powder. I have obtained an estimate for a plant for crushing barytes at the rate of 300 tons per month. The estimate comes to about £1,000. Mr. Somerville a large buyer of Liverpool, is willing to place a contract for at least 500 tons of crude barytes for two years at 28 shillings per ton, f.o.b. Madras. There is a great demand for barytes in England and France. In the latter country, the prohibition of paints with a lead base has created an unprecedented demand for this mineral. Large consignments are being shipped from Spain and Italy. Spanish barytes is selling at £8 per ton in Paris and English barytes at £5 10 shillings in London. Experts are of opinion that this high price will be maintained after the war. I am at present, finding a limited sale in India for the manufacture of paints. I am convinced that barytes mining can be made into a very considerable industry in India. But for this, protection against competition is absolutely necessary as well as low railway and ocean freight and financial assistance for milling. If these are available, I am confident that I may be able to develop an external trade of the value of even 2½ lakhs of rupees per annum.

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Extract from ORAL EVIDENCE, dated 22nd January 1917.

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Hon'ble Pandit M. M. Malaviya.—*Q.*—In speaking of the diamond mines you say that only machinery is wanted for winning diamonds on a larger scale, and you say that a working capital of two lakhs of rupees will place these mines on a producing and paying basis. Have you ever put forward a prospectus containing your views on this question before the public ?—*A.*—No, because I know that it will not be considered at all.

Q.—Why do you think so ?—*A.*—I have tried.

Q.—Have you put forward this particular proposal before the public ?—*A.*—I know that the public are not sufficiently advanced to encourage mining industry.

Q.—Surely you have confidence enough in the soundness of your views to press them upon the public ?—*A.*—Yes.

Q.—You say that you are convinced that barytes mining can be made into a very successful industry in India and that protection against competition is absolutely necessary as well as low railway and ocean freight and financial assistance for milling. Have you approached the Government with any request on this point ?—*A.*—Not yet. I intend approaching Government. Before the war, Germany was the principal shipper of barytes to England and very large quantities used to be taken by England from Germany. Since the outbreak of war, the German supply has ceased and now England is dependent on Spain and Italy for the supply of barytes. We have got large deposits of barytes in India, but on account of the present freight difficulties, we cannot ship the mineral and after the war, if there is no protection, of course, it will not be possible to ship.

Q.—Was this being worked by an individual German or a company ?—*A.*—By several German companies.

Q.—How long had they been working before the war ?—*A.*—For several years. Not in India but in Germany.

Q.—There was no German company working here in India?—*A.*—No. No one was working barytes in India before I started it. In 1912, England imported £161,649 sterling and in 1913, £150,376 sterling worth of barytes from Germany. But in 1914, England imported Spanish and Italian barytes to the extent of £85,000.

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WITNESS No. 203.

Mr. Ian Scott Mackenzie.

MR. IAN SCOTT MACKENZIE, *General Manager, South India Industrials (Ltd.) Madras.*

Extract from ORAL EVIDENCE—*Vide* page 45 of Vol. III of the Minutes of Evidence.

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Sir F. H. Stewart.—Q.—With reference to Government competition with private enterprise, have you got any specific instance that you would like to give us in confidence?—*A.* Yes. On the 10th of May 1916, in his letter No. 772-M., the Deputy Sanitary Engineer, Northern and Central Circles, sent us an enquiry for 2 well curbs for the Bellary Water Works. In reply to this enquiry, we submitted a tender on the 20th of May 1916 quoting Rs. 1,775 each f.o.r, Madras, for the 2 well curbs. On the 1st of June 1916 the order for the well curbs was placed with us per telephone, by the Deputy Sanitary Engineer. A few days later however, he informed us, again by telephone that he would have to cancel his order, as he was under the impression that our price of Rs. 1,775 was for *both* well curbs and he had not understood that we wanted Rs. 1,775 for *each* well curb. Shortly afterwards the order for the well curbs was placed with the Public Works Department Workshop. It may be noted that the Public Works Department Workshop generally submits estimate and not firm tenders as commercial firms have to do.

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WITNESS No. 206.

Mr. K. Hanumanta Rao.

MR. KOPALLE HANUMANTA RAO, *Headmaster, Andhra Jatheeya Kalasala, Masulipatam.*

Extract from ORAL EVIDENCE, dated 23rd January 1917—*Vide* page 86 of Vol. III of the Minutes of Evidence.

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Mr. C. E. Low.—Q.—Have you met any boys from the Victoria Technical Institute, Bombay?—*A.*—I have met them. I am not speaking out of prejudice, but I find them a good deal lacking in the practical side of the work. I have tried them with my own boys, but they are not good at doing things.

Q.—We have had evidence entirely to the contrary here and elsewhere, that they were the only people who were of much use?—*A.* I am not prepared to accept that idea. They are exceedingly fine as far as theory goes. I have had a case in point. Our mechanical engineer came into conflict with our foreman, and the theory of the mechanical engineer was not worth anything. There were many other cases in which the foreman was right and the mechanical engineer was wrong.

President.—Q.—Think of one case of a student from the Victoria Technical Institute; fix your mind on one, and tell us what you gave him to do to test his practical qualities?—*A.*—I am very sorry. I am speaking in this strain, but I am speaking from personal experience. I have found out that in the daily management of the workshop, in workshop work.

Q.—Take one case. You say you have tested boys. Think of one case. What did you give him to do as a test?—*A.*—There was a little casting; it was a curved piece of structure with a little handle connecting the two tips. There arose a difference of opinion. The foreman said the little thing would stand in the casting; the engineer insisted it would not. The thing was tested and cast, and it came out right.

Q.—Who was the foreman, was he from the Victoria Technical Institute?—*A.*—A mistree.

Q.—Was the engineer from the Jubilee Technical Institute of Bombay?—*A.*—Yes.

Q.—And on that you base the idea of their lack of practical knowledge?—*A.*—I was giving you one instance.

Q.—Can you give us any more?—*A.*—There was the case of designing a plummer block. There was a little dispute as to the best way of designing it. My foreman designed one and the engineer another. We tested both and had to give the preference to the foreman's design.

Q.—Was it the same student from the Victoria Technical Institute?—*A.*—Yes. We had really two. One had a certain amount of practical knowledge, though frankly I would not put him beside the foreman. He built our workshops, designed them, etc. We had another whom we had to send out again after three months of trial.

Q.—You think that is sufficient to give you an unfavourable impression of the boys at the Victoria Technical Institute?—*A.*—No, I will not generalise. This is all that I will say that there is a tendency to leave Hindu boys to specialise in theory.

Mr. C. E. Low.—Q.—You are taking a boy fresh from the Victoria Technical Institute, who has tremendous potentialities to learn, and you are putting him against a foreman who has completed all the potentialities and can do these practical things right off. You take these two people twenty years hence and then give us your opinion?—*A.*—There is just one point in it. We had the engineer from the Victoria Institute after three or four years of practical life. We did not take him fresh from school. He did not know any workshop work, and I found him weak in this.

President.—Q.—Your experience is a little unfortunate, because those practical people who have employed these boys speak very well indeed of them; but it would be a very poor institution which did not turn out a bad boy now and then?—*A.*—There is only this point. Amongst our Hindus there is a tendency to theorise about things. A man reads very much more of books than is good for him, and has very little interest in practical work. That is the truth of it.

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WITNESS No. 215.

Mr. C. A. Innes.

MR. C. A. INNES, I.C.S., *Director of Industries, Madras.*

FOR WRITTEN EVIDENCE—*Vide* pages 147 to 151 of Vol. III of the Minutes of Evidence.

ORAL EVIDENCE, 25TH JANUARY 1917.

President.—Q.—Could you tell us about the Travancore Paper Mill enterprise? Do you know what expert advice was taken in the matter and who organized it?—*A.*—The management of the company was vested in Messrs. Cameron Chisholm & Co., of Quilon. I am not certain if expert advice was taken before the company was organized in 1887. I know that an expert was consulted in 1893.

Q.—It is a rather ancient enterprise?—*A.*—Yes.

Q.—I understand that your department has recently been attempting to get the mill into work again?—*A.*—Some Chetties of Madura bought the property for a fairly large sum and they asked the department for help. Government at Mr. Tressler's instance agreed to assist by lending a mechanic and pulp-maker for a year, the object being to get data regarding paper-making.

Q.—When I was here in August, the place was in the charge of Dr. Marsden?—*A.*—Dr. Marsden was sent up to Tittaghur to learn something about paper manufacture in order that he might be in a position to advise the proprietors. He was not actually in charge. He was merely an adviser.

Q.—Are those mills going on still?—*A.*—They ran for about two months, and then we discovered that the boilers were so bad that they were dangerous and we had to stop work. Since then the proprietors have been making arrangements to have new boilers put up. They will begin work again in February or March. They have not made paper for some months.

Q.—What kind of data do you hope to get?—*A.*—The idea was to get data as to the cost of raw material and the cost of producing brown paper.

Q.—What is the position at present?—*A.*—Work is to be started again at the beginning of March. The term sanctioned for Government assistance expires on February 21st. There is an expert paper-maker available in Madras. I have told the proprietors that if they are prepared to engage him, I am prepared to recommend further Government assistance, but not otherwise.

Q.—I understand that they are getting their bamboos from the Travancore forests and that the forest is some miles off?—*A.*—I believe so.

Q.—They have no means of transport except by road?—*A.*—Road and river. I have not had time to go there myself. Dr. Marsden will be able to give you details about the mill.

Q.—The point is this. To what extent the mill has been a success or failure is a matter that is not of much importance. The more important question is whether the data obtained was really valuable to enable an expert to say whether an industry of that kind could be established in the locality with anything like commercial prospects. Obviously there is no use in obtaining data if that data is falsified partially by unusual conditions, conditions of a kind that will not be repeated under commercial operations. You rather think that we might get the information from Dr. Marsden?—*A.*—Yes. Dr. Marsden spent some weeks at Punalur.

Q.—What was the composition of this committee that met in 1909 to consider the chemical industries?—*A.*—Mr. Chatterton was a member and can tell you the names of the other members.

Mr. Chatterton.—This committee was started in 1909 as a suggestion of the department to review the position of the chemical industries in the south of India, and to endeavour to ascertain what prospects there were for starting new chemical industries. The committee contained three men from the Indian Institute of Science, Dr. Travers, Dr. Rudolf and Professor Hay. There was also the agricultural chemist, a chemist from Messrs. Parry & Co., and two other men, and Mr. Jackson of the Carnatic Mills. This committee met a certain number of times and collected a considerable amount of information which has been printed and published. Then I went on furlough and it was presided over by Mr. Cotton, and eventually while I was on leave they sent up the final report to Government.

Witness.—The committee passed a number of resolutions.

President.—*Q.*—Has the Government taken any action so far?—*A.*—I am not aware that anything came of the resolution, shortly after the report was sent in, the Department of Industries was abolished.

Q.—I understand from your preliminary statement that all the various forms of financial assistance resolve themselves into the simple formula that each case should be judged on its own merits. You have singled out namely the suggestion of guaranteeing a dividend. That is a system that should be to a certain extent demoralising. Have you considered the possibility of guaranteeing a dividend which is good enough to create public confidence in the matter of investment, and not small enough at the same time as to discourage the promoters of the scheme. 4¼ to 5 per cent in an industrial enterprise, people would be justified in looking forward to for a certain number of years, but not for ever. That would put a certain amount of confidence in the people in putting their money into an enterprise. At the same time, it would not be sufficient to encourage them to do anything. They know that the time-limit will expire. Have you considered that point?—*A.*—I had the Travancore Paper Mills in mind when I made the remark. Provided that the dividend guaranteed is small, I do not see much objection to the method.

Q.—In the case of the Glass Company the Government seems to have done little and that in a half-hearted way. What technical advice had the Government to rely on to judge whether the enterprise ought to be supported or condemned?—*A.*—Mr. Tressler was the only technical adviser at the time. We had no glass expert.

Q.—Was it not time for the Government to understand that we have passed that stage, and that all modern industries are based upon experience, knowledge and training of a specialised kind?—*A.*—I suppose they trusted their technical adviser.

Q.—One must realise now that if an industry is going to meet with competition in the world, specialists are required to carry on the industry?—*A.*—As a matter of fact Government directed me in October last to institute enquiries as to the possibility of getting an expert from home.

Q.—Would you be in favour of getting out a temporary expert to deal with a glass product of this sort?—*A.*—Personally I am very doubtful whether glass can ever be made at a profit in Madras. I have recommended that the glass experiments should be discontinued.

Q.—Are you wise in coming to that conclusion without technical advice?—*A.*—I was asked by Government to report upon the experiment and I did so. Before forming an opinion, I sent the Sub-Engineer in charge of the experiments on a tour of all the glass factories in India, and I studied his report carefully. I also studied all the literature I could get on the subject and I consulted Mr. Beardsell, who was the managing agent of the old glass company. I had also the authority of Sir Frederick Nicholson on my side. The conclusion I arrived at was that it is doubtful whether glass can ever be made at a profit in Madras. We have good sand and a fair market in Madras, but the crucial point is fuel; oil fuel has now gone up to Rs. 70 a ton, and coal is also very dear. Both have to be brought from long distances. On a consideration of these facts Mr. Beardsell and I both agreed that it was doubtful whether glass made in Madras could compete with glass made in England at factory close to coal mines where Pithead coal can be got at a few shillings a ton, and that the proper place to locate an Indian glass factory was probably somewhere near the Bengal coal fields. Further, if I was to continue, I should require first a furnace expert and secondly a general glass expert, and I saw no prospect of getting either as long as the war lasts. Our present furnace is wrongly designed.

Q.—Apparently some of these considerations are based on war conditions, namely the difficulty of getting glass experts and the cost of fuel?—*A.*—Fuel is always very dear in Madras.

Q.—You would not make glass here unless you felt sure of the home market?—*A.*—The old glass company were advised that economy in fuel could not be attained unless an outturn of 200,000 bottles a month were achieved.

Q.—And the local markets consume only 50,000?—*A.*—The figures of local consumption are uncertain because imports have been affected by the war, and separate figures for soda water bottles are not given in the Sea Customs returns before 1912-13. But judging by the figures available the total consumption of the Presidency normally does not exceed 80,000 a month, and we should have had to rely on the Calcutta market for a very large proportion of our output. Freight to Calcutta from Madras is probably not much less than freight from England.

Q.—These conclusions that you have come to, seem plausible of course, but I still think that the thing has not been gone into by a really first-class specialist?—*A.*—I wish it had been possible. I thought of borrowing the services of the glass expert of the United Provinces to advise me, but after consulting Mr. Silver, I decided that he would not have helped me to decide the general question for Madras.

Q.—Is your proposal to drop the Government interest in the thing a permanent proposal? Do you think that the conditions in Madras are such as to bar the carrying out of a successful glass industry?—*A.*—I can only form my conclusions from what I have heard and read and what the people have told me. The cost of coal is so high that it must always be a handicap. Also we have to import our chemicals and finally there is the difficulty of training labour. Almost the only thing in favour of a glass industry in Madras is the Ennore sand.

Q.—Do you think it might be cheaper to transmit sand to some other place than to make the glass here?—*A.*—That is the conclusion that I have arrived at.

Q.—Sand will be carried at a comparatively cheaper rate as a raw material, and you will not be carrying material that will be wasteful after a short time. That is evidently a good illustration of what difficulties will have to be overcome before we can hope to establish anything like a successful industry?—*A.*—Yes.

Q.—We have to consider the question of expert advice, expert labour, the materials required the freight rates, the organisation necessary and the question of the market also in which the articles can be disposed of?—*A.*—Exactly.

Q.—When we come to the question of working out big industries, all these points will have to be carefully considered. Tanning and other industries have been lightly advocated in the press and on the platform as industries that might be taken up at once. I am not saying this in any way by way of discouragement, but only by way of what things are required. We cannot afford to have failures. You have referred to this question of the adulteration of beeswax and you think that you have detected Calcutta as being the headquarters of it?—*A.*—I obtained three samples of beeswax, two from collecting centres and one from Madras. The first two were pure, the third contained 90 per cent of paraffin wax. The beeswax on sale in Madras all comes from Calcutta, I am told. The natural inference therefore is that the adulteration takes place in Calcutta.

Q.—You have no official machinery by which you could follow up the thing?—*A.*—I wrote to Mr. Lindsay, the Director-General of Commercial Intelligence, about the matter.

Q.—Don't you think that is a point where the Director-General of Industries, if there were one, could help?—*A.*—Yes. But the danger would be that history would repeat itself and that the Director-General of Industries would lead to friction between the Government of India and local Governments. This was his experience a few years ago. Hence the policy of decentralization.

Q.—It does not follow of course that that policy is a sound one. You realise that in the matter of scientific and technical advice you cannot afford to have a great variety of provincial departments?—*A.*—I quite agree as regards the technical side. If you have a research institute, it must be a big one for the whole of India.

Q.—Speaking broadly you are not afraid of a Director-General of Industries?—*A.*—Personally I am not.

Q.—There is bound to be a certain amount of local prejudice and you hope that the provinces might be educated sufficiently to realise that there are great advantages on the other side?—*A.*—My views of course are coloured by the fact that I was for three years an Under-Secretary with the Government of India.

Q.—Of course there is a temptation to be a self-contained and to have the expert at your own command to be able to ask him to go. That is a matter which we cannot discuss with you because you cannot present to us the other side. What industries have the Government pioneered here?—*A.*—Aluminium and chrome-tanning. We have done a good deal in regard to weaving and also in regard to pumping and boring experiments.

Q.—Would you be in favour of maintaining a tanning plant purely as a demonstration factory?—*A.*—It is difficult to draw the line between a demonstration factory pure and simple and a factory run on commercial lines. You must be able to sell your stuff and to that extent you are bound to compete to some extent with private trade.

Q.—Cannot you dispose of them to the chrome-tanning people who could dispose of them through their selling agents?—*A.*—Yes. That might be done.

Q.—When did Chambers & Co. start this chrome-tanning?—*A.*—About 1903; I believe that they began their experiments much about the same time as Mr. Chatterton.

Q.—Government were not exactly pioneers then?—*A.*—I can only judge by the records of the department, and as far as I can make out, Mr. Chambers' experiments did not amount to very much. But Mr. Chatterton can give you full information.

Q.—The aluminium industry was sold to a company?—*A.*—The Indian Aluminium company.

Q.—The whole of the metal is imported?—*A.*—All imported.

Q.—I suppose the metal is pressed by machinery?—*A.*—Yes, in the Indian Aluminium Company's factory. But in the Godavari bazaar industry, the aluminium vessels are merely hammered out by hand.

Q.—Would that to some extent displace the labour that is employed in the making of copper and brass vessels?—*A.*—Not altogether. The aluminium vessels turned out by the Indian Aluminium Company are made largely for the Army.

Q.—Is there any Indian capital in the aluminium company?—*A.*—I have seen the list, I think there is a certain amount, but I do not remember.

Q.—You have got a dyeing expert. What is he doing now?—*A.*—For the present, owing to the shortage of aniline dyes, he is not doing anything in his own proper line. But I have proposed that he should be employed under the indigo chemist and work on problems connected with the Madras indigo industry.

Q.—I understand from his report that he has condemned the vegetable dyes?—*A.*—He does not believe that they have a commercial future before them.

Q.—He has done no research work in order to overcome that difficulty?—*A.*—After studying the question he came to the conclusion that vegetable dyes could not compete with aniline dyes. He made practical tests at Bangalore. Materials were dyed in bulk and exposed for sale in Madras. They did not meet with approval.

Q.—Do you think that it is a fair thing to condemn an ancient industry like that without doing some research work with a view to overcoming the difficulty?—*A.*—I cannot speak with any authority, but all the practical dyers I have met entirely agree with Dr. Marsden. Research work has been carried for years in Europe upon natural dyes, and Dr. Marsden is familiar with the literature on the subject.

Q.—When he found that these ordinary vegetable dyes were of no use, he did not turn his attention to indigo?—*A.*—That is what I propose he should do now.

Q.—Do you propose to send him to Pusa?—*A.*—Mr. MacKenna, Mr. Stuart and myself recently discussed the matter. We decided that the indigo chemist and Dr. Marsden should work out jointly a programme of work but it was decided that probably the first thing that Dr. Marsden must do was to pay a visit to Pusa.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.*—You refer to the hand book of commercial information recently published by the Department of Industries? Is that book published in the vernaculars also?—*A.*—It was published only in English.

Q.—If that was published in the vernaculars also, don't you think it would be very useful to the people?—*A.*—In Madras a good proportion of Indian business men know English.

Q.—I have met some of them who do not know. If it is published in the vernacular also, it would be used largely by the people who are in business?—*A.*—It contains a great deal of useful information. The suggestion is worth consideration.

Q.—About the acquisition of land in the Malabar district, you say that the land should be acquired under the Land Acquisition Act?—*A.*—No, I did not go so far as that. I merely mentioned the suggestion as being worthy of consideration.

Q.—You go on to say "Big estates in parts which are nearly always on the margin of ordinary cultivation are greatly in the public interest" and then you want the claimants to fight out the matter among themselves. Don't you think that this is a very arbitrary proceeding?—*A.*—The story of these Malabar jungle lands is a very long one. My point is that there is no certainty as to who the owner is. The janmies do not know themselves in many cases, and eventually the question must come before the courts.

Q.—There is nobody in possession as a rule?—*A.*—The lands I am referring to are hills and jungles. No one is in possession of them in the sense that no one occupies them. Titles are created by giving leases for shifting cultivation or for cutting trees.

Q.—In whose names are these lands registered?—*A.*—They are outside the Survey Department. They are registered in nobody's name at all.

Q.—Do you think they should be brought under Government control?—*A.*—I do not see how they can be brought under Government control. The question of ownership must eventually be decided, in any case, by the courts.

Sir F. H. Stewart.—*Q.*—I understand that you have just taken over charge of the Department of Industries?—*A.*—I took charge at the end of October last year.

Q.—You do not start as an optimist regarding the industrial possibilities of the Presidency. You say that it must be recognised that Madras is and probably must always be an essentially agricultural country. Do you think that there are few possibilities for industrial development?—*A.*—I think the development must be slow because of the difficulty of getting cheap power. Fuel is very dear, and further there are not many big capitalists in Madras.

Q. With regard to capital, is there not a lot of money in Madras?—A.—I do not think that there are any really big capitalists. The Nattukottai Chetties are often wealthy, but they are mostly money lenders. Their money is not available for industrial purposes.

Q. They would not look at any industrial scheme?—*A.*—There are one or two of them who do, but it is the exception and not the rule.

Q.—With regard to the Madras Glass Company, do I understand you to say that the Madras Government were on the point of going into this matter with a view to helping it but that the orders from the Secretary of State put an end to everything?—*A.*—I understand from my conversations with Mr. Beardsell that he proposed that the Government should take over the Glass Company and actually work it and run it. This offer was made just after we received Lord Morley's orders, and those orders left us no option except to close down.

Q.—Was the question whether assistance could be usefully given, gone into by the officers of the Government?—*A.*—Not as far as I know. Mr. Beardsell, I believe, made his request to Sir Murray Hammick, and Sir Murray told him that it was impossible. There the matter dropped. Government helped in the matter of fuel.

Q.—The decision was then rather due to the unfavourable opinion Mr. Beardsell had formed of the whole enterprise?—*A.*—I don't think so. Mr. Beardsell wanted to go on, but the shareholders would not put up more money.

Q.—You say "I should also prefer, though I would make no hard-and-fast rule to this effect, that Government should tackle something big, such as the working up of oil-seeds in this country into finished products, that they should be prepared to spend money on the experiment and give it as good a chance of success as possible by importing experts from Europe and America to conduct it." Is this in your opinion too big for private enterprise?—*A.*—Private enterprise has not yet tackled it, and a firm which embarked upon the business without much capital behind it, would probably lose money. In the case of groundnuts it would be up against one of the most highly organised industries in the world, the Marseilles oil industry. In the case of copra, it would be in competition with the German copra-crushing industry. Markets would be a difficulty owing to the protective duties in most foreign countries, and generally to be a success the industry would probably have to be taken up on a large scale.

Q.—Supposing Government took up the matter in the interests of the public, how would it set about the work? Would it be necessary to have a big scale factory or small ones in the different places with the idea of familiarising the people with the best methods of doing the business?—*A.*—I only cited the oil-seeds as a very big subject that required attention. But I have not thought out the matter.

Q.—With reference to the weaving factory in connection with the Madura Technical Institute, you think that the proposals might lead the way to the formation of small private factories. Is that what is wanted? Don't you want the small home industries to survive?—*A.*—Yes, but the view has been taken that without organization the hand-loom weaving industry cannot survive, and that the proper form of organisation is organisation into small factories. The Basel Mission hand-loom factories are a case in point.

Q.—That may be true from the economic or the commercial point of view, but with reference to the well-being of the people, giving them the means of livelihood and that sort of thing, is it not important that they should be able to work it in their own homes?—*A.*—Small factory organisation has been suggested as the best way of saving the industry from extinction.

Q.—You think that as the weaving exists to-day, it is bound to die out, but that it might be saved if small factories were established?—*A.*—I think it is deteriorating as it exists to-day, and possibly organisation into small factories might revive it. An alternative possibly is organisation through co-operative societies.

Q.—With reference to the greater facilities to be given in regard to the acquisition of land in Malabar, you think that the Land Acquisition Act might be applied?—*A.*—Not as the Act stands at present without stretching it.

Q.—Would it mean fresh legislation?—*A.*—It would require an amendment of the Act.

Hon'ble Pandit M. M. Malaviya.—*Q.*—With reference to the Travancore Paper Mills, could you tell the Commission what is its present position? Has it been revived?—*A.*—Until recently it had been defunct for many years. It has been revived by two Chetties from Madura.

Q.—They are now waiting for their machinery?—*A.*—Yes.

Q.—I take it that your object in bringing this case to the notice of the Commission is to show that great care has to be exercised in assisting an industry?—*A.*—I gave the history of the case simply as a concrete instance of a new industry assisted by Government. I thought that the Commission would prefer concrete cases to mere talk.

Q.—That is a concrete case which has been a failure. But there may be other cases in ventures which have been assisted which have succeeded?—*A.*—Yes.

Q.—You do not know what other industries the Travancore Government have helped?—*A.*—No.

Mr. C. E. Low.—*Q.*—There was lack of expert investigation in that case?—*A.*—Yes, I think so.

President.—They have now appointed a Director of Industries to make a survey of the place.

Hon'ble Pandit M. M. Malaviya.—*Q.*—This one case of failure might be misleading?—*A.*—It was not intended as a warning to the Commission not to recommend any Government assistance to new industries. It was cited merely as one actual instance of the failure of an enterprise liberally assisted by Government.

President.—Failures are sometimes more instructive than success if the thing has been properly conducted. But the purpose of the questions I put to Mr. Innes were for finding out whether there were any useful data obtained from the failure. A failure does not prove anything. It does not prove that you cannot make the thing a success.

Hon'ble Pandit M. M. Malaviya.—*Q.*—You are aware that the Travancore Government are continuing their policy of aiding industries?—*A.*—I have not studied their policy.

Q.—You say in your note that Madras is and must probably always be an agricultural country? What leads you to think so? Is it only the absence of coal in the Presidency?—*A.*—The absence of cheap fuel.

Q.—Don't you think that you can use industrial alcohol to a large extent?—*A.*—I am not competent to express an opinion on the subject.

Q.—Could you not develop hydro-electric power?—*A.*—Some schemes are being investigated, notably the Periyar scheme. But one difficulty is that the eligible sites for hydro-electric schemes are speaking generally a very long distance from industrial centres.

Q.—Are you aware to what extent the use of industrial alcohol has increased in Germany and other countries?—*A.*—No. I have no detailed information on the subject.

Q.—Do you know that in Germany 80 per cent of the population was engaged in agriculture at the beginning of the last century and that at present about 30 per cent only is engaged in agriculture. It is therefore risky to say that Madras must probably always be an agricultural country?—*A.*—It is for the future to decide. My remark was an appreciation of the position as I see it at present.

President.—*Q.*—I think that your idea is that the present outlook is such that the Government should rather aim at improving agriculture rather than spend money on industries. He says that agriculture must always be the first thing. You cannot spend money on industries unless you have solved the fuel proposition?—*A.*—That is one of the main things to be considered.

Q.—You think that it would be worth while to spend money with a view to establishing the fuel proposition?—*A.*—I think that the Madras Government should be on the watch for any opportunity to develop industries.

Hon'ble Pandit M. M. Malaviya.—*Q.*—The reason why I have put you these questions is that you have been appointed to improve the industries of the Presidency, and the fact that you think that it must always remain an agricultural country must affect the work entrusted to you?—*A.*—You will observe from my evidence that I expressly stated that my opinions were purely provisional.

Q.—In paragraph 5 you say "On general grounds I think that a private firm or company is more likely to make a success of a new industry than a Government department"?—*A.*—That is my opinion.

Q.—Would it be better if the Government pioneered a new industry under its own management and then handed it over to private enterprise?—*A.*—My view is that on general grounds private enterprise is more likely to make a success of an industry than Government, given the necessary capital and knowledge. There are obvious difficulties in the way of successful Government enterprises.

Q.—Do you contemplate that private companies would take up the matter or that Government should assist them?—*A.*—I think that Government should assist any reasonable scheme consistently with the dictates of common prudence.

Q.—You think then that private firms might be left to do the pioneering?—*A.*—As a general rule.

Q.—What shape would the help of Government take?—*A.*—I think each case must be dealt with on its own merits. You cannot lay down general principles.

Q.—My point is whether you are in favour of Government pioneering the industry up to a certain stage and then handing it over to private enterprise?—*A.*—I imagine that the main object in view is to establish the industry. I think that the industry will be better established by a private firm than by the Government department.

Q.—It is really the Madras Government that started this policy of assisting the industries and the Mysore Government have taken up the idea lately, and it was only the Secretary of State's policy that stood in the way of carrying it out?—*A.*—The Secretary of State's orders of 1910 abolished the department, and its activities came to a standstill.

Q.—As regards sales of machinery on the hire-purchase system, don't you think that you should advise the Government to go ahead without waiting for the experience of the Mysore Government?—*A.*—In these matters I think the Government are waiting for the advice of the Commission.

Q.—You say that Indian ventures seem to fail owing to bad management. What do you as be the bad management to? Want of technical knowledge and business knowledge?—*A.*—Yes. Very frequently of course I have only the records of my office to go upon.

Q.—At present there is very little provision in this Presidency for the imparting of technical and business knowledge?—*A.*—Yes. We have got one or two commercial schools.

Q.—Do you think it would be a good thing to establish Government technical schools with workshops attached?—*A.*—It would be an expensive scheme if carried out on a large scale. I think that it would probably be better to work in a system of technical education in conjunction with railway and other large workshops. We would supply the theory, and the workshops the practice.

Q.—Don't you think that it would be better if there were workshops attached to the industrial schools?—*A.*—There are workshops attached to most of the industrial schools.

Q.—Is it not after all a question of finance. Money will find all the plant and machinery?—*A.*—Not altogether. It is a question whether real commercial practice can be obtained except in a real commercial workshop. Teachers are also a difficulty.

Q.—Would not money procure the teachers also? When the Japanese wanted to train their young men in scientific and technical pursuits, they invited professors from Europe and America and asked them to give the young men adequate training? Should not such a policy be pursued here also?—*A.*—It would be an expensive scheme.

Q.—You say that it will involve a very large amount of expenditure, but you do not seem to take into account the fact that this province is as large as France or Germany?—*A.*—My position is this. I have only just taken over charge. One of my duties will be to put up a scheme for industrial education, but without further inquiry and experience, I am not prepared to commit myself to any cut-and-dried scheme.

Q.—Do you agree that the Government has to face the question of providing adequate facilities for technical and industrial education?—*A.*—I quite agree that it is a question of great importance and that it has to be faced. But I am not prepared at present to commit myself on the question how it should be faced.

Q.—It is mainly a question of finance? *A.*—Partly.

Q.—You say that co-operative societies have not done much to improve the lot and condition of the weavers, and you ascribe that to their backwardness and want of education. Do you think that the lack of elementary education, general elementary education, is standing very much in the way of the industrial efficiency of the people? *A.*—I think it does. Elementary education with an industrial bent to it would do much good.

Q.—Do you think that if elementary schools with an industrial side to them were started in every district, you would get the men of the weaving class to attend these schools? *A.*—I am afraid it is a little doutful. Weavers' children are wage-earners at a very early age. But we are going to try the experiment at the Madura Technical Institute and are putting up a hostel.

Q.—Regarding the financial condition of weavers, you say that most of them are paupers and that they have no capital and no materials. You say that the co-operative movement has had very little success amongst them. Has the experiment of sending out lecturers to instruct them on the advantages of co-operation been tried to any large extent? *A.*—That question might be put to Diwan Bahadur Swamikannu Pillai, Registrar of Co-operative Societies.

Q.—Do you think that more should be done in that direction than has been done so far?—Do you think that nothing short of compulsory elementary education will succeed in their case?—*A.*—I do not know if elementary education by itself would alter the situation.

Q.—Supposing an industrial bias was given to it?—*A.*—Undoubtedly it would do good.

Q.—How long has the Victoria Technical Institute been in existence in Madras?—*A.*—It was first founded in 1888.

Q.—What sort of instruction is given there?—*A.*—There is no instruction. It is mainly a selling agency and a show room.

Q.—Referring to the land policy, you say that ownership of land in these remote places is very uncertain. Does a large number of transfer of lands take place among these people in the ordinary course of their life?—*A.*—Outright sales are uncommon in Malabar.

Q.—In the last portion of the note speaking about hydro-electric surveys, you say that the possibilities of the Periyar scheme were investigated, and that the scheme was rejected as it was found that in the worst year on record there was not enough water for a power scheme as well as irrigation. Can you tell us when that worst year occurred?—*A.*—No. As a matter of fact that phase of the scheme is dead; a new scheme is now under consideration again and Col. Ellis who is going to give evidence before the Commission will be able to speak at greater length on the subject.

Hon'ble Sir R. N. Mookerjee.—*Q.*—Have you felt the need of technical knowledge in the course of your work?—*A.*—Yes. Of course I have assistants who supply technical knowledge in some branches.

Q.—With regard to the pumping and boring operations, is it all under your department?—*A.*—No. It has been transferred to the Agricultural Department. An engineer has now been attached to that department. He has taken over the pumping and boring staff from the Department of Industries.

Q.—How did that work previously under the Department of Industries?—*A.*—Mr. Chatterton and later Mr. Tressler were both engineers, and they were assisted by a staff of trained supervisors and mechanics. The work partly was advisory and partly consisted of instruction. People who put up oil engines and pumps paid a compounding fee, and in return for this compounding fee, their installations were periodically inspected and they were entitled to such advice as the department could give them.

Q.—Have a large number of borings been put down?—*A.*—Yes. I have given the figures somewhere in my note.

Q.—Can you tell us the reasons why the work was transferred to the Agricultural Department?—*A.*—After much discussion and some controversy, it was decided that pumping installations raised so many questions, that were essentially agricultural, that the proper course was to attach an engineer to the Agricultural Department and to transfer pumping and boring work to that engineer.

Q.—That was before you became Director?—*A.*—Yes. It is an inconvenient arrangement for me, for though many of the plants are purely industrial plants, the supervision of them is now done by the Agricultural Department, and I have got no district staff at all.

Q.—Would you not want a district staff for other purposes?—*A.*—Certainly, at present I have no means of keeping in touch with industrial developments in the districts. I have represented the need for an industrial staff.

Q.—You would then have an engineering staff attached to the Agricultural Department and another attached to the Industries Department to deal with the different questions?—*A.* Yes, one dealing with the industrial plants and the other dealing with purely irrigation plants.

Q.—Would not that involve duplication of staff?—*A.*—Yes, to some extent. But I think that there is reason in Mr. Chadwick's view that many of the problems which arise as regards pumps are essentially agricultural.

Q.—Would not co-operation between the two departments have met that difficulty?—*A.* Possibly.

Q.—What status has the Agricultural Engineer got?—*A.*—He has got a status corresponding to that of a Deputy Director of Agriculture.

Dr. E. Hopkinson.—*Q.*—Did you start your work without any part of your original taff?—*A.*—At present I have got no district staff at all.

Q.—Have you made any representation to Government?—*A.*—Yes.

Honble Sir R. N. Mookerjee. *Q.*—With regard to hydro-electric proposition you say that there is a project under investigation?—*A.*—Yes, the Periyar scheme. Col. Ellis is going to be examined especially with regard to the project. He will be able to give the Commission definite information about the matter.

Mr. C. E. Low.—*Q.*—Have you considered at all the idea of producing the necessary wood in the right places with a view to increase the charcoal supply?—*A.*—The question of destructive distillation of wood has only just been referred to me for report. I have not considered it at all.

Q.—There are areas on the coast?—*A.*—We had casnarina plantations all along the coast in Madras. The original idea was to utilise them, but owing to a change in forest policy, these plantations have been sold.

Q.—Have you got any views about the organisation of the Commerical Intelligence Department?—*A.*—I am supposed to run a bureau of industrial information, but it needs proper organisation.

Q.—What I refer to is not industrial intelligence but commerical intelligence?—*A.*—I have not considered any such scheme.

Q.—At present there is a scheme before the Secretary of State for a Director of Commercial Intelligence with men under him in Madras, Bombay and Calcutta and with trading correspondents in certain centres like Cawnpore, Amritsar, etc. The Department would obtain information from the collecting officers in the various provinces in order to make the information available to the whole of India or outside India, and would also advise the Government about the movements of trades, etc. Have you considered the possibility of any such scheme?—*A.*—No.

Q.—There is a section in the Land Acquisition Act empowering Government to acquire land for companies. Are there any precedents in the past in the Madras Government where this section has been worked?—*A.*—I remember one or two cases particularly of an acquisition of a site for the Bank of Madras in Cochin

Q.—Without discussing the ethics of the particular transaction, could you obtain for us a collection of precedents of that kind in recent years?—*A.*—I shall try to get them.

Witness subsequently forwarded the following note:—

(1) In 1910 Government acquired land for the Bank of Madras at Calicut. The difficulty in the way of private purchase was the impossibility of getting a clear title. The owner was willing to sell.

(2) In 1915 Government acquired land in Madras under section 40 for the Electric Supply Corporation for "the erection of a building to house static transformers of high tension electric current for supply to Madras."

(3) Last year they acquired land for the Bank of Madras, Trichinopoly, the correspondence being the same as at Calicut.

(4) They are now considering the acquisition of sites at Cuddalore and Cochin for the same purpose.

Q.—In answer to question 62 you say "I do not think that an Imperial Department would do". Do you think that each local Government could afford to keep its own experts for all the industries? If the local Government cannot afford to keep so many experts, the industry would be left untackeld?—*A.*—Possibly local Governments might lend one another their experts—Mr. Elland for instance the glass expert in the United Provinces was lent to the Central Provinces.

Q.—Would you consider that an entirely satisfactory position?—*A.*—I am all for a Central Research Institute. Perhaps that might help.

Q.—Then with reference to this question of oils, do you think that the British and Indian demand for cocoanut oil would be enough to justify the taking up of the industry?—*A.*—It depends on the scale on which the oil is made and the scope of the operations. What is wanted is a firm not expressing the oil alone, but going further and making such finished products as soap, glycerine, edible oils and fats and so on. I have just received information that a well-known Indian business house is about to enter the Madras oil industry on these lines on a very large scale.

Q.—Have you anything to do with the granting of mining leases?—*A.*—Nothing at all.

Q.—There has been a considerable amount of information already before us that there has been a great lack of real expert knowledge among the officers of the industrial department which may be correct or not. I am not in a position to say that. But it is the view of a number of witnesses who were speaking in sincerity?—*A.*—The superior staff consists of a tinctorial expert, a leather expert and an Assistant Director who is a mechanical engineer. They all have a good knowledge of their particular subjects.

Q.—Do you think it is fair to the department and the officers to ask them to take up posts for which they have no previous experience, to take up things that they know nothing about? Don't you think it is liable to create a bad impression and discredit the department?—*A.*—Yes.

Q.—Have you any views as to who should have charge of industrial education, the Department of Public Instruction or the Director of Industries?—*A.*—In my view the Department of Public Instruction, with its expert knowledge of the principles and methods of education, is probably better qualified to guide the development of industrial and technical education. On the other hand, the Department of Industries is more in touch with the workshops and is more likely to take a real interest in this branch of education.

Q.—Have you considered the Victoria Jubilee Technical Institute in Bombay? Do you agree that it is the most successful institute so far as it goes?—*A.*—As far as I know, it is.

Q.—About the hand-book of commercial information, has it been useful to business men?—*A.*—I believe so. It was very favourably reviewed in one or two papers.

Q.—How was it prepared?—*A.*—Much of it was based on the Book of the Madras Exhibition.

Q.—How did they get information about the essential commercial points? *A*—Both Mr. Couchman and Mr. Chadwick were in touch with business men, and they got their information from business men.

Q.—You say that Massey & Co., and other firms do some business on the hire-purchase system? Has the system been successful?—*A.*—I believe it has caused them much trouble.

Q.—Who is going to take on agricultural machinery, such as sugarcane mills and things of that sort?—*A.*—The Agricultural Engineer. It is of course rather difficult to draw the line between agricultural plants and industrial plants.

Hon'ble Sir R. N. Mookerjee—*Q.*—You say in your note that there are very few openings in the industrial line. Do you agree that a beginning should be made. Do you think that a good system of apprentice ships should be started by which the railways in India should be made to take young men as apprentices. That is what is about to take place in Bengal?—*A.*—Most certainly.

WITNESS No. 221.

SIR CLEMENT SIMPSON, *Binny & Co., Madras.*

Extract from ORAL EVIDENCE, dated 26th January 1917 *Vide* page 202 of Vol. III of the Minutes of Evidence.

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Dr. Hopkinson.—*Q.*—Has any record been kept of the expenditure on these Mil Schools?—*A.*—Yes, we have a record.

Q.—Have you any objection to put in a statement of the expenditure incurred?—*A.*—What is the object, may I ask.

Q.—Our principal object is that we would like to know what the cost of such work is?—*A.*—I am quite willing to give it to the chairman, but I don't think I want it published by the Press.

Statement of expenditure.—

The Mill Schools cost Rs. 800 a month to each Mill. This is exclusive of upkeep of buildings. The schools were started to teach the three R's and improve relations between employer and employé and in the latter respect have succeeded beyond all expectation.

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WITNESSES Nos. 224, 225 and 226.

Messrs. Buchanan, Neilson and Keith.

(1) Mr. A. F. Buchanan,
(2) Mr. W. Neilson.
(3) Mr. J. W. Keith.

} *Messrs. Parry & Co., Madras.*

WRITTEN EVIDENCE BY MR. A. F. BUCHANAN.

My firm are the managing agents of the following industrial concerns :—

The East India Distilleries and Sugar Factories, Limited.
The Deccan Sugar and Abkari Company, Limited.
The Presidency Manure Works, Limited.
The New Malabar Timber Yards and Saw Mills, Limited.
Light Railway Engineering Works, Calcutta.

The first named company in addition to its main sugar business has now established a Chemical Works at one of its branches.

Sugar industry.

As regards the sugar industry, I do not propose to add much to the attached note by our factory manager, Mr. Neilson. The great bar to development is the difficulty of securing sufficient land suitable for the cultivation of sugar-cane at a reasonable rental within the reach of a central factory. This difficulty has been overcome to some extent around Nellikuppam by years of patient endeavour which it would be impossible for a newly formed company to exercise.

The sugar refinery at Nellikuppam deals with a considerable quantity of raw material other than cane, and for this reason it has been possible gradually to encourage the growth of cane by the local ryots for sale to the company, and also to lease from them a certain amount of land on which to cultivate cane.

As an example of the difficulties arising in other districts, I will relate our recent experience in the Vizagapatam district in connection with a cane-crushing plant belonging to the Deccan Sugar and Abkari Company, Limited. Last season cash advances were given and all arrangements made by the company to crush the cane contracted for, but when the time came many of the ryots, being under the impression that they would do better by crushing the cane for themselves and making cane jaggery for local consumption, broke their written agreements without hesitation, and repaid the advances they had received, with the result that the company's cane-crushing installation was not worked at all.

It is in the removal of such difficulties as these that Government may well come to the assistance of the sugar industry in India.

As a means to this end, I would suggest the acquirement of land by Government, not necessarily as an outright purchase for cash, but on a lease of say 20 years with a fixed rental to the owner, based upon the net return hitherto obtained. This rental, or part of it, should circumstances make it advisable that some measure of assistance be granted to the industry, to be recovered by Government from the sugar company.

An outcry would probably be raised in the first instance, but from experience I am inclined to the opinion that on expiry most owners would wish to renew the leases rather than take over the land themselves.

Export of jaggery to Ceylon.—I have already forwarded to the Secretary to the Commission a copy of my firm's letter to the Government of India on this subject, and

attach hereto a copy for reference. The matter is fully dealt with in that letter, and I trust the Commission will agree that some action on the part of Government is called for and will take steps to support our application.

The Company's Chemical Works are in charge of Mr. Keith from whom I enclose a note. Chemical Works.

A means that Government might adopt to encourage the manufacture of chemicals in India would be to permit the import of the required raw material free of duty. Till recently we have paid a duty of 5 per cent *ad valorem* and this has now been raised to 7½ per cent.

Another method of assisting the industry would be for Government to place its orders for acid with the manufacturing firms instead of making its requirements itself as at present.

The reason given for the existing procedure is that the requirements of Government must be assured in times such as the present. I suggest that this would be met by allowing the Government plants to remain, but for them to be worked only when necessity demands.

The Presidency Manure Works are also managed by Mr. Keith from whom I enclose a note with which I am in complete agreement. Manure Works.

The New Malabar Timber Yards and Saw Mills, Limited.—This company purchases timber in the log from native contractors and from Government and converts it into planks scantlings, boxes, furniture, etc. Timber Yards and Saw Mills.

We are of opinion that the true value of Indian timbers for the above purposes is not yet realized and the expansion of the industry is much handicapped on account of failure to season properly the timber before it is brought to the saw mills.

Our own experiments in artificial seasoning show that well-seasoned timbers from the West Coast are eminently suitable for such fine work as furniture manufacture.

Artificial seasoning is however very expensive and is therefore a serious handicap in competition.

We believe that natural seasoning at very small cost can be carried out provided this is undertaken before or as soon as, the timber is cut, and that it is necessary for Government to introduce regulations to enforce natural seasoning and to guide timber-buying contractors in the matter of seasoning.

We understand the Madras Government is making enquiries in this direction through Mr. A. W. Lushington, C.I.E., and we invite the attention of the Industrial Commission to this question as likely to assist very greatly the expansion of the Indian timber industry.

We have recently built works in Calcutta where light railway materials such as tipping wagons, points and crossings, trolleys, steel sleepers, fishplates, etc., are being turned out. Light Railway Engineering department.

We are of opinion that, in the past, competition in this business by British manufacturers has been stopped by periodical "dumping" by Germany.

Our opinion is based on the facts that British and French attempts to compete have always sooner or later failed, and yet German prices, when competition has been withdrawn, have returned to a level which invited competition. The periodical "dumping" system has made the business sufficiently unattractive to British manufacturers to prevent their making a speciality of this class of business, the only way in which it can be successfully handled.

Steel rails can now be manufactured in India and steel plates suitable for light railway accessories will shortly, we understand, be available.

We are of opinion that, provided foreign "dumping" is prevented, India will manufacture all its own light railway materials in the near future and is naturally provided so to do.

We think a permanent committee should be formed to enquire *promptly*, as cases arise, into the methods of foreign competitors wherever they appear to be based on "dumping."

Such a committee should have at its disposal sound engineering advice and assistance.

The committee, having so far as possible satisfied itself that competition precludes a profit to the local manufacturer, should study the special cases brought to its notice and, with the help of its engineering advisers, ascertain the true cost in the competing country.

It must be remembered that there are market prices for all classes of iron and steel in every country, and therefore it should not be impossible for the committee's technical advisers assisted by the manufacturers, to make the committee acquainted with the true cost of the manufactured article, or at any rate to show that sales of foreign goods are being made below cost price. We are of opinion that British firms have nothing to learn from foreign firms in the matter of light railway manufacture and that they have been

disheartened and prevented from developing in the past by a form of competition with which they were quite unable to cope.

It is not for us to suggest the *form of retaliation or prevention best suited to meet* "dumping" methods it is a very large question which will doubtless be met with in many of the enquiries now being made—but we think all will agree that *promptitude* in retaliation as cases arise is the only course which will save British manufacturers from again having to acknowledge themselves beaten.

Copy of letter to the Government of India regarding export of jaggery to Ceylon.

We have the honour to request that Government will be good enough to take steps to prevent the exportation of jaggery from the Madras Presidency to Ceylon.

The companies we represent are largely interested in refining jaggery and for this purpose have erected three well-equipped and up-to-date sugar refineries in this Presidency.

With the exception of some two or three months during which sugarcane is crushed at the principal factory, all three refineries are dependent for their raw material upon supplies of jaggery.

These supplies are quite inadequate to keep the three factories fully occupied, and nearly every year the two smaller stand idle for about six months.

Whenever possible supplies of local raw material are supplemented by purchases of raw sugars from Java, Mauritius and Manila, but the point we wish to emphasize particularly is that the available supplies of local jaggery are quite inadequate for the needs of the refineries already in existence.

That such is the case is further emphasized by the very large imports of foreign sugar into the Presidency, which during the past three years ending 31st March have been approximately as follows:—

1913-14	28,132	Tons
1914-15	19,968	"
1915-16	18,659	"

A large company has recently been started in Ceylon ostensibly with the intention of manufacturing sugar from the juice and jaggery of the local palmyra and cocoanut trees. Supplies of such material having apparently been considerably overestimated, attention has been turned to the jaggery markets of Southern India and purchases of over 5,000 tons were made last season for export to Ceylon.

The result to the sugar industry in Southern India is two-fold as not only has it been deprived of this large quantity of local material, but owing to competition, prices of jaggery have risen to an alarming extent.

That purchases of Indian jaggery by Ceylon are possible is accounted for by the high import duty on sugar into Ceylon of Rs. 3 per cwt. The Ceylon refiner is thus protected to this extent against competition, and can therefore afford to pay more for jaggery than can his competitors in India.

From a refining point of view the relative value of jaggery to sugar is approximately 60 to 100, and after paying the import duty into Ceylon of As. 12 per cwt., the extra price the Ceylon refiner is able to pay for jaggery is therefore about Rs. 1-1-0 per cwt., or say Rs. 21-4-0 per ton.

The following figures illustrate the position:—

The duty in Ceylon on 60 cwt. of sugar (the produce of 100 cwt. of jaggery) is Rs. 180.

If however the jaggery is imported and refined in Ceylon, the duty amounts to only Rs. 75 (100 candies of jaggery at As. 12 per cwt.).

It cannot, we submit, be the intention of Government that one part of the Empire should enjoy preferential treatment at the expense of another, and we therefore request that early steps may be taken to protect the sugar industry of Southern India from the unfair competition detailed above, either by the imposition of a suitable export duty on jaggery or otherwise as Government may think fit.

Note on the prospects of sugar industry in Southern India by Mr. W. Neilson, Manager, East India Distilleries and Sugar Factories, Limited, Nellikuppam.

In my opinion it is very doubtful whether the general conditions prevailing in Southern India are such as to warrant a belief that unassisted by protective tariffs, a large, sound and remunerative industry can be firmly established.

My reasons for this opinion are founded on the following facts:—

(1) The sugar industry of South India together with the whole sugar industry of India is in competition with the cheapest sugar-producing country in the world, *viz.*,

Java. The Indian industry cannot compete successfully with the Java industry for the following reasons:—

The agricultural conditions in Java are superior to those generally prevailing in Southern India. The soil in the sugar-growing parts of the Island is volcanic, and is therefore naturally richer than the soils in Southern India. The climate is more moderate and the extremely high temperatures prevailing during critical periods of the life of the cane in Southern India do not obtain in Java. Rainfall is more equally distributed and irrigation facilities are superior and very well arranged in the sugar-growing part of the Island.

The sugar-manufacturing industry can only be successfully carried on when it is conducted on a fairly large scale. In my opinion factories crushing less than 50,000 tons of cane per annum suffer a severe handicap in manufacturing costs and cannot compete with larger factories.

Owing to the economic conditions prevailing in Southern India, it is a matter of great difficulty to secure such a quantity of cane for a central factory from ryots except at rates which leave only a meagre profit for the manufacturer.

The Java manufacturer does the business of *planting* as well and thus secures the profit accruing to both branches. This system offers the best possible opportunities for organisation on the agricultural side as well as in the factory. When the factories are able to obtain, either by lease or purchase, suitable lands, the factories can develop to a greater extent the agricultural possibilities of the lands and grow much better and cheaper cane. Further, the time of planting and cutting can be regulated in such a manner that the best results are obtained.

A company which puts down an expensive sugar plant in India puts itself entirely in the hands of the Indian cultivators and has absolutely no other recourse than to close down, should the cultivators chose to plant other crops than cane.

The leasing of suitable cane land which apparently can be done without great difficulty in Java is a very troublesome matter in Southern India. A company which attempts this is charged much higher rentals than those locally prevailing and much higher than those charged in Java for much better land, because the ryot always takes his maximum yield of produce as the average in his calculations when leasing his land to the company although he perhaps calculates otherwise when the Revenue Officer comes round. Custom has also a great deal to do with it. He has never done this before, and he thinks that he must be losing something when a company is anxious to relieve him of his anxieties. These prejudices can be to some extent overcome in time, but in the case of a new company starting the company would be defunct before it had overcome them.

(2) The only remedy I can suggest is the compulsory allotment of certain lands for sugar-growing and manufacturing companies in suitable districts. The proprietor or lessor of the land would suffer no financial loss, as I think the sugar companies could afford to pay rents at least equal to the nett income obtained by the cultivator, and large sums of money would be distributed by the companies in payments for labour and in other channels.

In Java before a sugar-manufacturing company is allowed to start, very careful inquiries are made by Government regarding its prospects in the proposed district and sanction must be obtained; when such sanction is obtained for a certain company, no other is allowed to start in the same district and thus cut-throat competition is avoided which is a very wise proceeding.

I would say that the moral I have read from the past history of the sugar-cane industry in India is that one should make quite sure of securing the hare before purchasing very expensive utensils for cooking it.

Certain existing arrangements could be greatly improved in my opinion in this district. The irrigation channels are not efficiently supervised; I think that with a moderate expenditure water could be distributed with greater fairness and could be made to do much greater work than at present, were it more equably distributed.

The main roads are not too well maintained and the minor village roads are not maintained at all. Cane thefts from carts along the road are very prevalent, and it is extremely difficult to secure punishment of the people who steal the canes; the individual thefts are minor but in the aggregate they represent a considerable loss.

Note on the Chemical Works, Ranipet, by Mr. J. W. Keith, B.Sc.

Our Chemical Works at Ranipet manufacture acids and heavy chemicals, and our experience shows that their manufacture in India is a practicable commercial proposition if conducted on sufficiently large scale.

Our principal manufacture is of course sulphuric acid and so largely does this bulk in the chemical industry that it is likely to be the mainstay of our production for many years to come. Among our other manufactures, nitric acid, hydrochloric acid, epsom salts and green copperas can only be produced sufficiently cheaply to compete with the imported article when cheap sulphuric acid is obtainable.

Cheap manufacture of sulphuric acid can only be brought about by production on very large scale. This involves the erection of a large plant at a relatively large expense, bu this would be justified if Government guaranteed a large demand by undertaking to place al their orders with local manufacturers.

As an instance to the contrary, the Cordite Factory at Wellington produce their ow nitric and sulphuric acids, a part anyhow of which might be purchased from loca factories.

Manufacture on a large scale also ensures better freight facilities for the raw material which in the case of sulphuric acid, is usually imported from Japan and Chili.

Both sulphur and nitrate of soda pay duty at the rate of 7½ per cent *ad valorem* when imported into this country. In view of the importance of cheap sulphuric acid, not only to the chemical industry, but to so many other industries besides, the above two constituents when imported for its manufacture should be allowed into the country duty-free.

Technical aid

Experience shows us that European supervision is desirable in the manufacture of all chemicals, and even for subordinate posts in the works it is difficult to secure an adequate supply of skilled labour, that is men with chemical training who would be able to supervise the working of chemical processes. Although we have with one exception been unsuccessful in obtaining the class of men we want, there must be a certain number of chemical graduates turned out yearly who would be suitable for the employment we have to offer. The average chemically trained graduate does not appear to care for work apart from that of a purely analytical type; he regards his education as finished and does not wish to face the drudgery of at least a year's work before he can apply his college-acquired chemical knowledge to the industrial chemistry of a Works. The graduates appear to dislike the unpleasant conditions so often prevailing in a Chemical Works, and disinclination to do night work greatly discounts their value in the proper supervision of chemical processes which are often continuous. In a Chemical Works, to which a Fertiliser Works is attached, caste prejudices against organic animal matter used in the production of fertilisers is another factor unfavourable to the employment of the average Indian graduate.

The demand for men with chemical training for subordinate positions in our Chemical Works, who in time would take over the control and supervision of one or more processes does however exist, and the demand will no doubt secure the supply.

There are, however, at present few other openings for such men, as the tendency of all chemical industries is to become centralised and the establishment of small chemical factories all over the Presidency is neither desirable nor profitable. Further amplifying this question of technical aid, the formation of some central institution possibly in connection with some recognised college, which at the same time as training students would also afford analytical facilities might be a desirable thing. The necessity for analytical facilities will arise in connection with the purchase of raw materials and sale of finished products, because, as industries grow, these purchases and sales will be made more and more upon the results of analysis and efficient neutral analysis is essential. Work which would be undertaken by such an institution would be analysis of such things as sulphur, nitrate of soda, fuel, etc. There is a tendency at present to discount the *results found in a* manufacturer's own laboratory, on the ground that his chemists are biassed in his favour.

With regard to the question of research work, this I think should be done in India under Indian conditions.

Assistance in marketing products.

We have found commercial museums to be of advantage, and many enquiries have resulted from the exhibition of our products in the commercial museum in Calcutta.

Training of labour and supervision.

Difficulties are experienced by us in securing an adequate supply of skilled artisans, possibly owing to the situation of our factory away from other industrial centres. This difficulty we hope to overcome by arranging more housing accommodation.

It is doubtful whether the extension of technical schools would be of great assistance to us unless the men were given a very extensive practical training. Probably owing to centuries of the caste system, the artisan whose trade is hereditary is usually superior to the technical school-trained man.

Note on the Presidency Manure Works, Ranipet, by Mr. J. W. Keith, B.Sc.

Many of the considerations referred to in connection with the Chemical Works apply also to the Presidency Manure, Works, but there would appear to be six points on which Government might be able to assist the fertiliser industry—

(1) An extension of the activities of co-operative societies would be welcome. These societies are in existence at the present time, but we do not seem to be getting orders for manure from them in any quantity. The average ryot,—and he is really the person who ought to manure in order to increase his outturn—is in many cases so poor that he cannot afford to pay cash for manure, and it is not practicable for us to adopt any credit system. Co-operative societies judiciously managed could, by large purchases of manures, help individual ryots since they would be able to have security in the shape of crops—a security which we at present could not entertain without an enormous supervising staff. Further, the saving on railway freight alone would in many cases be quite sufficient to remunerate the co-operative society for its trouble. We have at present some experience of co-operative action with regard to purchase of manures, as in one or two instances—attracted by our discount for large quantities—several villagers have joined together and sent one man to purchase manure, the commission presumably being shared amongst the purchasers.

(2) We have derived considerable benefit from the institution of commercial museums and also from properly organised exhibitions. We may recall in this connection the interest excited by our exhibits at the Madras Fair last year, and quite recently exhibitions at Trichinopoly and Negapatam were productive of enquiries.

(3) We think that in the present state of the fertiliser industry, more especially in that part of it concerning ryots, the adoption of a proper Fertiliser or Adulteration Act is necessary. European planters are quite able to safe-guard their own interests, but the average ryot cannot differentiate properly between good and bad manure. We are sure that our methods of packing, etc., have been copied by native firms with bad results, not only to us but also to the consumer. In this connection, the question of the proper values of *poonacs* from a manurial point of view should be taken up and pointed out more than it is by the Government Agricultural Department. In many cases, instances of which will readily occur, the price of *poonac* is not at all comparable with its manurial value, and doubtless many tons of worthless *poonacs* are yearly foisted upon the agricultural community. The Adulteration Act would of course, require to be so drafted as to properly safe-guard the manufacturer from being at the mercy of unskilled sampling, as from experience at home this has been found to be the greatest bugbear in the working of such an Act.

(4) The publication of scientific agricultural literature in vernaculars might be more extended than it is at the present time. We find that our Journal of Scientific Manuring is eagerly welcomed by Indian ryots, and it should not be necessary for a private firm to have to undertake such extensive propaganda work entirely from its own resources.

At present the Agricultural Department purchase from us and resell to ryots a certain quantity of superphosphate and simple fertilisers.

(5) *Railway freight.*—We are about to try to get the local railways to accept small consignments of fertilisers at their rates for full wagon-loads, which should assist us in our propaganda work considerably, and we would welcome assistance from Government in this connection. We supply fertilisers to places as far apart as Bezwada and Tinnevelly. The railage on small consignments to the former place amounts to As. 13-5 per cwt. and to Tinnevelly As. 10-11 per cwt. when the value of the manure itself amount to only Rs. 5-8-0. This railage is somewhat excessive and a reduction in rates would, we think, encourage sales. Further, fertilisers and especially small quantities of fertilisers sent by rail should be treated on the same footing as perishable goods. Unfortunately there is a prejudice against the carriage of manures, but it should be borne in mind that in all cases the cultivating season is a very short one, and that orders are not placed unless there is a likelihood of a fair crop; where more than a few days elapse between the despatch and receipt of the fertiliser the cultivating season may often be missed and the purchase of the fertiliser rendered nugatory.

Regarding planters' orders, last year we experienced difficulty at a time of pressure on the railway, in securing empty wagons for our consignments, and in several cases the manure arrived too late to be of any use during that season.

(6) We would welcome stricter supervision by the Agricultural Department over mixed manures supplied to ryots by fertiliser manufacturers and would suggest the publication of results, including the names of the suppliers, when any unscientifically prepared fertiliser is discovered offered for sale not containing the quantities of plant food said to be contained therein.

ORAL EVIDENCE, 26TH JANUARY 1917.

NOTE:—Messrs. J. W. Keith and W. Neilson accompanied Mr. Buchanan during oral examination.

Mr. C. E. Low.—*Q.*—I understand that you grow a good deal of cane yourself at Nellikuppam on jowari system?—*A.*—Yes.

Q.—How many tons of cane per acre do you get as a rule?—*A.*—About 20 to 22.

Q.—And what do the ryots get usually?—*A.*—They get about 18 to 20.

Q.—Is the ryot's cane pretty good in sugar-yielding qualities?—*A.*—Yes.

Q.—What cane do they grow? Java?—*A.*—Mostly Red Mauritius, but Java B 208 is also popular.

Q.—It is a comparatively low yield considering what the cultivators get in the Deccan. They get 30?—*A.*—We have never got anything like that.

Q.—You do not think the conditions here are as favourable?—*A.*—No. We generally get a long drought in the early stage shortly after the planting.

Q.—In what months do you plant?—*A.*—We plant about March and April. I do not think we have ever tried October. We tried planting in August and September, but the conditions were not suitable for that.

Q.—How do you irrigate? Is there Government irrigation?—*A.*—There is Government irrigation on some lands, and in other areas we have wells and oil engines.

Q.—Is Nellikuppam one of the delta districts?—*A.*—No.

Q.—Have you seen any cane grown in delta?—*A.*—Yes.

Q.—Does that run higher than your cane?—*A.*—Yes.

Q.—Much higher?—*A.*—I saw some cane up in the Vizagapatam district yielding about 30 or 32 tons. That has delta irrigation. There is a very large area under cane, but the cane is at present all crushed and made into jaggery.

Q.—The factories which have been started in the United Provinces and Bihar complain very much more of the quality of the cane?—*A.*—I do not think we have anything to complain of in that direction. The main difficulty in the way of development is the difficulty of securing sufficient land.

Q.—If you could get cane as regularly and at suitable rates, how much could you crush?—*A.*—The quantity that we crush at Nellikuppam is about 2,000 acres of which only about 800 is our own, that is, it is grown on land that we have leased.

Q.—Is that in any one year 2,000 acres?—*A.*—Yes.

Q.—Do you help the ryots to get manure and so on and encourage them to use it?—*A.*—We give them advances.

Q.—And you do not take any particular steps to help them to get manures? You do not sell them sulphate of ammonia or anything of that kind?—*A.*—No. The manure in that particular district is groundnut *poonac* which is locally available. I do not think the ryots are quite ready for scientific manures.

Q.—Is there plenty of cattle locally to supply sufficient farmyard manure for the cane there?—*A.*—No. Cattle are not plentiful. They are not adequate.

Q.—Has the Agricultural Department done anything to try and popularise the use of artificials at all?—*A.*—I do not think they have done very much in that way. They have a demonstration farm for sugar-cane at Nellikuppam.

Q.—They have a small demonstration farm?—*A.*—Yes.

Q.—On which they grow sugar-cane?—*A.*—Yes, but they have not much encouraged the use of artificial manure.

Q.—Do you use artificial yourself?—*A.*—To some extent. We are experimenting largely in that direction with different manures.

Q.—Do you conisder the use of sulphate of ammonia to be a paying proposition before the War?—*A.*—I do not think that our experiments are sufficiently far advanced to come to any conclusion.

Q.—What price do you pay the cultivators for cane?—*A.*—There is a special system of buying at Nellikuppam, which has been in force for over 100 years or so. We crush their cane and the juice is measured, and a certain quantity of it is boiled up into jaggery according to their own methods in open pans and a calculation is made from that as to how much jaggery the man has supplied.

Q.—Of course, if you could substitute for that the chemical analysis, you would reach an ideal system?—*A.*—This appeals to the ryot much more.

Q.—It is a thing he can understand?—Yes.

Q.—What proportion of gur do they get from this cane?—*A.*—About 12 per cent.

Q.—On what basis do you pay for the sugar contents?—*A.*—We pay them so much a candy of jaggery of 500 lbs.

Q.—With reference to the export of jaggery to Ceylon, it is a matter before the Government. You have never tried to export any sugar to Ceylon?—*A.*—We have sold to Ceylon in the past not as a regular thing, but we have done so and there is no reason why we should not.

Q.—If there was no tariff against our sugar, there might be more of it?—*A.*—Yes. Our point in that connection is that the tariff on the raw material is too low.

Q.—Don't you think that it is somewhat dangerous to be drawn into a tariff war with Ceylon?—*A.*—But is it not a case of Ceylon having begun it?

Sir F. H. Stewart—Q.—You refer to your experience in the Vizagapatam district, that the ryots broke their agreements with you. Did they get more money thereby than they would have had from you?—*A.* Yes.

Q.—There is a danger of their doing it again?—*A.*—Yes.

Q.—Is this a solitary instance, or have you had other cases?—*A.*—That is the first time we have experienced it.

Q.—Generally speaking, what are your relations with the ryots? Do you get on pretty well with them?—*A.*—Most excellently.

Q.—You have been there for a very long time?—*A.*—In the South at Nellikuppam we have been there for a very long time. In the Vizagapatam district it is more or less a new development.

Q.—You suggest that the Government should not interfere with private enterprise by letting the Government plant lie idle until the necessity for it arises. Would that not be rather a waste of public money? *A.*—There would be the assurance of having the plant.

Q.—With reference to the seasoning of timber, have you any definite proposals about that?—*A.*—The question is being considered now by the Madras Government, and they have deputed Mr. Lushington on special duty to look into it and he is doing so at present. From what he has told us there are apparently great possibilities.

Q.—You say that the Forest Department must undertake to see that the timber is seasoned before it is sold?—*A.*—Yes.

Q.—That would be all right in the case of their own timber, but could they apply restrictions to private ownership?—*A.*—Possibly not restrictions, but suggestions which the private owners would find it profitable to follow.

Q.—With reference to the question of dumping, are you a member of the Committee of the Chamber of Commerce?—*A.*—No. I am a member of the Chamber, but not of the Committee.

Q.—Have you been consulted with reference to the question of dumping among those which have to be dealt with after the war?—*A.*—No. I do not think I have seen the papers connected with it. They may have come recently. I have been away.

Q.—Reference was being made to the different commercial bodies and the local Governments by the Government of India, and this was one of the points raised. You have no specific suggestions of your own to put forward, but you point it out as a danger which ought to be guarded against?—*A.*—Yes.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q.—As regards the sugar factory, have you got your own land which you cultivate—*A.*—Only land leased.

Q.—Leased for how many years?—*A.*—It varies.

Q.—You try to produce just like Java sugar?—*A.*—Yes.

Q.—Have you succeeded in improving the quality and growth of cane?—*A.*—Yes.

Q.—And you are of opinion that without a large acreage of land coming into possession of a private body which intends to start a sugar company, there is no chance of competing with Java sugar after the war?—*A.*—Yes.

Q.—And that Government ought to have some legislation for the acquisition of this land?—*A.*—Yes.

Q.—How many chemists do you employ?—*A.*—Three.

Q.—And then you say that educated Indians do not take up this work?—*A.*—Chemical works? So far, our experience has been that with one exception we have not found any particular keenness on the part of our employés.

Q.—In Messrs. Tata and Sons we had all Europeans at first, and now we have 27 Indians, and they work eight-hour shifts. I hope this will gradually be the case with you also?—*A.*—Yes.

Q.—*Mr. A. Chatterton.*—Besides the Nellikuppam factory you have one at Samalkot?—*A.*—Yes.

Q.—Is it working now?—*A.*—Yes. That is on palmyra jaggery.

Q.—You have also got a factory at Kulasekharapatnam?—*A.*—Yes. That is also working on palmyra. A certain amount of palmyra juice is made direct into sugar, but the bulk of the work is refining jaggery.

Q.—Have you leased lands in Kulasekharapatnam?—*A.*—Juice is bought from the tapper at the foot of the tree and transported to the factory by tram line.

Q.—Do you transport juice to the factory by a pipe line?—*A.*—Yes.

Q.—Is it satisfactory?—*A.*—It proved unsatisfactory. There were leakages, delays, etc.

Q.—Was there any difficulty in getting the pipe line clean?—*A.*—Yes.

Q.—In the Godaveri do you pursue the same system of buying juice?—*A.*—No. We buy all jaggery.

Q.—Your principal difficulty is that you are not able to get sufficient supply of jaggery to keep the factory going throughout the year?—*A.*—Yes.

Q.—Has the recent rise in the price of sugar and indirectly of jaggery led to any extension of cultivation of cane in Nellikuppam?—*A.*—It has certainly. We are paying more for the cane than we did three or four years ago, and that has made for greater and extended cultivation.

Q.—The ryots bring all their cane into your factory?—*A.*—Yes.

Q.—Has it produced the same effect in the outlying stations where the ryots make their own jaggery?—*A.*—I am afraid I cannot answer that question. Do you mean that the area of cane in the district has increased?

Q.—Yes.—*A.*—I do not think that it has to any great extent.

Q.—Is that due to the fact that the ryot is growing as much as he can and that as regards the facilities he possesses, the mechanical means of crushing his cane, he has reached his limit?—*A.*—I do not think that necessarily follows. I think that a lot of factors have to be considered. The price of paddy comes into the question very largely, and indigo and groundnut. I think the majority of ryots like to have a little of each.

Q.—But where they have water facilities for irrigation do they experience any serious trouble in crushing the quantity of cane they actually grow?—*A.*—Not that I know of.

Q.—Do you think that the establishment of small central power stations and power mills would have an appreciable effect upon the quantity of cane which the ryots would grow?—*A.*—The attraction in that case would be that he would probably have a better extraction.

Q.—But he would be saved the trouble of having to put all his cattle on to the work?—*A.*—Yes.

Q.—But would that be sufficient to induce a considerable extension of cane cultivation?—*A.*—It is rather difficult to answer.

Q.—Is it a fact that you have a certain number of out-stations?—*A.*—Yes. That is, of course, with the object of supplying the refinery which would otherwise remain idle without material for refining.

Q.—Has the institution of these small factories by your farm led to the development of cane cultivation area?—*A.*—I think the cane has existed and we have put stations later.

Q.—But it has not increased the area since you started work?—*A.*—No.

Q.—Do you import from Java considerable quantities of jaggery?—*A.*—Raw sugar from time to time.

Q.—Have you a sufficient supply of molasses from your sugar factory for your distillery?—*A.*—Not entirely. We import molasses from Java also.

Q.—How many oil engines and pumps have you for lifting water for the irrigation of cane crops?—*A.*—35 under our control. We did not put them all in ourselves, and some of them are leased from the ryots. We have put in about 25 and they have got the balance 10

Q.—Do you know how many there are in the district altogether?—*A.*—I could not say.

Q.—Does it run into hundreds?—*A.*—Do you mean in the Cuddalore District?

Q.—Round Villupuram.—*A.*—There are several there and towards the French territory there are many. They do probably run into hundreds if you go as far away as that.

Q.—Have you any general information regarding the working of them?—*A.*—I was trying to buy some second-hand engines the other day, and I sent a man round to enquire and found that a great many of these engines were either under litigation or in a damaged condition.

Q.—In these small stations do you use the country methods?—*A.*—We use improved methods.

Q.—Are these plants expensive?—*A.*—They are fairly expensive: about three-fourths of a lakh.

Q.—And you want a fairly large supply of cane to keep them going?—*A.*—Yes, about 250 acres.

Q.—Would you consider it a good policy for Government to take steps to encourage the installation of these small mechanical appliances for dealing with sugarcane crushing so as to reduce the amount of labour involved in cane crushing?—*A.*—Yes. I rather doubt whether the jaggery that would be made in these plants such as ours would be quite so suitable for the local consumption market as that got under the present method. But people can be made to imitate what is at present turned out. What we turn out at present from these small plants is practically dry brown sandy sugar. It is perfectly dry, and it is very easily dissolved and handled in the refinery and it does not run as ordinary jaggery does.

Q.—Do you think the ryot is under any disadvantage owing to the fact that the jaggery which he usually makes runs after a time, and he has to sell it very soon after making it with the consequence that when cane crushing commences the price of jaggery falls rapidly?—*A.* He is at a disadvantage in that way.

Q.—If you encourage the making of brown sugar he could store it better?—*A.*—Not indefinitely.

Q.—How long?—*A.*—He might keep it longer, but being so dry, as soon as wet weather came along it would absorb moisture very rapidly.

Q.—Can he get it in a form so that it may be possible for him to get advances from the banks on it?—*A.*—Possible, I think.

Q.—That would mean the constructing of godowns of suitable size alongside these central crushing plants?—*A.*—Yes, but at present, at any rate, the ryot's output of such jaggery is much too small for a bank to finance.

Q. But when you are dealing with jaggery of 2,000 acres, is it not enough?—*A.*—It is not a very great deal.

Q.—If it is too small an area for the larger banks to deal with it, it might be done with the agency of co-operative societies?—*A.*—Yes.

Q.—And the ryots would have facilities for getting money, and that would get rid of one of the difficulties against cane cultivation?—*A.*—Yes.

Q.—Is it possible for Government in the areas with which you are acquainted, such as the Godaveri delta, the Vizagapatam district and the South Arcot district, to take any steps to improve the water supply for cane cultivation apart from encouraging engines and pumps? *A.*—I think a certain amount of improvement could be carried out by keeping the existing channels in better order than they are at present. I am speaking of South Arcot at the moment. These channels are from rivers.

Q.—In the Godaveri delta, why is there such a comparatively small area under sugarcane?—*A.*—Presumably other crops pay better.

Q.—It is not a question of water supply?—*A.*—No.

Q.—Without large quantities of cattle manure or oilcake is it practicable to use artificial manures in these irrigated tracts in the delta, or is the manure washed away by irrigation water?—*A.*—I think if the irrigation is intelligently regulated, it would not be. But practically, so often these canal irrigated areas are over-watered, and in that case, of course, loss would occur.

President.—*Q.*—I do not understand your proposal that the Government Cordite Factory should purchase nitric and sulphuric acid from local factories. You would not recommend to carry sulphuric acid all the way from Ranipet to Wellington? If you made a proposal that the Government should allow you to manufacture nitric and sulphuric acid at Wellington one might consider it as a more reasonable proposition, but making the acids at Ranipet and carrying them all the way to Wellington by rail is not business at all?—*A.*—It is a question to what extent the Government are anxious to assist industries.

Q.—But the first thing, of course, is to make sure that any industry is run on the most economical scale possible?—*A.*—Yes.

Q.—Does it strike you as a manufacturing chemist that it is more feasible to manufacture acid at Ranipet and carry it to Wellington than it is to make it at Wellington itself?—*A.*—No. What I mean is that Government, instead of making the whole of their nitric acid and sinking much capital on it, may possibly have a smaller unit there and allow us to have a bigger unit at Ranipet.

Q.—And carry the acid all the way from Ranipet to Wellington?—*A.*—We carry much larger distances. I put this forward as an instance; if the Government are anxious to assist industries, that occurs to us as a possible means of doing so.

Q.—If it was made on the spot, that might be another proposition. What would happen in the case of dislocation in the railway, or damage to your works in time of war? Cordite has got to be made?—*A.*—Exactly the same argument if anything goes wrong with the Government factory.

Q.—They have their factory at Wellington and get nitric and sulphuric acid under definite military protection?—*A.*—Is it not a fact that they have only recently started manufacturing at Wellington? Until quite recently all their acetone had been imported. Ours is a better proposition than having to import.

Q.—You say that you pay 7½ per cent on sulphur and nitrate of soda which is imported. In the case of sulphur it only works out to only one-third of the weight of your acid and so it only taxes your acid to the extent of 2½ per cent on the value of sulphur?—*A.*—Yes.

Q.—The same thing applies to nitrate of soda. You want only a small quantity of nitrate of soda compared to the quantity of sulphuric acid turned out. That question is worth considering whether even that much might be saved to the benefit of local manufacture?—(No answer).

Q.—Have you had any cases of the kind of so-called fertilisers,—that is a sort of Beecham's Pill fertilisers—which deal with all forms of soils and all forms of climate and all kinds of crops and are advertised as a cure for all things?—*A.*—I do not think we have here.

Q.—They have not come into the Madras area?—*A.*—No.

Q.—We have come across cases of fertilisers being put on to the market, that are recommended to deal with the troubles in crops, and anybody knows that, if a fertiliser is good for one soil, it may do harm to another and sometimes the constitution of the soil is such that it neutralises a great deal the value of the fertiliser, and in all cases they are charged at a rate which is not warranted. You have got no cases of that kind?—*A.*—I have come across no specific instances like that.

Q.—There are no imports of fertilisers that you think ought to be condemned?—*A.*—No, so far as I know.

Q.—These are the cases that we have had before us of fertilisers imported, namley (1) certainly of no value, (2) of very little value and (3) only of value in certain cases, and they were being passed on to the ryots, in some cases giving rise to a bad impression regarding the value of artificial fertilisers. That form of civilisation has not extended to Madras then?—*A.*—It has not quite come to Madras yet.

Sir F. H. Stewart.—*Q.*—Is the value of fertilisers being gradually more appreciated by the ryots?—*A.*—Yes. There is a growing demand.

Q.—Do you recommend the issue of Government certificates of quality? Would the issue of Government certificates of quality and analysis keep out bogus things?—*A.*—The whole risk of that is in the correct sampling, and I believe that a great deal of difficulty is experienced in that direction at home in the working of the Adulteration Act in connection with fertilisers.

Q.—What lease for cane do you usually get? Is it 15 or 10 years?—*A.*—Five to ten years is the utmost that we have ever had. Very often it is one.

Q.—Is it worth while taking a lease for so short a period like that?—*A.*—That is done with the ultimate object of getting longer ones.

Q.—It is rather working from hand to mouth?—*A.*—Yes. That is the great difficulty.

Hon'ble Sir Fazulbhoy Currimbhoy.—Q.—Is your land divided up; have you got it in patches?—*A.*—Our lands are divided up very much.

Q.—Do you bring the cane to the factory over other peoples' lands?—*A.*—Yes.

Q.—They do not object to it?—*A.*—No.

Q.—What is your means of transport? Have you got anything like light railways?—*A.*—We are gradually introducing them, but hitherto it has been bullock carts.

Q.—What is the radius of supply to your factory?—*A.*—Ten miles' radius.

Mr. F. G. Warbrook.

WITNESS No. 235.

MR. F. G. WARBROOK, A.M.I.M.E., *Director, Messrs. Mussey & Co., Engineers, Madras.*

Extract from ORAL EVIDENCE, 30th January 1917, *vide* page 298 of Vol. III of the Minutes of Evidence.

* * * * *

Mr. C. E. Low.—Q.—Regarding supply of plant on the hire-purchase system.—In about how many per cent of cases have you got to go to extremes to collect the money. You have 700 plants out?—*A.*—Out of 700 plants we have sold, we have had to take back 20 plants. The machines have actually come back to the works. We don't consider the matter very serious when we have to take it into court, we consider it serious when we have to take it or let it go.

* * * * *

Q.—Do you get any trouble as to the ownership of the plant? You make it over on the hire-purchase system to one man, and supposing another claims it?—*A.*—We try and avoid that as far as possible by never selling a hire-purchase plant to partners or to co-operative societies. In all cases where we know we have sold to anyone with partners, there is invariably trouble. We have a case in point which is just being terminated. A man in the Negapatam district bought a plant for which he gave Rs. 3,600, and he took in two partners to provide the working capital, and they quarrelled as usual, and we could not get the amount from any of them. They only owed Rs. 850 out of the Rs. 3,600 and none of the three would pay, the two partners or the original hirer. We had great difficulty in getting the plant, but eventually we got it. When it was back in Madras, the original owner turned up and wished to pay the balance and take it away. In that particular district we wanted an example and did not accept it.

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WITNESS No. 242.

HON'BLE COL. W. M. ELLIS, R. E., C.I.E., *Chief Engineer for Irrigation, Madras.*

WRITTEN EVIDENCE.

Note on Periyar-Cardamom Hills Hydro-Electric Project.

1. It has been definitely decided that no power scheme will be countenanced which would interfere with existing irrigation, its seasons, and supplies, under the Periyar system. It is possible to guarantee a supply of 250 cusecs for 240 consecutive days for power generation at Kuruvanath from water issued for irrigation from Periyar lake, there, being a fall of 1,000 feet available. Mr. Garrett has for a long time been corresponding with the Government of Madras regarding a concession for exploiting the generation of power and of an industry dependent on cheap power generated from this source. The original concession has lapsed but its modification has been under correspondence for some years and Mr. Garrett has urged that the concession should be given to him for 250 cusecs for 240 days at an initial rate of Rs. 15 for million cubic feet and he has addressed the President of the Industries Commission on the subject in a letter dated 22nd July 1916, which is reprinted with G. O. No. 551 I*, dated 30th November 1916, enclosed.

* Enclosures: G.O. 616, Political, 24th September 1914, G. O. 551 I, 30th November 1916 and G.O. 545 I, 29th November 1916.

* Not printed.

2. It will be recognised that a source of power which can only be depended on for 240 days yearly is commercially of comparatively small value as compared with one which can be depended on to give continuous power, and that if the supplies available for 240 days could be so supplemented as to enable power to be generated for the remaining 125 days of the year even in considerably reduced quantities that the power water would be worth far more commercially, and as a basis for industrial development than the above Rs. 15 per million cubic feet.

3. There are facilities for supplementing the supplies available from the Periyar lake from a new reservoir proposed to be built in the Cardamom Hills at a cost of about 46 lakhs by means of which a continuous supply of 150 cusecs could certainly be guaranteed throughout the whole year, while there is a reasonable prospect of being able to guarantee up to 200 cusecs. Additional supply to bring discharge up to 250 cusecs for 240 days can be guaranteed and generally 500 cusecs could be passed, if required, during 7 months of the year. The value of the continuous power is fixed in the concession at Rs. 60 per million cubic feet as compared with Rs. 15 for the discontinuous power. It is also believed that the prospects of floating a solvent company to take up the exploitation of this source of power is, in the case of continuous power, better than the prospects of the discontinuous power scheme. Indeed the chances of a concessionaire being able to float a company to exploit the discontinuous power is, it is believed, remote.

4. The continuous power water cannot be furnished except by the combination for this purpose of the supplies of the existing Periyar lake and the proposed Cardamom Hills reservoir and if the former is alienated for the purposes of any concession for discontinuous power the prospect of generation of continuous power is at an end. The Government of Madras have on this ground refused to give Mr. Garrett any concession for discontinuous power unless coupled with conditions involving the taking up and using continuous power at greatly increased, but reasonable, rates if the project for Cardamom Hills reservoir should materialise, and this although Mr. Garrett has urged the discontinuous power concession which does not entail any great expense on Government should be given him.

5. A concession* has been drawn up and offered to Mr. Garrett subject to approval of the Secretary of State guaranteeing supply for discontinuous power not less than 250 cusecs for 240 days at Rs. 15 per million cubic feet and stipulating for utilization at an additional rate of Rs. 45, of such part of this total flow as, if guaranteed within the next 2 years, be made available for continuous power (365 days yearly). The latter can only be made available by the expenditure of about 50 lakhs on the construction of the Cardamom Hills reservoir and subsidiary works. Mr. Garrett's acceptance or refusal of this concession which requires the eventual sanction of the Secretary of State is awaited. (*Vide* G.O. No. 551 I*, dated 30th November 1916, attached).

* Annexure to G 551 I, 30th November 1916.

6. A serious difficulty has arisen in the refusal of the Travancore Darbar to assent to the construction of the reservoir of which the site would be in Travancore territory (as also is the Periyar lake). The reasons which induce such an attitude have been stated and fully met by this Government, but the Darbar still decline to assent to the scheme or lease the water spread area for this purpose. It would appear that general opposition to allowing any exploitation of the resources of Travancore for furthering the interests or developments in British India is rather the basis of the refusal than the specific reasons alleged. The site chosen is one quite unsuitable for development of power in Travancore and this scheme is also unsuitable for economic development in Madras except in combination with the already existing source, *viz.*, the Periyar lake.

7. The development of cheap power and a chemical manure industry in the extreme south of India would benefit Travancore as well as the south districts of Madras and the prosecution of the Cardamom Hills project appears to be in the interests of both States.

8. This note does not deal with the engineering details or aspects of the scheme which however have been worked out in sufficient detail to frame a reliable estimate of cost. This amounts to 46 lakhs making suitable provision for establishment, tools and plant and unforeseen and this may be regarded as a safe estimate. The confidential note to G. O. No. 545 I of 29th* November 1916, attached, shows the financial aspect of the scheme under different assumptions.

9. A few details regarding the scheme and rough data are noted below for ready reference. The head available at the foot of the ghats from the water issued from Periyar lake is about 1,000 feet.

Water H. P. $= \frac{\text{Cusecs} \times 64 \times \text{fall}}{550}$

B. H. P. on turbine shaft may be taken at 80 per cent of above.

E. H. P. about 70 per cent of water H. P.

1 mill. c. ft. will develop 25,000 B. H. P. hours or about 22500 E. H. P. hours and this equals 16,700 kilowatt hours or electrical units.

The rates will thus be

	Per E. unit As.
Rs. 15 per m. c. ft. discontinuous power	·014
Rs. 60 ,, continuous ,, ...	·056

* Not printed.

Political, G. O. 516, 24th September 1914.

10. The water supplies available for Cardamom Hills are based on daily gauge readings of a very bad year from which discharges were computed, and on comparison with the known yield of the similar catchment of Periyar lake. The following compares the effective capacities and catchments of the two reservoirs.

	Catchment square miles.	Effective cap. m. c. ft.
Periyar lake	239	9,605
Cardamom Hills proposed reservoir	73	3,373

The yield of the Cardamom Hills catchment in the year 1913 in the south-west monsoon—May to September—was 33 per cent of that of the Periyar catchment and in the north-east monsoon—October to December—was 23½ per cent of that of the Periyar and the total yield 29½ per cent. The yield totalled to 4,789 m. c. ft. while that of the Periyar totalled to 16,578 m. c. ft. being the smallest for 18 years. The water required to give 150 cusecs for 160 days is 2,074 m. c. ft. Further and more reliable measurements of discharge would be very desirable but they have not been undertaken in view of the refusal of Travancore to entertain proposals.

11. The cost of the works as estimated are:—

	Lakhs.
Preliminary	0·10
Dam	20·00
Buildings and camp	2·10
Watershed cutting	1·63
Tunnel	5·80
Road	3·52
Run-off channel	2·30
Maintenance	0·50
	35·95
Establishment charges—	
21½ per cent on 32 lakhs	6·88
Leave and Pension allowances	·96
Grand total	43·79
or 44 lakhs.	
Improvements to the watershed cutting and head sluices at Periyar.	2
Total ...	46

On this sum the financial forecasts (G. O. No. 545 I,* dated 29th November 1916) have been made. These exclude all consideration of possible irrigation revenue which however is a good and reliable asset which would yield, say, an additional 1½ per cent on capital cost.

ORAL EVIDENCE, 30TH JANUARY 1917.

Sir F. H. Stewart.—*Q.*—We feel that this is rather a delicate matter during the middle of negotiations with a private concessionaire, and there is also the question of the Travancore Darbar?—*A.*—The question of the Travancore Darbar appears to be really the most important one. It did not appear as if the Travancore Government were likely, or were at all anxious, to concede what we wished, and if the Government of India or the Commission expressed an opinion on the subject and if they placed any value on the development of the Periyar power as an industrial development, possibly the Travancore Government might be induced to reconsider their views. I do not think that the Travancore Government's views are based really on definite reasons. The Resident expressed the opinion that he thought that they were based on sentimental grounds. Of course, it is their property so to speak, but when they say no, we cannot say anything further.

Q. Do you attach great importance to the scheme?—*A.*—I am not in a position to judge but I think that it should be very doubtful if one is likely for some years in future to go on with such a scheme, because after all it is somewhat of a speculative nature.

Q. And very large capital is required?—*A.*—Yes.

Q. How long has it been in negotiation with Mr. Garrett?—*A.*—We have been corresponding with him for the last six or seven years. He occupied the position which I now occupy, at one time. He was Chief Engineer for Irrigation. When he retired he took this up, but he is not in any way in a position to put in capital himself. He could only perhaps

induce some large firm to take the matter up and I think before the War he was in touch, I am inclined to think with Siemens; I am not quite sure,—but the conditions have somewhat altered.

Hon'ble Mr. C. E. Low.—*Q.*—Do you think in this particular case Mr. Garrett was the only man who came along, or were other enquiries made by anybody else?—*A.*—The position really was this, that Mr. Garrett originally asked for a concession for Periyar power without any guarantee whatever with regard either to the quantity of water or the continuance of the power, and the Government gave a concession for so many years, but Mr. Garrett, I think, found, when he began to go about in London, that nobody would look at it, and he then asked to have the terms of the concession modified and tried to make out that we could give continuous power from Periyar.

Q.—The first idea was discontinuous?—*A.*—Not only discontinuous, but without any guarantee as to the amount, and naturally we did not object to giving that, but we never thought for a moment that it would materialise, and Mr. Garrett found that it would not. Then he sent us figures with a view to proving that we could give continuous power from the Periyar, but we did not believe that we could safely do so and we declined to do anything which would in any way interfere with the incidence of supply to existing irrigation. We said that we thought that we could give 250 cusecs for 240 days and we said that if the Cardamom Hills scheme matured we could try to supplement the Periyar supplies and give continuous power.

Q.—That was the suggestion that you put forward?—*A.*—It is rather the suggestion that we put forward and we said that we were not prepared to give any concession for discontinuous power unless coupled with the condition of taking up continuous power at excess rates; otherwise the chances of having continuous power from Periyar are gone for ever. That is the attitude that this Government has taken. Mr. Garrett has agreed orally to our proposals with one exception, but he has latterly taken up the attitude, "I do not want continuous power and you are putting rather heavy terms upon me, because you insist upon my taking a development which I do not want."

Q.—You have rather an undesirable concession which apparently is given to a certain gentleman because he asked for it without any test being made to see whether there was anybody else more suitable or offering better terms coming along?—*A.*—Yes.

Q.—Suppose, for argument's sake, this turns out to be a really good thing, you are then committed to your original concessionaire in respect of something very much better than what he had at first, which might possibly or conceivably,—I am not criticising the particular instance—have been disposed of to very much greater advantage and with a much better prospect of rapid exploitation if it had been placed before the public in the ordinary way. Do you think that criticism is fair speaking generally?—*A.*—We were not in a position to guarantee anything in regard to continuous power and we had one person likely to touch discontinuous power and that was Mr. Garrett, and if we could through his agency place a concession which would take discontinuous power and also bind itself to take continuous power if we could eventually give it, we thought we had done a fairly good stroke of business. We have been corresponding with Mr. Garrett for about six years.

Q.—You see, in the first instance, you are committed to an individual without having put the proposition before the public?—*A.*—But it was a proposition which we considered the public would not look at.

Q.—Speaking generally, are there a lot of places of this kind which are suitable for water power along your western districts?—*A.*—Not in combination with reservoirs, and not on a large scale.

Q.—They are all storage schemes?—*A.*—You have got to pay for storage. We have already this large storage, which we use for irrigation, in existence which gives this source of power but is not sufficient, and it is important to irrigation to such an extent that we cannot give through it continuous power, except by supplementing it by a comparatively smaller further storage.

Q.—What part does the channel take in the scheme?—*A.*—It brings water which otherwise would run off on the west coast of India.

Q.—You say that there are not a very large number of these sites?—*A.*—There are sites, but there are not a large number, and so far as I know, there is no other reservoir in this Presidency that gives facilities for the development of large quantities of power. There are no doubt sites where reservoirs can be built.

Q.—But whether you can profitably drop water down as well as store it .....?—*A.*—That is what I mean. I have got a map here.

(*At this stage the witness explained the map in a detailed way.*)

Q.—Are there other sites?—*A.*—I do not know of any other site for a big scheme, but there might be some sites.

Q.—Your idea is that they are not promising?—*A.*—Our idea is that you have got this huge existing work which is really good enough for continuous power.

Q.—Is there anything in the nature of a reconnaisance survey for hydro-electric works in this Presidency?—*A.* That matter is not under me, but under Mr. Murray. A certain amount has been done, but I do not think there is anything that could equal the generation

of power under this scheme. There are sites in the Nilgiris, Ootacamund and round about there, in which power on a considerably large scale can be generated. There is also one on the Cauvery near Salem in which about 10,000 h. p. can be generated day and night, but in that case it would be a direct flow.

Q.—But smaller than 10,000 means dear power and expensive power?—*A.*—I am not an expert on that subject but I take it, it is so.

Q.—And expensive power is not of use to industry? The point of electric power is relative cheapness among other things?—*A.*—Yes.

Q.—You think we shall be justified in saying that, so far as you know, this is the only scheme of first-rate importance providing power on a really large scale?—*A.*—There are several small schemes of which I do not know the details, which I know are being considered.

Q.—This is the only scheme of first-rate size which is likely to be forthcoming?—*A.*—As far as I know, it is.

Q.—They are going to make calcium cyanamide?—*A.*—That is what has been suggested. Cyanamide would be used as manure. They have got to get at any rate 20,000 to 25,000 h. p. It is a chemical manure. It takes nitrogen from the air.

Q. You combine liquid air with lime at a very high temperature—*A.*—Lime is obtainable. It is the company's look-out to find that there is sufficient lime and also their market.

Hon'ble Pandit M. M. Malaviya.—*Q.*—Has it been proposed to the Travancore Government that they might co-operate by contributing to the capital?—*A.*—No. But it would be rather a mixed thing. The chief source of power, the Periyar, is already in our possession. It would be rather difficult to arrange, I think. But I do not know that there is any reason to believe that we would not consent to co-operate if the Travancore Government wished to do so, but we would naturally wish to have consideration for the capital that we have already expended on the Periyar. The Periyar is the great source, and this is only a supplementary source, but it is the supplementary source that enables us to utilise the whole storage that we have in the existing Periyar lake which is in the Travancore territory, and for which we have been for so many years paying Travancore Rs. 40,000 a year in the way of rent.

Q.—They might have a proposal to utilise the water in some different way? —*A.*—They have made a suggestion that it might in the near or far future be used for irrigation, but considering that they have got a rainfall of 120 inches on the coast where the Periyar runs, I do not think that it is likely that they really intend or propose at any time to utilise it for irrigation. They have put forward several reasons why they do not wish to grant us this concession, but our answers to them are fairly conclusive and I think it is just a sentimental reason that actuates their refusal. They think that they are giving away some source which may in the distant future be useful to Travancore, but after all, you cannot expect Rs. 20,000 a year for nothing.

Q.—Who is this Mr. Garrett?—*A.*—He was Chief Engineer for Irrigation in Madras. He was a Madras Engineer all his service and he is now retired and drawing a pension.

Mr. C. E. Low.—*Q.*—Why is it that it has been necessary to be sticky about the existing irrigation in the Periyar?—*A.*—Because we consider that these people have taken up lands in the belief that they will get water in a certain way and in certain quantities.

Q.—That water is actually being taken out by people who have come along relying on the word of Government that they will get water?—*A.*—A great many of them are only going on working their old holdings, but at the same time they have been in the enjoyment of this now for a number of years and we cannot go back.

Q.—How many years?—*A.*—It has been going on for 25 years. The Periyar was opened about 1895.

Mr. A. Chatterton.—*Q.*—In this scheme for the Cardamom Hillsr eservoir, have you taken into account the irrigation aspect of the case?—*A.*—I think I have put in a note showing the irrigation revenue, and we could be safe in saying that we could get one per cent additional return by utilising the water for irrigation, but not taking it for second crop. If people grow sugarcane on a large scale, I have no doubt that we could get more revenue. It is quite a possibility, but it is not certain.

Q.—You can get the same storage capacity by pumping out of the present lake below the level of the watershed cutting?—*A.*—I do not remember what the capacity of the Periyar lake is, and I should think probably you can.

Q.—At the present you are only offering an intermittent supply and you have only one applicant and it is a scheme which may mature or may not mature. These concessionaires have applied for discontinuous supply of power, but from the papers published here, there is no clear evidence that it is going to be carried through. What strikes me for the moment is, would not be possible, or worth the while of the Government, to make the terms easier than they have made for discontinuous power? If you allow them to take power from the Periyar lake, that is to say, to pass irrigation water through a turbine, it would not interfere with the irrigation at all and it would cost Government nothing?—*A.*—It will not cost much. It might cost a small amount.

Q.—Assuming that it will cost a couple of lakhs, which is paid by the concessionaires and the Government spends nothing on it, might it not be worth while to allow them to have

power on very much easier terms,—less than Rs. 15?—*A.* We took the opinion of the Electrical Engineer to the Government of India, and he said that the rate was all right, and he thought the continuous power rate was a little bit high.

Q.—W . t seems to me to be possible in this case is that, if you can get someone to use an intermittent supply of power, you will be able to test the capacity of this system, and possibly later on, experience will show that you will be able to supply a certain amount of continuous power?—*A.*—If you are thinking of the rate for discontinuous power, we are thinking of the rate for continuous power, and that has been a great objection to giving any concession for discontinuous supply, apart from the liabilities for continuous supply. It is only by the aid of the Periyar lake that you can ever make a continuous supply. Continuous supply is 0·056 anna per electrical unit. I do not know what that works out for horse power. It was said to be rather high and suggested that it should be reduced from Rs. 60 to Rs. 40 a million c. ft. which would work at ·038 anna per electrical unit. I have not worked it out in horse power. That is for water only. You have got to put up machinery and all the rest of it. In 1914, just before the War broke out we had a meeting in London. Sir Harold Stuart was in London, and I was in London, and Mr. Garrett and Sir John Benton formed what we might call the other side, and we had a talk over this and over the concession, and we came to an agreement, and the agreement was practically in accordance with the agreement which we have drawn up, with one exception about which we said nothing at that time, *i.e.*, asking the company that would be formed to give us any guarantee in the case of their failure, for our loss in building the Cardamom Hills Reservoir which would be, as it were, left more or less in our hands. But with that exception we agreed to everything inclusive of rates. As regards the rates, Mr. Garrett rather said that our rate was rather too high for continuous power and Sir Harold Stuart and myself said that we were not experts in this and suggested that we might go to the India Office and get advice as to what was fair. They went home and wrote to us that they agreed to the rates from which I take it that they thought that the rates were quite good ones for them. But since the War has broken out, Mr. Garrett has written and asked for a reduction of rates and he says that the price of many things is a great deal more than it was before and so on, and in reply, we have told him that this cuts both ways.

Q.—Supposing we had the Cardamom Hills Reservoir, and the water power scheme failed, you could still use it for irrigation?—*A.*—If you use it solely for irrigation it will pay 1·8 per cent, that is at Rs. 5 per acre.

Q.—If you use it in combination with the Periyar water for irrigation only, and supply the perennial crops at a higher rate?—*A.*—If the perennial crops are prepared to pay higher rates we will try and use it in combination with power. If the Periyar crops would now take water perennially as it were, we could do without the Cardamom Hills altogether by cutting their supply during the irrigation season and giving out during the dry three months, but that is not the agricultural practice and we cannot very well force it on them.

Q.—Could you get them to take to cultivation of sugarcane under the Periyar channels?—*A.*—They might grow sugarcane under the higher up channels, but still we cannot count on that as a certainty, only as a possibility.

Q.—May we assume as correct that no attempt has been made since the Periyar irrigation began, to modify in the least the ryot's practice of irrigation?—*A.*—Not as far as I know.

Q.—Although there is now a much better and more certain supply of water than was formerly the case?—*A.*—Yes. No attempt has been made to modify his agricultural practices.

WITNESS No. 245.

MR. F. A. COX, *Engineer and Manager, Messrs. George Brunton & Co., Cochin.* *Mr. F. A. Cox.*

Extract from ORAL EVIDENCE, dated 2nd February 1917, *Vide* pages 354—356 of Vol. III of the Minutes of Evidence.

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Mr. A. Chatterton.—*Q.*—I do not know whether you would like to answer this, and your answer, if you like, may be recorded as confidential. Can you build engines as cheaply as you can import them?—*A.* Yes, I have got all the figures of these 30 h. p. engines. The total cost comes to Rs. 1,800. The market price would be Rs. 3,000 net.

Q.—Do you think there is a prospect of developing a business of this kind?—*A* —Yes.

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WITNESS No. 261.

MR. G. A. D. STUART, I.C.S., *Director of Agriculture, Madras.* *Mr. G. A. D. Stuart.*

Extract from ORAL EVIDENCE, dated 7th February 1917, *Vide* pages 500 & 508 of Vol. III of the Minutes of Evidence.

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Mr. C. E. Low.—*Q.*—Regarding control over mixed samples of cotton.—Supposing that were not possible, can you suggest any other line of defence?—*A.*—There is even an earlier line of defence in Tinnevelly, that is the power to pull up the mixed crop in the field. As a

matter of fact the Collector with the help of the revenue subordinates has gone round the villages and had this pulichai cotton pulled up from the ground. It was very successful. I believe that some ryots threatened that they would file suits. We have no legal right to do that sort of thing. This pulichai is grown with the other good cotton and can be easily distinguished in the field.

Q.—Do they cut off that plant?—*A.*—Yes. The Deputy Director of Agriculture has also done a large amount of work himself and he has uprooted a good deal with his own hand.

* * * * *

Dr. E. Hopkinson.—*Q.*—Do you remember any occasion when any of the research officers here felt that their research work was not properly received and failed to be published in due course?—*A.*—I can give you one instance, if it is kept confidential. It does not apply to work done in Madras but at Bihar by the Economic Botanist. It was refused publication. I don't know much about the facts as it happened out of my time.

Q.—Was the general feeling that an injury had been done?—*A.*—The general feeling was that it ought to have been published.

Q.—But you would not go so far as to say that the general impression is that justice is not done to the researches of the Provincial Colleges?—*A.*—No, I don't think so.

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WITNESS No. 266.

SIR ALFRED G. BOURNE, K.C.I.E., D.S.C., F.R.S., *Director, Indian Institute of Science, Bangalore.*

ORAL EVIDENCE, 10th February, 1917 *Vide* pages 524 to 528 of Vol. III of the Minutes of Evidence.

Sir A. G. Bourne. *Dr. E. Hopkinson.*—*Q.*—I think I should say, first of all, how very glad we are all to be here and to see the Institute of Science, but our joy is tempered by the fact that Sir Thomas Holland, the President, is not here with us. However, he has had the advantage of being personally here before and in meeting you. We have come here for the purpose of informing ourselves as to the exact position of the Institute, and I don't think the fact of the President's absence need detract from the advantage we may gain from our visit here. I should like to ask you first about the exact present position of the Institute. It seems to me that it is no part of our business, and that no good would result from any enquiry into its past history. Most of us have various documents which show what the past history has been, but for my part I do not see that it really concerns us. I should like first of all to ask you about the financial situation. I suppose this table attached to the last Report* of the Council indicates the financial position completely?—*A.*—In drawing up this report, I endeavoured to give an idea of the financial position, partly on pages 4 and 5, partly in the table at the end. I have also worked out all the accounts from the very beginning. The figures which I have given on page 5 are based upon an exhaustive summary of our previous accounts.

Q.—Let us turn to the sheet at the end, which also gives the budget for the current year. First of all, under "Receipts, Income and Grants", that represents the income received first of all from the Tata benefaction, which we understand, is assured at the figure of Rs. 1,25,000 That is assured for all time to come?—*A.*—I presume it is so. I don't know what the security amounts to. It is house property, but it is understood that the income will not be less than Rs. 1,25,000.

Q.—It cannot be more?—*A.*—I don't know that there is any reason why it should not be more. It depends upon the house rents. The property vested consists of house property, and the Board of Management have been putting aside from these properties certain incomes which are not paid over to us at present. They have paid us over the minimum only.

Q.—The Board of Management may hold funds in addition to this annual payment; do they hold the funds in trust?—*A.*—I find that last year the gross income was Rs. 2,19,000 To that has been charged certain items, municipal taxes, insurance, bad debts, repairs, ground rents, expenses of management, totalling Rs. 66,000, but even that only brings the revenue down to Rs. 1,52,000 and then apparently, in order to bring it down to Rs. 1,25,000 the balance has been put into the Sinking Fund. This is a matter which the Standing Committee raised a year or two ago, and discussed with the Board of Management, and I presume it was settled that the arrangement should continue, but that is why I say there is no reason why the income should not rise, if the property rises in value. The guarantee was that there should not be less than Rs. 1,25,000. Sir Dorabji and his brother have given a further security to make certain that it should not fall below that amount.

Sir D. J. Tata.—I believe it was for ten years from the date of the original vesting of the properties. Certain properties have been laid aside which would guarantee that the

* Not printed.

income should be a net income Rs. 1,25,000. It was felt that after ten years, things should so arrange themselves that there should be no question of the income being less; but that in order to ensure that the income should not fall below Rs. 1,25,000, there is a Sinking Fund system. In case the value of the property diminished, this Sinking Fund would make up the deficiency. On the other hand, the value may increase, and it was contemplated that if it did, it would be for the benefit of the Institute.

Hon'ble Sir R. N. Mookerjee.—From the papers that is not clear. It says that Sir Dorabji Tata and his brother, Sir Ratanji Tata, gave property to the value of Rs. 8,000 per annum, for the purpose of making up out of the same any deficit that may occur in the net annual income of the endowment properties. Naturally as they have given a guarantee, it is proper that they should have a Sinking Fund. I don't think it is safe to calculate on more than Rs. 1,25,000.

Witness.—I merely said that it is not fixed at Rs. 1,25,000. The guarantee is that it will not be less.

Hon'ble Sir Fazulbhoy Currimbhoy. I have seen that Trust, and as some of the properties have leases of 99 years, they are bound to have a Sinking Fund. After 99 years they must have cash to that amount, therefore the Sinking Fund is a large fund.

Dr. E. Hopkinson.—*Q.* Then going on to the grant from the Government of Mysore, in what sense is that assured in the future?—*A.* I presume on the guarantee of the Government. They said it would be an annual permanent grant, so long as the said lands are used for the purposes of the said Institute.

Q. Are the purposes defined in the Vesting Order?—*A.* As the whole document was published at one time, the Vesting Order with these promises, and the regulations which lay down to a certain extent the functions of the Institute, I presume that it is so. I don't think that the Government of Mysore have in so many words said what the purposes were to be, but the Vesting Order included this statement that the Mysore Government will give so much, and includes the regulations which were agreed to by the parties concerned. I presume that we may say that the regulations define the purposes of the Institute. You will find them in the bound copy of the Calendar, on page 21 and onwards. Our information on the subject comes from the Goverment of India. They merely tell us that the Government of Mysore give us an annual grant of Rs. 50,000. We have no direct information from the Government of Mysore, and are accepting the statement of the Government of India.

Q. Then the recurring grant from the Government of India is one-third of the total, that is, it is 50% of the other two items. That is under the Endowment Act?—*A.* They based it on their usual grant-in-aid code, and they said it might increase. This was to be the present contribution. Originally, the Government of India announced that they were willing to regard as a local asset the sum of Rs. 1,25,000 derived from endowment properties, and the grant-in-aid of Rs. 30,000 promised by the Mysore Government, and to make a grant-in-aid of half this sum. Subsequently when Mysore raised their promised aid to Rs. 50,000 the Government of India raised theirs to Rs. 87,500, and they further promised to raise it if the local assets were raised. They laid down very stringent regulations as to what local assets were to mean in future, and they laid down the maximum grant at Rs. 1,50,000. The local assets in future were to be permanent contributions from private individuals or from Native States, provided that a capital sum was set apart to provide the income, *i.e.*, a Native State merely saying that they would contribute Rs. 10,000 a year would not be a local asset until they assigned capital covering that amount. It is true that the contribution from Mysore was treated differently. The Government of India said in the first place 'We will treat the income from the Bombay properties and contribution from Mysore as local assets', but thereafter, "local assets" will have to be limited as I have already stated.

Q. There is no income from fees?—*A.* No fees of any sort whatsoever excepting that we charge rent for the rooms in the hostel. It is a very small amount as the number of students is small; it comes under "Miscellaneous Receipts."

Q. Hitherto at any rate you have made no charge to any Government or industrial undertaking who may have had research work carried on here?—*A.* We have made no charge. We charge expenses in certain cases. The Government of Mysore for whom we did certain things provided the materials, and we have charged for our workshop assistance, our carpenter's time in the shops. The charges merely cover out-of-pocket expenses.

Witness to Mr. Chatterton.—Where we have taken up work outside, say for the Government of Mysore, it has been mutually arranged between the person carrying on the research work and the Government of Mysore, as to how expenses should be met. If it was inconvenient for the Institute of Science to find the money, or the particular individual to carry out the work, and there was no budget provision in the Institute of Science, then the Government of Mysore found the money or the assistance. They never paid any money to the Institute of Science, but found the apparatus or paid for the labour. For instance, in connection with certain things, I have paid regularly weekly or monthly muster rolls, that is to say, a large amount of labour was employed here doing coolies work. Instead of money being paid by the Institute, the muster roll was signed by me and paid by the Government of Mysore.

Q. There is an income in 1915-16 of Rs. 3,27,000 which in the current year is estimated at Rs. 3,29,000, is that income assured for the future?—*A.* You are including the Suspense items. I have separated it out in this way. The Rs. 2,62,000 is, as it were, a permanent income. The interest on fixed deposits will diminish as the capital is used. Of course the 3,700 will remain, but the 18,000 will disappear. These "Miscellaneous Receipts" are made up of the amounts we all pay for our water and electric lighting, or if we purchase anything from the laboratories, or if one laboratory purchases anything from another laboratory. It all comes within "Miscellaneous Receipts."

Q. Coming now to expenditure, I think it is fully explained here; but will you tell us what are the stipends of the several Professors?—*A.* My salary is Rs. 2,500, Dr. Sudborough's is Rs. 1,250, but he is getting an increment during the course of the ensuing year.

Q. Up to a maximum of Rs. 18,000?—*A.* There is an old bye-law, to the effect that pay of Professors shall commence at Rs. 15,000 per annum, and after the end of six years of completed service, will increase by annual increments of Rs. 750 to a maximum of Rs. 18,750 per annum. Under those bye-laws we have got Dr. Hay and Dr. Sudborough. Then we got the Government of India to agree to change that bye-law, and leave the salary to be decided by the Council, with the result that we engaged Dr. Fowler, offering him Rs. 1,500 to 2,000 by annual increments of Rs. 100. Dr. Fowler is going to get next month Rs. 1,600, and we made Dr. Watson, a Professor on Rs. 1,000 for 3 years without any increment, the matter to be reconsidered at the end of three years. Those two cases led to our asking for a change in the bye-laws. We felt we might want to give more in some cases and less in others. Dr. Hay is under an old bye-law. He is of a little longer standing. His actual salary is Rs 1,500 now.

Sir F. H. Stewart.—*Q.* There is a duly executed agreement in each case?—*A.* No, there isn't. Dr. Hay has no agreement, Dr Sudborough has no agreement. We have now started agreements Dr. Fowler and Dr. Watson and I have duly executed agreements.

Q. Who are parties to the agreement?—*A.* The Professors on the one side, of course, and the Director on behalf of the Council on the other side, or in the case of my own agreement the Resident as Chairman of the Council.

Dr. E. Hopkinson.—*Q.* In the case of Dr. Hay and Dr. Sudborough, where there is no agreement, is the appointment for life?—*A.*—The bye-laws in force at that time said that in ordinary circumstances the Director or Professors shall retire from the service of the Institute at the age of 55, subject to the sanction of the Patron of the Council who may extend their service.

Q. There is no provision for retirement on any ground of incompetency?—*A.* Not in the case of these two gentlemen.

Mr. A. Chatterton.—*Q.* They come under the Vesting Order, as well as the bye-laws and the Vesting Order does provide.—*A.* Dr. Hay comes under the Vesting Order, but Dr. Sudborough doesn't. It is bye-law 31, "No Professor shall be dismissed without the sanction of the Patron." "Patron" has been changed to "Governor-General-in-Council."

Q. Does it mean that a professor can be dismissed provided the Governor-General-in-Council sanctions?—*A.* Yes.

Sir F. H. Stewart.—*Q.* It does not say it does.—*A. Mr. A. Chatterton.*—We had legal opinion on that point, and it was decided that he did have that power.

Sir D. J. Tata.—The legal opinion was that the Council could dismiss a Professor.

Dr. E. Hopkinson.—Dr. Fowler and Dr. Watson have agreements with specific terms?—*A.* Yes.

Q. Do you know what the terms are?—*A.* Dr. Fowler's is 5 years and Dr. Watson's is 3.

Q. Is any Professor absolutely at liberty to take up such private work as he thinks proper?—*A.* The question of private work was settled by a resolution in Council. Dr. Fowler was permitted to engage in private consulting work to such an extent as in the opinion of the Council did not interfere with the discharge of his duties and subject to such conditions as would in the opinion of the Council secure to the Institute due compensation for the use of apparatus, etc. The Council resolution merely said that Professors might take up private practice.

Q. Is the Council informed in each case of a Professor taking any private work?—*A.* No. That seems to be in the discretion of the Director. I inform the Council if it is a large business.

Q. But you are informed?—*A.* There is no system by which I am informed.

Q. I am asking these questions somewhat in detail, because they have an important bearing upon any conclusion that the Commission may come to.—*A.* I fully agree that the matter should be threshed out. I am asked what the fact is. There is no difficulty at present. It might arise. Nothing has arisen in the past giving rise to trouble. But when we were discussing this matter with Sir Thomas Holland, it was one of the subjects that

I put down for definite discussion—private practice—but it was not discussed to any great extent. The Government of India have agreed to the bye-law which I have pointed out the bye-law which states.....

Q. I should have thought that the bye-law 38 shows that the Council or the Director acting for the Council ought to be informed?—*A.* I think so, and as far as I know, I have been informed, and I informed the Council of the big cases. I have not informed the Council of a gentleman getting Rs. 30 for analysing clay or things of that sort. I use my discretion, I have informed the Council of Dr. Fowler's engagement with the Government of India and the proposal to employ Professors Watson and Sudborough as Consulting Chemists to the Sandalwood Oil Factory.

Q. Take Dr. Fowler's work in connection with acetone. He told us that practically the whole of his time was devoted to it, and I believe that he gets a substantial remuneration from the Government of India.

Sir F. H. Stewart.—*Q.* Is that in addition to his salary?—*A.* Yes.

Dr. E. Hopkinson.—*Q.* In that particular case we know it is war time and it is war business. Dr. Fowler is neither directly nor indirectly at the moment doing much for the Indian Institute of Science, but he is drawing the full remuneration from the Indian Institute?—*A.* I would not like to say that. Things have got very acute in the last week or in the last few weeks and Dr. Fowler had to go off to Delhi. I think he has done full work for the Institute.

Q. How many students has he?—*A.* He has got all these Hyderabad men, that is, six from Hyderabad. He has got a dyeing man, a soap man and he has got two men who came as students to the Institute and he himself put them on the acetone business as part of the students' work. It is part of the Institute's work in a way.

Sir D. J. Tata.—*Q.* What are the Hyderabad men on?—*A.* I only go round to the laboratories and learn these things from what the staff tell me. They are chiefly on the utilisation of the spirit which Hyderabad is turning out.

Q. Has Dr. Fowler received any consulting fee?—*A.* I think he has had one fee.

Dr. E. Hopkinson.—*Q.* I think he also still retains connection with a certain amount of work going on at home?—*A.* I do not know anything about this one way or the other.

Sir D. J. Tata.—*Q.* Practically all this is outside work. There is hardly any work that he is doing, that is for the Institute.

Dr. E. Hopkinson.—*Q.* It is really very important for us to have clear ideas upon this matter.

Mr. A. Chatterton.—*Q.* In his original application he distinctly stated that he would not accept the appointment here, unless he was allowed to retain his interest in certain matters in which he was already interested at home?—*A.* He is doing nothing that is not known to the Council.

Dr. E. Hopkinson.—*Q.* I am not suggesting that. I do suggest that the Institute, in a sense, has Dr. Fowler in order that he may do research for other people for which he is paid independently?—*A.* May I suggest that, so long as there are students associated with him in his researches, whether he is paid separately for them or not, he is doing service for the country. He is helping these men in technical work and they actually got posts as a result.

Sir F. H. Stewart.—The Hyderabad men are all under promise of engagement by the State after they have been trained.

Sir D. J. Tata.—*Q.* Is he not doing something in lac also?—*A.* Yes.

Dr. E. Hopkinson.—*Q.* I do not know in my experience of any similar case at home. I have known of cases where a professor was quite free to take up any private work that was proper and had the use of the laboratory of the institution, but he received no stipend as professor. I know two or three instances of that sort, but I have never heard of anything of this nature?—*A.* I was on the committee that selected Dr. Fowler, and we came to the conclusion that we could not get a man to come out here unless we gave him a retaining fee as professor and allowed him private practice. We could not get a suitable man on any other terms. They were failures, one after another. That was my experience there.

Mr. C. E. Low.—Some of these professors were here before private practice came? What did they do?—*A.* I could not say. These are the original bye-laws. "Every Professor will be permitted to engage in private consulting practice to such an extent as in the opinion of the Council will not interfere with the discharge of his duties." They were the original bye-laws. They were drawn up while I was on the Council, shortly after I first joined the Council.

Mr. A. Chatterton.—*Q.* They were drawn up in 1911, after the first Council was formed?—*A.* It was done by Dr. Travers.

Q. And these bye-laws were drawn up after Dr. Hay and Dr. Rudolf had been appointed, and they were embodied in the terms of their agreements?—*A.* They have no agreements.

Q. The terms under which they were employed were merely embodied in a letter?—*A.* I have never seen the letter.

Q. Dr. Travers was engaged in organising the Institute and Dr. Hay was engaged, first of all in organising the laboratory and taking students. What is the meaning of organising the department?—*A.* They discussed the plans of the buildings and got out apparatus and fitted it up. When they were appointed, there were no laboratories.

Mr. A. Chatterton.—*Q.* The first building that was equipped was the general Chemical Department under Dr. Travers and Dr. Watson was his assistant, and Dr. Watson and Dr. Travers were entirely engaged on scientific work with students, research work elementary or otherwise, as the case might be, dependent on the character of the students they had to deal with. Then Dr. Sudborough came out a little later, and organic chemistry was handed over to him and he also had students who were engaged in doing research work in organic chemistry. In the meantime, in a separate building altogether, Dr. Rudolf was working at applied chemistry and Dr. Rudolf spent about four years in building that laboratory such as we saw to-day. Then a certain number of students joined and Dr. Rudolf also received offers for a certain amount of private consulting work, but as a matter of fact, he could not do his work and the whole of the applied chemistry department was in a mess and there was no real satisfactory work done there—no attempts at it. Then, first of all, Dr. Rudolf went on leave and finally left the place and Dr. Sudborough and Dr. Watson took charge of the applied chemistry department. Till the first Director retired and Professor Rudolf left the applied chemistry department, there was practically no applied chemistry research going on, but immediately they left the place, attempts were made to entertain certain practical problems for solution and some of them were taken up and worked out and some of them are being still worked out in the laboratories. In the beginning, of course, all the work was done by Dr. Sudborough and Dr. Watson, but later on Dr. Fowler joined the institute and he took over all the applied chemistry laboratories, and for a month or two after Dr. Fowler came out, all the three people were working at the same laboratory, but as fast as they could, they eliminated certain things and gradually transferred the works so that each Professor was working independently in his own laboratory. Dr. Fowler was left with certain things in his laboratory and certain other things went on to the general chemistry and organic chemistry laboratories of the other two Professors.—*A.* As far as I know the facts, I agree with you. We were both on the Council at the time and we used to ask questions and try to learn what was going on, but we were told that the results of research could not be divulged before they were complete, or something of that sort, and, of course, this was the state of affairs that led to our trying to upset the then position.

Mr. C. E. Low.—*Q.* I understand that the Institute received a request from the United Provinces to take up a list of twenty different subjects from the Industrial Department in the United Provinces. Have many requests been received from the Industrial Departments of the different Provinces, or from official agencies, such as for instance, the Forest Research Institute at Dehra Dun?—*A.* No. We have not had many. The one that you refer to came very properly to me as Director, and I had a meeting of all the chemists and we sent an *interim* reply, and we had further communications with the Director of Industries in the United Provinces, and at the moment we are expecting their assistant down to discuss with the chemists here what should be done in those problems. They have promised to send him down. We are waiting for him.

Q. Have requests been received from the Forest Research Institute at Dehra Dun?—*A.* Not to my knowledge. If anything had come from them, it must have come direct to the chemists.

Dr. E. Hopkinson.—*Q.* Is it possible that they might come direct?—*A.* It is possible for anybody to write a letter to anybody else.

Q. If it did come to him, would it not be his first duty as Professor to put it before you?—*A.* Well, the Director's position has never been defined. There is *nothing* on record that it is his duty, if the chemist at Dehra Dun writes for instance to Dr. Sudborough. I do not know whether it is a fact that he has written or he has not written.

Q. Any requests from Pusa?—*A.* Nothing has come through me, nor do I know of anything coming otherwise.

Q. To what extent would requests from official sources like Pusa, or Dehra Dun, or the provincial Directors of Industries be allowed to take precedence over private work with reference to the volume of work that can be got through?—*A.* I think there is a general feeling that they would have absolute precedence. I think there is no doubt about it.

Q. But the position has hardly arisen?—*A.* No. So far as it has arisen, they have had precedence. I have never noticed anything in the least indicating the reverse.

Q. You do not think that a pressure of that sort would cause any difficulty?—*A.* It seems to me to be a question of an honourable man and a man who is not honourable. I have not the slightest suspicion that we could have any difficulty with our present staff.

Q. They do not object to the Institute making a charge against the Local Government or the Department of Government for any work done?—*A.* We do not make any charge for the work.

Q. But I think you said that some expenses might be charged?—*A.* Yes. We have done a good deal of work for Mysore and I personally regard that as an obligation on account of their contribution. Hyderabad is coming forward with problems—I am speaking confidentially now—and if this Commission had not been coming up here, I should have gone to Delhi and raised the question with the Government of India as to how I might apply to the Hyderabad Government for contribution. I got their Revenue man here and he stayed with me and saw the place and so on, and I think we are going to get a contribution—I hope so.

Mr. C. E. Low.—*Q.* Do you get enquiries from small swadeshi enterprises for information?—*A.* Yes. We have from time to time. We got one yesterday about clays for tiles. I hand that over to the Professor who, I think, is best qualified to deal with it.

Q. Is it treated as private work or public work?—*A.* It is treated as private practice. It has been on a very small scale, and I am watching and trying to formulate a policy in that matter.

Q. Supposing that a great deal of private practice comes along and many public demands, would you ask the Government for a larger grant to employ a larger staff—I am not asking you as Director of the Institute?—*A.* I cannot help feeling that this country must have chemists in large numbers, and if we get these chemists—and good chemists—we shall have to accept the situation that what they get from public funds is a retaining fee like the Advocate-General, for instance, and for the rest they may take any amount of private practice. I admit the difficulty of settling how much time they should devote to one or the other, but I think you will have to face the difficulty and leave it to the honour of the man to do the work. Is there any difficulty with an Advocate-General, who gets a small fee of about Rs. 2,000 a month paid by Government, and makes Rs. 20,000 a month.

Q. But here there have been one or two cases, but very few cases, where a man took up work which clashed with Government work?—*A.* I do not think that you will get a man to come to this country if you do not admit that principle.

Dr. E. Hopkinson.—*Q.* I can mention at least three chemists of first-rate standing in India at the present time in connection with the Agricultural Department who are doing as good work as any that has been done. They are debarred entirely from any sort of private practice and are in receipt of a salary from the Government of India?—*A.* The only chemist I know in the Agricultural Department is quite dissatisfied with the position.

Mr. C. E. Low.—*Q.* Is there much scope for a man like the agricultural chemist for private practice?—*A.* There is increasing scope.

Q. Nothing like the industrial chemist?—*A.* I dare say not.

Mr. A. Chatterton.—*Q.* I know their general feeling and the majority of these men are utterly dissatisfied with the terms on which they are employed by Government. There is scarcely a man in the Agricultural Department who is satisfied. They have been trying to supplement their pay to make it sufficient by getting the sanction of Government to do private work.—*A.* It is more than pay. I think it is a question of feeling that you are tied up, and you did not know that you would be tied up like that. The only case I know much about was when I was on one of these Commissions for the University and I had to do the whole of my ordinary work, I had to work day and night. The University was willing to pay me the usual fee, but the Government of India said that I was not to receive it. It was not public money, it was University money and I had done the work of both. I naturally felt indignant at the way I was treated.

Dr. E. Hopkinson.—*Q.* We should like to know, as a Commission, what your opinion is on a proposition of this sort. Suppose there was an organisation under Government of the chemists of India, where your chemist in connection with the Agricultural Department and possibly in connection with the Institute of Science or any other scientific department, formed the members of a branch of the Government service. As such, they would receive salaries only—and the salaries ought to be adequate. They would look for advance to higher posts in the service. Any one of them can expect in time to be the Director-General of Chemical Service of the Government of India or something of that sort. Do you say that it would be impossible to get good men to enter such a service?—*A.* I think it will be increasingly difficult.

Q. You are not hopeful about the possibility of the establishment of such a service?—*A.* If I wanted to get the best men, I would do what I have suggested—trusting to their honour and giving them a retaining fee as Government servants and giving them a free hand to do what they liked.

Hon'ble Sir R. N. Mookerjee.—*Q.* In the case of the retaining fee to the Advocate-General, he cannot take up any case in which the Government is interested?—*A.* No.

Q. But in the case of research, how is one to know whether the Government work clashes with the private work?—*A.* I think it is a question of honour.

Mr. A. Chatterton.—*Q.* The main object of an institution of this character is to develop private enterprise in industrial work. That is one of the functions, the development of industries by the application of science. If that is so, and if we employ a certain number of men as consulting chemists, if they do more private work, would it not be achieving the final result? The main object of this institution is not to do Government work, but to develop private enterprise?—*A.* I think private enterprise is most important for developing industries.

Dr. E. Hopkinson.—*Q.* We are discussing the general question of the establishment of a Government scientific service.—*A.* A scientist, after he had been in this country a little time wants to be put on the same footing as the medical man.

Q. Would you allow anybody in the Finance Department of the Government of India to give advice on a financial matter?—*A.* Such a case possibly involves some other question. My only object is to secure the best man of science.

Mr. C. E. Low.—*Q.* When a man is called in to do private consulting work, naturally the information which passes between him and the firm is confidential. Supposing he is consulted by some Government authority on the same question, what is his position with regard to that confidential information of which he is in possession as a private consultant?—*A.* I admit the difficulty and I am not prepared right away to offer a solution. I take the further case of a man who discovers something while he is here, which may bring him a fortune. That remains in his brain, and nobody can force it out. If he withholds it, it might influence the whole future of the country. Nobody could prevent him, no amount of pay or anything. So the Government is not worse off in that case, nor is the country, than in the other case.

Dr. E. Hopkinson.—*Q.* There are two courses open to such a man in possession. One is to put the whole thing before the governing authority and get its consent, and the other is to retire?—*A.* Yes. The Government is no worse off.

Witness to Mr. C. E. Low.—Your case might come up almost immediately, not as between individuals but between two Governments. The Government of Mysore have carried out research here which has resulted in the sandalwood oil factory. The Government of Madras may suddenly settle to run their own sandalwood oil factory. They apply to us for information. I am not prepared to say what we are going to do, but there is the difficulty and I am only pointing out the difficult position.

Sir F. H. Stewart.—*Q.* You say that you will get the best scientific men available and allow them to do private practice trusting to their honour.—*A.* It seems to me we are trying it to some extent and it seems to me that it is working. I held an opposite opinion some time ago. I have come round to this after seeing what is going on here.

Mr. C. E. Low.—*Q.* Also you would say that an institute like this helps the private business man to know whom to consult, whereas if he engaged his own man he has nobody to tell him whether the man is good or not?—*A.* That is true, and the industry or whatever it is, is helped in that way.

Dr. E. Hopkinson.—*Q.* In your printed note you make mention of the National Physical Laboratory, and you suggest that the Indian Institute might do some work of the sort done at the National Physical Laboratory?—*A.* Not I think in the note, I spoke about the National Physical Laboratory the other day in my address to the Science Congress.

Q. That organisation is based on entirely different principles from anything here. There nothing would be more foreign than the idea that any assistant in the National Physical Laboratory should receive any remuneration excepting the salary?—*A.* Wherever this suggestion was made—I am not quite sure myself—it must have referred to the possible future. I am referring to the chemical side of the thing. I know Dr. Hay has been asked to go to the Hydro-Electric Works on one or two occasions.

Q. Would Dr. Hay charge a fee to the electrical company in such a case?—*A.* I cannot answer on hypothetical points. If I were Dr. Hay, I think I should charge a fee, whether it went to my pocket or somebody else's pocket, because I think people ought to pay for such information. Otherwise, you are interfering with other people's private work.

Sir F. H. Stewart.—*Q.* Now you are getting on to another point. These fees should be collected officially through the Director of the Institute?—*A.* I very much doubt it. A really first-class man may be tempted to come here as a chemist, because he knows his own powers and his own chances of getting ahead. He does not want to be put in with the rest of them and take just his ordinary share. He thinks he is going to make a name for himself. It seems to me that is the feeling throughout the chemical world. I did not know anything about chemists until I started to select men for this place.

Sir D. J. Tata.—*Q.* May I suggest that this question about the employment of experts in this way may perhaps be met thus. If a man was employed by Government on a retaining fee, and his services were lent to some industry, and that industry profited by it, that industry might be called upon to contribute a portion of the profits to the funds of this Institute.

Hon'ble Sir R. N. Mookerjee.—Then they will bring their men out from home.

Sir D. J. Tata.—Let them. They do not want to go to the expense of bringing a man out; and they want to take advantage of the man being in this country, and brought out at somebody else's expense. If they are to retain the entire benefit, they must bring their own man out, if they don't, and employ men brought out at somebody else's expense, that somebody else should share in the profits.

Witness.—The man in England will say 'No, because if anyone wants information on special lines they will send for me, whereas if I come out here, I will be getting a fixed salary, it is true, but for anything beyond my ordinary duties I may have to give my brains for nothing' Dr. Fowler came out to this country on the condition that he should be at liberty to charge fees for extra work. He was not going to come out here on a fixed salary without such prospects.

Dr. E. Hopkinson.—*Q.* Is there any objection to eliciting their views on this particular point as a matter of principle?—*A.* Surely not. I am most anxious to have this thing settled. There is not a trace or suspicion of scandal, but it is as a matter of principle, a most important thing to settle one way or the other, as to exactly how this private practice should be dealt with, and all the details connected with it. I regard it as a most important matter to settle. The whole question is one of organisation.

Mr. C. E. Low.—*Q.* It has much to do with organisation. Supposing two men are called in, and one says that is a branch of science of which I require my colleague's help. That I suppose is easily settled by letting them divide the fees among themselves?—*A.* Yes.

Dr. E. Hopkinson.—*Q.* I confess I don't see the difference between Government service and private service. If a chemist in my laboratory made some important improvement or discovery, he would be properly remunerated for it, but I should not dream of a chemist who was working for me working also for a competitor across the way. I don't see exactly where the line of distinction comes between private and Government service.—*A.* Government has no competitor on the one hand, and there is no indication whatever that they will ever reward anybody for anything on the other.

Q. Is the payment to Dr. Travers a life payment?—*A.* Under his agreement he was to draw a pension of £500 a year, and the pension became due on the 1st December. Up to then he was paid half salary, having been given leave on half pay. He was given leave on half pay and was then to draw the pension under his agreement.

Q. Did Dr. Rudolf get anything?—*A.* He got a lump sum of £5,000.

Mr. A. Chatterton.—*Q.* Assuming that the object of the institution is to develop industries, *i.e.*, the application of science to industries, from your experience can you tell us whether you think that an application by the public to a scientific service, such as the Geological Survey, is likely to result in the work being done quickly and well, or whether it would be better for the individual who wants help from Government, in some form, to come to an institution like this and obtain assistance as he does at present. To a certain extent the preliminary work is free, and later on if it results in commercial work, fees are paid for the work that is done. Supposing a chemistry problem were to arise, is it more likely to be solved by a Professor of Chemistry of a Government institution, who is not allowed to take fees, or by a Professor of Chemistry here who is allowed to take fees?—*A.* I think everything I have said up to now indicates that I have taken the latter view. The problem is very complicated. I must ask who you are supposing is the consultant; what class of person is to be the consultant?

Q. Our object is to develop the resources of the country. We may assume that Government is going to develop them in the one case by establishing Government factories. In that case Government would command the services of such experts as it employs, or Government may say, "We are not going to establish Government factories at all, but will assist private enterprise." The question is what practical way would be the best for assisting enterprises?

Mr. C. E. Low.—I suggest that this is rather a wide question. We may ask Sir Alfred Bourne if he will be good enough to put his views down in the form of a note.

Sir F. H. Stewart.—I don't think he could give his views more clearly than he has done.

Witness.—I would rather not undertake to do so. I have drafted a memorandum here for the Council, which they have accepted with some modifications.

Mr. A. Chatterton.—*Q.* Do you regard a professor working in the laboratory here in the Indian Institute of Science as being in the same position as a chemist working in a laboratory for a large steel works, or a dye factory? Would you say that the Professor of Chemistry here is in the same position as a chemist in a German dye works, as regards his relations to his employers?—*A.* I don't know anything of the relations of a chemist in a German dye works. Take the case of the Kodak Co., a private firm. He enters into a contract with the firm, whatever the terms of the contract may be, but it is probable that he has sold himself body and soul to his people. Here no man does that, but is left a very free hand.

Mr. C. E. Low.—*Q.* It depends upon the terms of his appointment with his employer.—*A.* Government cannot engage a man like a firm can. If they were to do that, I don't think they would get the best man.

Mr. A. Chatterton.—*Q.* Apart from the best available man, supposing a man here is doing research work. He is committed to business operations with large private interests. Is it not likely that he will attract into his laboratories a better class of students than he would do if he had not such private connections?—*A.* I think so certainly. They see at once the chance of earning a livelihood. These men have come here with an assured future.

Sir F. H. Stewart.—*Q.* The fact that a chemist in an institution like this gets a large amount of private practice and public recognition of his abilities should be evidence of the

fact that he is doing his work here in developing the industries of the country?—*A.* Certainly, that is the evidence that you look to.

Dr. E. Hopkinson.—Dr. Fowler has been Consultant Chemist at home in large practice. He has held various public appointments. India wants to get him away from home and in order to induce him to come out, they provide him with a stipend and a laboratory, and consider the recompense they get is the fact that he will have a number of Indian students working in his laboratory brought in one way or another up to research work, and the advantage of the work of a man like Dr. Fowler is reaped in India.—*A.* They offered him a salary, but he said, "I won't take it unless you give me a free hand."

Sir D. J. Tata.—With reference to this particular question, it seems to me it all depends on whether you consider this a private or a public or Government institution.

Mr. C. E. Low.—We have all been assuming that it is a public institution.

Sir D. J. Tata.—Government have little to do with it. They said they refused to try to control the thing in any way, and they leave it to the Council to manage their own affairs.

Mr. A. Chatterton.—It is a public institution, not Government.

Mr. C. E. Low.—I take it our questions are directed towards similar future institutions like this one.

Sir D. J. Tata.—Those would be Government institutions.

Hon'ble Sir R. N. Mookerjee.—*Q.* After your experience for so many years, both as a Member of the Council and as a Director, and having regard to the vicissitudes and misfortunes of the Institute, owing to defective management, and also having regard to the fact that Bangalore is away from intelligent public opinion, can you tell us whether Bangalore is the proper centre for this Institute to fulfil its object, *viz.*, to develop Indian industries?—*A.* You mean geographically?

Q. If you don't like to answer the question, I will leave it in this condition.—*A.* I think that it is at any rate as good as any other centre. When you start to put an institution of this sort as a single unit somewhere, you have got to select some place. If you had selected Bombay, Calcutta public opinion would have been more opposed to having it in Bombay than here. I say it has a certain definite advantage as being a good centre. We are at any rate fairly free from wire-pulling here. You suggest that we are away from criticism; we are also free from criticism carried a little further, *viz.*, wire pulling. Anyone can come and see the place; there is no secrecy about it. I don't see what public opinion could do, how it would act on a place situated in a more populous centre.

Q. If there is public opinion, and this was in Bombay or Calcutta, I don't think Mr. Travers would have gone so far as he did.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Don't you think that in a country like India with important presidencies like Bombay and Bengal, that there ought to be separate institutions for each province?—*A.* The Council have dealt to some extent with that particular question in this memorandum.

Dr. E. Hopkinson.—*Q.* You don't admit that Bangalore is a long way from everywhere, except Madras?—*A.* It is nearer to Bombay and to Calcutta than either is to the other. Taking the general view, I cannot myself see any disadvantage arising from the institution being here. Sir Fazulbhoy's question was whether there should be more than one. That is a different matter. It is a mere matter of opinion, but I should think that for the scientific questions that want to be taken up, it is better to have one, that is to say, to mass all your men together where they can consult with one another and dovetail their work with one another's. It is better to have that than a number of separate institutions.

Hon'ble Sir Fazulbhoy Currimbhoy—*Q.* Take for example this institution; you have so much work from Mysore that you cannot do work from Bombay or Bengal?—*A.* At present we have only three or four chemists, but if we had, say, twenty chemists, we could undertake work from anywhere.

Mr. A. Chatterton.—*Q.* In the selection of a site for a place like this, does your experience of Bangalore lead you to think that the climate is of great importance in respect to the amount of work done in the place?—*A.* Yes, I think it is. It depends upon individual idiosyncrasies. There are salamanders who don't seem to mind what they stand. Nine people out of ten will work better in this climate than in any other that I have known in India. That applies to Indians to a much greater extent than to Europeans. My experience of Madras was that the moment it got hot the Indians were all knocked up.

Sir D. J. Tata.—In this connection I may say that this question of location took a lot of thinking out. The question was considered in all its aspects. Several suggestions were made, and one of the questions that Sir William Ramsay had to take up was that of location. There was the question of Bombay, the money having been found in Bombay for the institution. But we were told that the climatic conditions in Bombay were not suitable for research work. Later on several other sites round Bombay were suggested, but were all considered unsuitable. And later on still when Professor Masson was asked to make a report, they decided upon Roorkee, but the advantages offered by Bangalore, in the matter of financing, the grant of the site, and the 5 lakhs that would come from the Mysore Government, and which would otherwise not be forthcoming from anywhere else, decided

those concerned finally to fix upon Bangalore, a great deal of emphasis being put at the same time upon the climatic conditions there. The suggestion was, however, made everywhere that Bangalore was too far removed from the light of public opinion, and that the site should be more central, as public opinion would prevent abuses. There was even a talk of taking the institute to Bengal.

Q. You said that it is open to anybody to come here and see the place. How long has it been open to anybody?—*A.* I cannot say beyond my time. I personally have taken measures to invite people here.

Q. I want to know if you know the incident about Dr. Mackinnon who was a Visitor, and who asked Dr. Travers if he could come and see the place. Dr. Travers said, "No, you are only a Visitor here and cannot see the place."—*A.* That is past history. I regard it my chief duty to get people to come here and see the place.

Dr. E. Hopkinson.—*Q.* Is it possible for you to give us a list* of students past and present, showing where they came from, what their prior education had been and what they have done after leaving?—*A.* Yes, I will do so. As regards what they have done after they left the institution, the individual professors will tell you better. I will get the information from the professors as to what has become of them afterwards.

Q. This memorandum † which you have presented on behalf of the Council contains a definite suggestion of policy for the future of the Institute?—*A.* It was arrived at, of course, after a meeting of the Council with Sir Thomas Holland and Sir D. J. Tata, and we spent a whole day in discussing matters and this was drawn up. I drew it up under the impression that I was merely, as nearly as possible, formulating the views put forward at that long meeting, and then it was submitted to the Council afterwards and accepted by them with verbal alterations. If I may say so, the first suggestion of the possibility of this course came from Sir Thomas Holland. It is his own suggestion, not that we should not have thought of it, but he definitely offered this as a suggestion.

Q. It means the devotion of the Institute entirely to chemistry?—*A.* That is so.

Q. And the Electrical Technology Department would some time in the future cease to exist?—*A.* Or form the nucleus of another thing altogether. We might remove it geographically, or it might remain on this land, but would be a separate organisation. That was the idea.

Q. Does it mean absolute divorce of the Institute from teaching except in so far as teaching comes in research?—*A.* My opinion is that we should not teach here anything that is being taught in any university institution in India. I feel very strongly against the original scheme of taking graduates and inducing graduates to come here not charging any fee—I feel very strongly against taking them away from their own professors who are willing to keep them. One great incentive to the professors in most colleges in this country or the best of them at any rate, is that when they get a good man and he graduates, they could keep him for some years working with them. I object very strongly to the establishment of a central institution trying to draw these men away to give them further instruction. I am thinking now of the chemical side. Of course, on the electrical side, we are going in for a course of instruction super-imposed upon graduation.

Q. You have just said that it would be separate and would not form part of this scheme?—*A.* My idea would be, not to have anybody come here to learn the ordinary course of chemistry. I would divide this up into a number of departments according to the subject, and not as it is now, general chemistry, organic chemistry and so on—to take up each big group of industries where chemistry bears upon them and have a department for it such as a soap department, dye department, etc.

Sir F. H. Stewart.—*Q.* Your test of the suitability of the student would be his ability to help on the research work of the institution?—*A.* What I mean is that we should not be expected to teach the men what they could learn in any college in India.

Sir D. J. Tata.—*Q.* It was never intended that chemistry should be taught here?—*A.* No.

Q. The reason why there was some teaching was that the first professors who came said that the students who came to them had not been properly taught, and there was no means of teaching them such things as would enable them to carry on higher research work here, and consequently some elementary work had to be taught to them in the first instance.—*A.* Since then, we have been content with the few who really are chemists.

Q. We do not want quantity but quality?—*A.* *Yes.* That is my idea.

Dr. E. Hopkinson.—*Q.* At the origination of the scheme there was some suggestion that there should be a department of medical science and a department of physical science. That has disappeared now in the course of evolution?—*A.* Nobody puts it forward. I am against it. The Government is giving large sums of money to the science colleges throughout the country, enabling students to go to the M. A. degree or the D. Sc. degree. It was proposed to add medical research to this originally, and subsequently the idea was abandoned.

Mr. A. Chatterton.—*Q.* Apart from that, did not the Council investigate the possibilities of doing medical research in Bangalore and were they not strongly advised by local

* *Vide* pages 526 to 528 of Vol. III of the Minutes of Evidence.
† *Vide* pages 524 and 525 of Vol. III of the Minutes of Evidence

people that this place was a bad centre for developing that class of work?—*A.* There is no big hospital here.

Dr. E. Hopkinson—*Q.* We have heard it suggested that a possible development of this institution in the future might be that the Mysore Government would take over the Institute, and release the original benefactions of the Tata family and would utilise it for the University of the Mysore State.—*A.* I do not know what ground there is for that.

Q. What I want to ask you is, is there any specific ground?—*A.* I should think none whatever. When I came out here and began to wonder what the future of this place might be, this was one of the ideas that occurred to me and I mentioned it to Mr. Chatterton among other people, but I do not think the Mysore Government have ever entertained it, at any rate not to my knowledge.

Mr. A. Chatterton.—*Q.* It is only a bazaar rumour.

Mr. C. E. Low.—*Q.* What about this idea of surrounding the Institute with industries and industrial concerns? I do not know whether they were supposed to be Government ones or private ones. Has that been revived in any form?—*A.* I suppose you may say that the putting up of a sandalwood oil factory at our door is an example. They may put up a soap factory and that may be another example. I know nothing more than that. You only ask me whether it is a fact or not?

Q. Was there any idea of reviving it?—*A.* Not that I know of. Mr. Chatterton can tell you more about that.

Mr. A. Chatterton.—A year ago, it was part of the policy of the Department of Industries to avail itself as far as possible of the resources of the Institute and to establish their experimental factories round the outskirts of the Institute and some four or five were sanctioned, no doubt, outside the Institute, but to be as near to the Institute as possible so that the staff of the Institute might be utilised either by an agreement with them or in any other way that could be arranged to help them in semi-chemical or entirely chemical problems. This policy has been given up. The original idea with regard to the acetone factory was that it should be located close to the Institute of Science, and it had to be given up because there was not a sufficiently large water supply, and it was then proposed to take up another site.

Dr. E. Hopkinson.—*Q.* In the development scheme in this note, it is suggested that the future Director should be of such high qualifications that he might be expected to command the respect of the entire staff and be in a position to arrange for the necessary co-operation. Is it in your mind and in the mind of the Council that the future Director should be an expert in chemistry?—*A.* It is a question that I have found very difficult to answer even to myself. I do not think it would be desirable to have a man who has not been a scientist at all. On the other hand, you must not lay down that the man must be an expert chemist because I do not think that any expert chemist ought to profess to be an expert above the experts of the branches, and by the time a man reaches the position of a Director of this Institute, he probably would feel the young expert to be the authority rather than himself. I would wish if possible that he should be a chemist, that is acquainted with chemistry, but I do not know that it is necessary that he should be or have been an expert chemist. I would not have an absolute outsider who has no sympathy with science and no knowledge of science laboratories, but I would select a man who had been through the mill to some extent at any rate.

Q. Let us be a little more personal to make it clear. You are a distinguished zoologist. Do you, as a zoologist, find any difficulty in running a team of chemists?—*A.* I have done some work in zoology and I know something of chemistry. Chemistry was an old love of mine. I like chemists. I do not profess for one moment to know anything about the details or technicalities of chemistry, but I am interested in all their work so far as I can understand it, and it is better to have so much connection with the subject than to have no connection whatever and have a purely business man. On the other hand, you would not get a man who is sufficient of an expert in all the details of chemistry to run a team of chemists. A man could run it if he had leanings towards chemistry without being an expert in the subject.

Q. Let us put it in another form. Supposing there was a scientific department of the Government of India, which might embrace not only chemistry, but mycology, entomology, botany, what qualifications should the Director-General of such a service have? I rather take it that he must be a scientific man from this note. Your opinion is that he must be a scientific man with scientific sympathies and you would insist on his having such a qualification, whether he is a botanist or a zoologist?—*A.* I would not attempt to lay down the qualifications. I would look round and see who is the best man. It is a rare appointment which comes now and then. I should have no qualifications laid down. I would choose the man from among those available and I do not think I can go further than that. It is not possible to put down on paper the essential qualifications. I mean that you must not be bound by any pre-conceived notions of qualifications on an occasion like that.

Q. You would not go so far as to say that he ought to be a scientific man?—*A.* I have said that I should certainly choose a man with scientific leanings if possible. I would not, for instance, choose a man who had never gone outside classics or history.

Q. Would you choose a civilian?—*A.* I would not reject him because he is a civilian, but he would come under my general heading.

Q. You would not choose a business man so much at the present moment?—*A.* I cannot get beyond the feeling that if I had to make the appointment, I should find out who are the men available and try to make up my mind as to who is the best. I should certainly give preference to a man who had had scientific training of some kind or other, as opposed to the classic, historian, visionary or poet.

Q. Was not there some proposal that Dr. Fowler should, sooner or later, become the Director of the Institute?—*A.* That was, I think, the idea of the Council when they asked us to select a man.

Mr. A. Chatterton.—*Q.* When the appointment was finally made, that was absolutely definitely dropped?—*A.* The general idea was that for the present, the direction should be in the hands of an applied chemist.

Sir D. J. Tata.—*Q.* If this Institute were made the centre of a Chemical Institute, would it be advisable to extend it to all industrial chemistry. Or would you separate agricultural chemistry and make the Institute a centre for industrial chemistry only? Or would you rather continue in it both agricultural and industrial chemistry?—*A.* I am not quite sure what industrial or agricultural chemistry is. But speaking generally and as a non-chemist, I think there must be problems connected with agriculture which would want chemists working in conjunction with the other men dealing with agricultural problems, but there would also be problems connected with agriculture which ought to be dealt with by men working with other chemists. You want both. My idea of this Institute was that some chemists would go out and become agricultural chemists for the time being at any rate, and then come back here into the chemical home as it were. This would be a centre and we would lend the man out, in this case a man who had leanings towards dealing with agricultural problems. I think there are two kinds of problems, the specific agricultural problem and the problem which bears on agriculture but wants the co-operation of a number of chemists and so with other branches, but particularly with forest chemistry and agricultural chemistry. I am not really qualified to answer such a question.

Q. I simply asked this question because it has been suggested to us that perhaps if there was a central institute for chemistry, it would be advantageous to have a separate institute for agricultural chemistry.—*A.* I was under the impression that you want an agricultural institution and a forest institution with chemists on the staff lent from here who would, in ordinary everyday work, be working in co-operation with the botanist and the mycologist and so on, on the spot, but when the problem was a more serious chemical problem, it would have to be worked in co-operation with other chemists.

Sir F. H. Stewart—*Q.* Has this Institute any vacation?—*A.* Under the bye-law there is an annual vacation, but the two years I have been here there has been no question of closing down entirely. Some students go away and some remain. Last year some of the professors—Drs. Fowler and Watson—were here the whole time and Drs. Hay and Sudborough were here part of the time. I went away the whole time. The year before, I think, Dr. Watson was here. There is a vacation on paper, but not in practice in recent years. Work is going on all the year round and I am bringing up a proposal to put the thing on paper I want to get rid of the University traditions. There is one special reason why it is important to have the laboratories open in the vacation here, namely, some of the men who are teaching chemistry in colleges are glad to spend their vacation by coming here. We have two men who have applied to come here in this vacation, and it would be a pity to shut down the place and refuse them admission.

WITNESS No. 290.

MAJOR C. F. MARR, I.M.S., *Officiating Medical Storekeeper to Government, Bombay.* *Major C. F. Marr.*

Extract from WRITTEN EVIDENCE *re* the manufacture of drugs in India, *vide* pages 86 and 93 of Volume IV of the Minutes of Evidence.

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Burroughs Wellcome & Co., Parke Davis & Co., and other manufacturers of similar repute do not hesitate to expend money in gaining and maintaining their reputation, and the Indian mind will have to be trained to acquire a similar trend if drug manufacture in India is to be successfully developed by private enterprise.

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Extract from ORAL EVIDENCE, DATED 15th NOVEMBER 1917.

President.—*Q.* Are the surgical instruments that are being manufactured by Mr. Eyres available for sale to the public?—*A.* No, he cannot at present spare anything outside Government requirements.

Q. I suppose it is so during war, but during normal times there is enough to spare?—*A.* Not at all. It is difficult to increase the output. Labour is the difficulty. Expert labour takes long to train, and as soon as a man finds that he is any good, he seeks more lucrative employment outside.

Q. Is this an ordinary case of supply and demand as between Mr. Eyres and his workmen?—*A.* I think he tries to meet them fairly. He gets a certain contract rate from Government, but now owing to the high cost of raw materials he cannot well afford to pay his labourers more than he does.

Q. What is the system that you follow in settling the prices of instruments with him, since he is the only maker and you are the only buyer?—*A.* The arrangement at present is that we pay him Rs. 13 for what costs a pound in England.

Q. Has this rate been fixed with reference to the present war prices?—*A.* That is the old rate. He has now asked for Rs. 15 *plus* 20 per cent to cover the war increase in price for raw materials.

Q. Rs. 15 *plus* 20 per cent. that is, Rs. 18?—*A.* Of course that 20 per cent will go off after the war: he wants Rs. 15 to remain for good.

Q. The 20 per cent will stand while the war is on?—*A.* Yes.

Q. Is this a private factory or is it a limited company?—*A.* It is a private factory, but the buildings belong to Government. He gets it rent free, and his contract is for a term of 5 years.

Q. So there are certain privileges *plus* the Rs. 18 per pound?—*A.* Yes, there are.

Q. You have no precise way of getting at the cost of manufacture to Mr. Eyres compared with the prices you have to pay if purchased in the open market?—*A.* I never tried it.

Q. How long has this arrangement with Mr. Eyres been operative?—*A.* It is an old arrangement. It dates back some years.

Q. I understand he is now making artificial limbs. How many a month can he turn out?—*A.* 20 finished limbs.

Q. Do you know how many are required monthly according to the statistics of the war hospitals here for the returned troops who have lost their limbs? I have been told recently that they are going to manufacture artificial limbs themselves, and the reason for this is that Mr. Eyres is unable to turn out a sufficient number of limbs, and there are still large numbers of soldiers who have been here for months without limbs?—*A.* I think that is wrong. We have more than overtaken the arrears, that is to say, Mr. Eyres will have finished with all the orders on hand before the end of December.

Q. But a good many soldiers are without limbs now?—*A.* That is rather a big question. You cannot give a man an artificial limb very soon, certainly not before his stump has completed contraction. But as regards the work at present on hand, as far as I can see from the orders coming, Mr. Eyres will have no orders remaining at the end of December.

Q. You do not think that it is necessary to grant priority certificates for obtaining further plant required for the manufacture of artificial limbs?—*A.* I have already written up that it is unnecessary and superfluous.

* * * * *

Mr. A. Chatterton—*Q.* In regard to drugs, you say that it will be desirable that facilities should be given for the study of pharmacy in India. Is that not done in the medical colleges here now?—*A.* They teach pharmacy as far as prescribing is concerned. What I mean is commercial pharmacy.

Q. You mean the manufacture of chemicals on a large scale?—*A.* Yes.

Q. Is there no regular examination here corresponding to the examinations of the Pharmaceutical Society in London?—*A.* I do not think so, I do not know of it.

Q. I should like to ask you about the training of workmen in Mr. Eyres' factory. Does he take apprentices?—*A.* He engages coolies as far as I can make out. If they are intelligent, he keeps and trains them, and if they do not possess a certain standard of intelligence, he gets rid of them.

Q. Have you discussed this question with him at all?—*A.* Yes. He has got one man under apprenticeship system at present; he has been with him for the last six years; he came as a practical apprentice.

Q. Do you think it will be possible to get a considerable number of boys to go to his workshop as apprentices?—*A.* Quite possible, I think.

Q. This workshop of Mr. Eyres only supplies stores to your department?—*A.* Well, we use to the fullest extent the local material we can get; over and above that we import from home.

Q. You mean that you import surgical appliances which you cannot get made here?—*A.* Attempts are made to purchase instruments, etc., from firms in India when Mr. Eyres is unable to meet demands. If we cannot obtain them in this way we order them from home.

Q. Because there is no space in the workshop to develop the manufacture?—*A.* Yes. In fact he is already overloaded: he has got more orders than he can execute.

Q. Would you advocate the development of this system?—*A.* To avoid risk of a breakdown in obtaining our supplies any change in present arrangements is undesirable.

Q. There are other firms in Bombay making surgical instruments and they are complaining I believe of the competition of this factory?—*A.* I have not been very long in Bombay; as far as I can say, Mr. Eyres has not much time to enter into competition. He is under contract with Government to supply these instruments. In any case I do not think he competes very much, certainly not at present. Within the last three years you will find him fully occupied with war orders.

Q. But if the orders which are now placed with this factory for surgical instruments were offered to public tender, there would be no cause for complaint?—*A.* If it were not for the existence and support of Eyres factory there would be no certainty of obtaining quickly special instruments, etc., of reliable quality for which sudden and unforeseen demands frequently arise.

Q. We have here a list of articles that are made by Mr. Eyres: does that include delicate eye instruments?—*A.* Eye instruments take up so much more time than others that we rather encourage him to do things that require less attention, and turn out more of them.

Q. You want bulk production rather than fine production?—*A.* Yes.

* * * * *

Q. What is Mr. Eyres' position? Is he a Government servant?—*A.* No, he is a Government contractor.

Q. Is he under Government control?—*A.* The only control Government has over him is with reference to the fact that the building belongs to Government and that he has a running contract with Government.

Q. How does he pay his workmen?—*A.* That is a matter entirely for himself. We only have two Government cutlers in his factory. We maintain them on account of having to send them on field service.

* * * * * *

Sir D. J. Tata.—*Q.* Under head D in your note you speak of "Articles of surgical instruments and field equipment which we manufacture in *our* factory."—Which factory do you refer to?—*A.* That is Mr. Eyres' factory.

Q. Then you say: "the Medical Store Depôt is maintained for the purpose of meeting the medical and surgical requirements of military hospitals, etc." Does this factory form part of the Medical Store Depôt, or is it outside it?—*A.* I just explained that the building belongs to Government. Mr. Eyres has a standing contract with Government; but the factory is a private concern.

Q. But at the same time it has got the full patronage of the Government?—*A.* Yes.

Q. And it supplies all the needs of Government Departments, without enquiring whether other firms outside can supply them?—*A.* Other firms outside do get a certain amount too, because this factory cannot cope with the work that it has got to do.

Q. If any of the articles are made in this country, do you call for any tenders for their supply?—*A.* The present arrangement is what Mr. Eyres cannot supply or cannot be obtained from local firms we order from home.

Q. You don't make enquiries to find out whether these articles can be obtained in this country, say by inviting tenders?—*A.* We do make enquiries.

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Q. You said that about twenty artificial limbs per mensem are made in this factory of Mr. Eyres. Are you aware that there are other firms that are making them also?—*A.* I am aware.

Q. Do you think that these limbs are in demand at all in the hospitals?—*A.* I suppose there must be a certain demand for them, but they are expensive, only rich men can keep them, as they cost a good deal and entail recurring charges.

Q. But are all limbs that are supplied to the wounded soldiers in the hospitals, supplied from Mr. Eyres' factory? Are there not other factories which supply them as well?—*A.* Not that I know of. They may or may not, I have no knowledge.

Q. Have you seen any of the limbs made by these other firms; and have not they offered to supply you?—*A.* I have not seen; and they have never approached me at all.

Q. I am referring to Messrs. Powell & Co. Have you any idea as to who supervises the manufacture in these other factories? You say it is not possible to do these things with Indian labour in this country, but I am given to understand that Messrs. Powell & Co., employ entirely Indian labour, and they have been very successful?—*A.* I did not say that it is impossible. I said that the native labourer is not capable of turning out products which can be relied on for quality and quantity unless he is constantly and closely supervised.

Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* Are you quite clear about your information on this point: as to whether when Mr. Eyres' contract expires it should be continued? Would you like to have the present system continued, or would it be better to hand the business over to private enterprise when the present contract expires?—*A.* I am always keen on private enterprise: and everybody ought to encourage private enterprise; but if you do want to get the stuff really well done, you won't get it by giving it out for competition.

Q. Do you know that many of these artificial limbs and other articles are taken from other private companies for the war hospitals?—*A.* I do not know.

* * * * *

Hon'ble Mr. C. E. Low.—*Q.* Turning to another matter, supposing a firm put forward the proposition to you that they were prepared to deliver artificial limbs or surgical instruments at a certain price, and of certain qualities and quantities, would you be prepared to consider that offer? Are you in a position to do that?—*A.* Hardly at present, because what is being turned out in our factory meets the demand.

Q. I am not speaking of the war demand. Do you know what was the state of affairs before the war?—*A.* We had no artificial limb manufactory at all then.

Q. Do you know if they accept tenders for surgical instruments and so on in England?—*A.* I do not know.

* * * * *

President.—*Q.* Are you quite sure that Mr. Eyres is turning out 20 of these artificial limbs a month?—*A.* For the last three months he has turned out 20 every month. There are 35 limbs on order now, and I think he will continue to turn out 20 a month.

Q. You told Sir Dorabji Tata that the articles that Mr. Eyres cannot make for you here you indent for from home, is that from the India Stores Department?—*A.* That is the usual method of procedure. We also ask other medical store depôts and purchase locally when procurable.

Q. You don't make enquiries from manufacturing firms here?—*A.* I make enquiries from other medical store depôts who tap other sources of supply and ask them if they can supply or purchase and we take from local firms what they have ready made.

Q. Then that statement of yours is not quite accurate?—*A.* No, not in its entirety.

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Q. Now are we quite clear about your relationship to Mr. Eyres? Is it correct to assume from your evidence so far that you are now going to give Rs. 18 for every article that costs a sovereign?—*A.* At present, that is what I said he wants; the old agreement was Rs. 13; he has applied for Rs. 15 *plus* 20 per cent, during the war.

Q. That is Rs. 18 and in addition to that he uses a Government building, and certain amount of Government plant?—*A.* Yes.

Q. In making this contract, have you any idea as to what his expenses are, the cost of manufacture? He publishes no accounts of course?—*A.* He publishes no accounts.

Q. So you have no means of finding out what his actual costs are?—*A.* I have not gone into it personally. I do not know that any comparison has been made.

Q. You are not prepared to give your opinion as to whether this arrangement is fair to Government or fair to Mr. Eyres?—*A.* I am not prepared to say what is his margin of profit.

Q. How long has this new arrangement been in force?—*A.* It has only just gone up for consideration: he forwarded his application through me. The final arrangement will be sanctioned in Simla in the office of the Director-General, Indian Medical Service. It has not been made as yet. I sent the application just a month ago I think.

Q. Did you make any recommendation to the authorities at headquarters when forwarding that application? You are the authority I suppose that would advise Government on an arrangement of this kind? I want to know what recommendation you made to headquarters as to the final arrangement between the Medical Storekeeper and Mr. Eyres who is occupying a privileged position in the manufacture of surgical instruments? If you think it is too confidential to give here, you can put it in a note and send it confidentially, you would probably do that?—*A.* I think I could probably say that here. I have recommended it.

Q. I presume that you have got some means of finding out whether this arrangement is fair to the public or whether it is hard on Mr. Eyres, from a comparison of the prices you pay with the actual cost of manufacture, and with the prices which other people are prepared to tender at. Would you like to reply that point by letter*?—*A.* I think I had better. I have to take many items into account, and it is difficult to say offhand.

Q. I quite understand that you don't want to speak in Mr. Eyres' absence, and I hope Mr. Eyres will understand also. But so far as the Government are concerned, they are responsible for public money. Would you send us a statement of the grounds on which you made your recommendations about the new agreement between Mr. Eyres and the Medical Storekeeper with regard to the prices to be paid for these surgical instruments, and the reasons for increased prices?—*A.* Yes, I quite understand.

* *Vide* additional written evidence printed after oral evidence.

Q. Do you know where Mr. Eyres gets his steel from for making surgical instruments?—*A.* I think he gets a good deal of his raw material from home. He must do that, it is not made in the country; steel for surgical instruments must be of a very special kind.

Sir D. J. Tata.—*Q.* With regard to these artificial limbs, if the Government call upon the Medical Stores Department to supply a certain number of limbs, you give the order to your contractor?—*A.* Yes.

Q. Do you try to find out whether other firms are making limbs in this country which are suitable, and if so at what price they can be obtained?—*A.* The custom that has been going on up to the present is that we give all orders for artificial limbs to Mr. Eyres.

Q. Have you made any inspections to find out if the limbs supplied by private firms are efficient or not?—*A.* I have made no such inspection.

Q. Is it not the duty of the Department to find out? Then in sending your recommendations about price, have you tried to enquire the price of these articles elsewhere?—*A.* The arrangement was there when I took over. I have made no enquires at all.

Q. Then you don't know if outside firms have got any opportunities of competing?—*A.* Outside firms have never approached me.

Q. Is the Indian Medical Gazette an official publication or a semi-official publication?—*A.* I do not think it is official.

Q. With reference to this some time ago I had a copy sent to me by a firm in which they say "No name is better known amongst the medical circle than that of.....The progressive activity of the above-named widely known concern in connection with the manufacture of surgical instruments and hospital furniture has placed it in the front rank of a highly important trade. No firm in India has done more towards the perfecting of such production. This had a career of steady growth and sustained success." In the face of this, don't you think the Medical Stores Department might have gone to the firm and found out what they could supply?—*A.* I have never seen that copy of the journal.

Q. It is from the Indian Medical Gazette?—*A.* I have not seen that Indian Medical Gazette.

Q. You know that this factory has fitted the hospital ships 'Loyalty' and 'Madras'?—*A.* I do not know the firm you are referring to.

Q. I am referring to Messrs. Powell and Co., who have fitted up the hospital ships 'Loyalty' and 'Madras,' and also the Lady Hardinge War Hospital?—*A.* I have no knowledge.

ADDITIONAL WRITTEN EVIDENCE *(submitted after oral examination).*

As desired by the President at the time I gave my oral evidence I beg to state that my reasons for recommending an increased rate to Mr. E. Eyres are because the prices of his raw materials (steel, iron and wood) have gone up in price as also cost of labour.

The statement below shows the pre-war prices and those now prevailing.

Comparative statement of pre-war and existing prices of materials used in the manufacture of surgical instruments and field equipments

Iron of various kinds has risen from Rs. 5, Rs. 10 per cwt. to Rs. 40, Rs. 50 per cwt.

Steel surgical has advanced 100 per cent.

Brass from 8 annas per lb. to Rs. 1-4 per lb. A consignment of wire now *en route* from England is invoiced at *from* £0-1-9 to £0-1-10½ per lb. Import charges add about 12 per cent to invoice cost.

Aluminium sheet for splints, etc., was invoiced in July 1914 at £ 0-1-2 per lb. A consignment imported in September 1917 was invoiced at £ 0-3-9 per lb.

Aluminium tube for drenchers was invoiced in June 1913 at £ 0-2-1 per lb. We have just received telegraphic advice that the present price is £ 0-4-11 per lb.

Dealwood for boxes, splints, etc., has risen from an average of about Rs. 12 per 100 feet to an average of about Rs. 26 per 100 feet.

Oakwood for crutches formerly obtainable at Rs. 4-8 per cubic foot is now Rs. 7.

Leather—Sheep skins have advanced from Rs. 1-8 to Rs. 3 per lb. Cow hides from 12 annas to Rs. 1-8 per lb. Black hides from 14 annas to Rs. 1-12 per lb.

Canvas—The export of Willesden Canvas is prohibited, but we used to obtain one of the best qualities of genuine Willesden at £ 0-2-5 per yard, now we have to pay locally from Rs. 2-12 (£ 0-3-8) to Rs. 3-4 (£ 0-4-4) per yard for a very inferior canvas.

We have on file a few invoices of the materials imported from England, but these mainly apply to shipments of recent date.

In the case of local purchases these are nearly always against cost paid in the bazaar without the passing of any bills.

WITNESS No. 296.

MR. E. M. HODGSON, *Divisional Forest Officer, Belgaum.*

WRITTEN EVIDENCE.

Government aid to industries.

Pioneer factories.

I suggest that Government inquire into and, if possible, take over temporarily the Mangalore Tile Factory at Khanapur, putting it under a European manager, to prove once for all whether suitable tiles can be manufactured at this place or not. At present all Government departments have to obtain tiles from Mangalore. This, in the case of the Forest Department, means sending a man from time to time to Mormugao to arrange for carriage. It would be a great convenience, and would probably save cost to various Government departments and to the public if a local factory *could* be established. It is likely that there would be good local demand throughout Belgaum District, and possibly in Dharwar District also, for good tiles. The present factory has been wasting time for several years, but does not turn out tiles of good quality. I have seen the tiles melt away in the rain on the roof of a house, and those sent to the Public Works Department for testing were condemned. The manager has informed me that he has brought expert tile-makers from Mangalore, and they are fully satisfied with the clay available at Khanapur. Personally, I do not pretend to know anything about tiles. The Executive Engineer would probably be in a better position to give useful information. But it is a fact that the above tile factory is languishing, while a demand exists for the tiles which it is not producing. There are now (1917) two rival tile factories at Khanapur, but no tiles are yet available. I am still of the same opinion as I was nearly a year ago.

Other forms of Government action and organisation.

Working of the Forest Department.

The deficiencies in forest transport known to me are mainly due to neglect of existing roads and failure to supply funds for necessary new roads. In at least one case in this division the new road required could have been constructed on the extra, and avoidable, expenditure we have had to incur for transporting forest produce from the forest to the railway during the past five years. This road-making would lower the cost of assembling raw forest products, besides encouraging the villagers to the west in the Belgaum District to construct and use carts. Here in the Belgaum District all forest transport work also suffers from scarcity of carts. This is probably due to a variety of factors and it is difficult to suggest a remedy. Plague and cholera are primary causes, while the large area of agricultural land claiming attention, the disinclination of the people for work, and, lastly, the difficulty of increasing the rates for hire, all increase the scarcity. Provision of more roads to the west, free grants of wood for cart-making in backward villages, and establishment of a Berad Settlement* at Khanapur would all probably help. The Berad Settlement is now being started. Again, if the provision of roads was assured, it would pay to plant harda, Terminalia chebula, extensively and increase the myrabolam output. The revenue from all forest produce would increase. I have been advocating these roads for nearly six years, without much result.

I do not think it is practical, as a rule, to concentrate special kinds of trees in limited areas, though casuarina, babul, etc., plantations are made, and where the areas are not too extensive, and when funds are provided, teak and other valuable species are assisted and their percentage increased at the expense of the inferior species. Speaking generally, a forest grows those trees for which the soil is suitable, and, if not impossible, it is, in India, at least very difficult and expensive to alter the natural type of growth. I recollect a case where the authorities decided that a valuable teak forest with an undergrowth of palas (Butea frondosa) was undesirable and should give place to a grazing ground, the quantity of fodder being already vastly in excess of possible requirements. All the trees were cut, but the stools gave vigorous shoots, which, not being eaten much by cattle, produced denser forest than ever. To have replaced the existing crop by grass or some other kind of tree would have necessitated grubbing up all the tree stumps, a very costly operation. Exactly the same difficulty would be met in Belgaum, even if fire were used and the area cleared temporarily by the Kumri method†.

Soft woods.

I am certain that pure crops of soft woods could not be produced except at a loss, for if ordinary land is taken, the soft wood crop could not compete with the field crops, while if forest is set aside for this purpose, a very valuable crop of timber trees would have to give way to a crop of the least valuable species these forests grow. Take a 100-acre teak pole coupe, 40 years old, which sells for from Rs. 5,000 to Rs. 30,000, and suppose it contained pure 40-year old Bombax; it is doubtful if anyone would pay Rs. 300 for it. Again, suppose this Bombax coupe were moved 30 to 40 miles west—no one would offer one anna for it, whereas the same area there could support 100 harda to the acre, each tree giving fruit worth at least Re. 1 a year. The match or box, etc., factory would need to be an extremely paying concern to get over these facts. Mulberry is said to be easily grown; so, assuming the silk industry paid sufficiently, the requisite land might be procured outside forest, when it would

* The Berads are a criminal tribe.

† "Kumri cultivation" = felling and burning a forest area for the production of a cereal crop.

be unnecessary to incur expenditure on clearing an existing tree crop. In connection with this question, I would like to say something about the Belgaum Match Factory. It is very difficult to understand how it was ever started under the existing discouraging conditions. The very nearest source of wood supply is ten miles distant; of several species* scattered in the forest and used in match-making only one (char) is taken. Labour is scarce and dear in Belgaum. No visitor to the factory could fail to notice how wanting the staff was in skill. Fully 50 per cent of the wood imported was wasted. For several years the Match Company has been granted free wood by the Forest Department—yet no dividends were usually paid. With the outbreak of war the factory closed down, owing to all chemicals coming from Germany. Contrast this with what one sees in Europe—the factory (pulp, furniture, vinegar, etc.), put right inside the forest, skilful management, and probably clear thinking before the venture was started. Match factories.

The sooner this playing at match-making ends the better. Possibly, conditions are more favourable in other parts of India—here they are hopeless.

Recently, the Divisional Forest Officer, Kanara, N. D., had trees of several soft species cut in this division, and turned out boxes at a saw-mill—for Mesopotamia, I believe. What the financial results are has not yet been intimated, but there is not the slightest prospect of these woods competing with teak and with the several other superior woods: the superior wood will always be worth at least ten times as much as the soft. I strongly urge the importance of concentrating attention on the more valuable timber species.

Still these soft species are sufficiently good for charcoal, for which there is a growing demand, and the best thing would be to rid the forests of them by conversion into charcoal, thereby making room for more superior species. If Government were prepared to spend money on experiments and establishments, it is likely a permanent charcoal industry could be established in the Belgaum Division. Not only would soft woods be used, but waste pieces of all kinds. And if we had a research officer, and again, sufficient money for experiments and establishments, it might be possible to combine charcoal-making with the production of pyroligneous acid and its derivatives. For this an expert is needed, as our knowledge of by-products is scant. My remarks refer mainly to the Khanapur Taluka. Charcoal-making in a primitive manner is already established in the Gokak and Belgaum Ranges. But the pyroligneous acid is all wasted. Charcoal manufacture is extending in the Belgaum forest division (1917).

Tan products urgently need looking into. First of all the tan expert is needed at Khanapur with his plant, for at least one year. As a result of a short visit of the expert (Mr. Pilgrim), we now know that the cost of assembling raw *harda* can be reduced by crushing the nuts, and still further reduced if the useless kernels are discarded. From experiments carried out in this division during the past five years it has been proved that it is easy greatly to increase the number of *harda* trees. Dindal, Anogeissus latifolia is plentiful over a large area in this division. The bark and leaves are stated by Mr. Pilgrim to be excellent for tanning purposes, but a trade has to be worked up. Neither bark nor leaves are used at present. The properties of the barks, leaves, twigs, flowers, and fruits of many local trees are unknown and require examination. Tan products.

Sandal wood is increasing in price. Besides occurring in forests many trees are found in the hedges of private fields. At present inquiries are in progress as to the approximate length of hedge in each village that would produce sandal. As the land is not under the Forest Department, the Revenue Department alone is in a position to take steps to induce land-holders to stock their hedges with this species. The field owners are now given 25 per cent of the sandal sale proceeds, and the trees are so valuable that this share exceeds the full value of any other tree they are likely to grow. Sandal is easily grown from seed. If the necessary steps were taken to increase this species in areas known to be suitable (both in reserved forests and private lands), I believe that the present annual revenue of about Rs. 5,000 could gradually be raised to at least half a lakh. Sandal wood.

I have advocated a bamboo pulp factory at Londa (on the railway) where conditions are favourable. Mr. Pearson, however, has informed me that a factory should be started in Burma and in Kanara first, which he considers the best places, and later on at Londa when the other factories are proved a success. The war has, for the present, stopped everything. Since the above was written Mr. Pearson has expressed himself as being in favour of a bamboo pulp factory at Londa. Bamboo pulp.

Forestry is itself an industry connected with about one-fifth of the area of British India. Every measure advocated by the Forest Department is primarily intended to further forest industry, but it is nearly always a question of providing funds. The fact that funds are not provided accounts mainly for the unsatisfactory condition of the staff and Forest Department generally. We want money for establishments, better facilities for educating the members, research officers, communications, wells, buildings, forest protection, afforestations, working plans, cultural operations and experiments; and until the necessary provision is made it is useless to expect improvements in forest industry. General.

* Char = Buchanania Latifolia.
Sawar = Bombax Malabaricum.
Moi = Odina wodier.
Bhendi = Kydia Calycina.

ORAL EVIDENCE, 16TH NOVEMBER 1917.

Mr. G. A. Thomas.—Q. In the first paragraph of your evidence you speak about the Khanapur Tile Factory. When did you write this written evidence? Was it over a year ago?—*A.* I wrote it on the 17th January this year. It is not quite a year yet.

Q. When did you visit the factory?—*A.* I visited it in January.

Q. With the Conservator?—*A.* Yes.

Q. The Executive Engineer has since made a favourable report of it, as a result of which Government have given certain concessions as you know?—*A.* I have sent tiles to the Executive Engineer to test whether they were suitable and they were found to be unsuitable.

Q. Since then, two new kilns have been scientifically built and they have got experts from Mangalore and he is of opinion that it ought to be encouraged?—*A.* I agree that it should be encouraged, and we should make a beginning by discovering what kind of clay could be got, the quantity available, and under what conditions the landholders will allow removal.

Q. As regards clay, it has been examined by the School of Arts here and reported on favourably?—*A.* They told me that the Mangalore men said that it was all right, but did not prove it by producing the proper tile. I understand that it was largely because the kilns were defective.

Q. Since then, the Executive Engineer has reported that it is better and he has recommended certain concessions. Do you know what the factory has been doing since last year?—*A.* No, I was transferred shortly after and I do not know what has happened to it since.

Witness subsequently noted:—

Since making this statement I have again seen the Range Forest Officer, Khanapur, who says no tiles have been produced, and that a rival tile factory has been started at Khanapur.

Q. In the second paragraph of your written statement you say something about the Berad Settlement. Has the Berad Settlement proved a success?—*A.* Not as much as was anticipated.

Q. Has it not been closed down?—*A.* Only temporarily. I passed through the Belgaum District a few days ago, and I understood that they were going to start it again.

Q. Hitherto it has not been a success?—*A.* It has had a very short trial. I do not think you can say that it is a failure yet on the short time that it has been tried.

Mr. A. Chatterton.—Q. What is the Berad Settlement?—*A.* A settlement of Berad people. The Berads are a criminal tribe.

To Mr. G. A. Thomas.—When I went to visit the tile factory on more than one occasion, I asked the manager about the supply of clay, because everything depended on that. If the clay is of a wrong quality you cannot make tiles. If there is not a sufficient supply you cannot start a tile factory, and they admitted that they had not made any survey of the available places nor was there any definite arrangements with owners of the clay-fields for the supply of clay. They were taking clay from a private field. I believe there is probably enough soil and that arrangements could be made, but I have no ground for saying so beyond expressing my opinion from what I have seen of the country there. I think that these are important points that ought to be settled absolutely and definitely before any capital is spent on building a factory.

Q. By Government?—*A.* I suggested that because the tile factory has been languishing for several years and I thought that Government might inquire into the matter and start a factory if careful investigations give sufficient promise of success.

Q. Your opinion is that this is a question which the local Director of Industries might inquire into with advantage?—*A.* Yes, if the local Director of Industries is a competent European officer, acting on behalf of Government.

Q. In the second paragraph you say, "I have been advocating these roads for nearly six years, without much result." Whom do you blame for that?—*A.* The authorities, whoever they are.

Q. Who are the authorities?—*A.* I have tried to get money from the Forest Department, from the Local Boards, and from the Revenue Department. I have tried to get money in every way I could. I got a certain amount, but not nearly enough.

Q. Have you shown that these roads would actually pay by figures?—*A.* Yes.

Q. And, in spite of that, your proposal has been turned down?—*A.* I got a certain amount of money, and I even made a fair-weather track, and then I started off on some culverts and bridges, but I have not got money enough for finishing them.

Q. Have you recovered the cost of these roads out of the increased forest receipts?—*A.* None of the roads in question are sufficiently near completion to allow of their affecting revenue yet. But one short road finished in January for Rs. 600 brought in Rs. 1,500 *extra* revenue within three months.

Q. They are not of any use now?—*A.* Only sections of them. But we do not get the full value out of them. Even as fair weather roads we do not get full value. When we make a road it is not only good for one department, but it is good for the people too, and all the local

people were very anxious that these roads should be made because they would help them in their cultivation.

Q. And do you advocate any toll being placed upon these roads?—*A.* I would rather put a toll on it and have the money for repairs, unless funds are otherwise supplied. I have not been able to get money for repairs. I can give an instance. The Divisional Forest Officer made a recommendation that a certain road should be handed over to the Forest Department or the Public Works Department. The Public Works Department would not take it because they said that there were no funds available. Then I suggested that the Forest Department should take it up, and we did our best to get what we could from the Local Board and the Forest Department. Since I left the place, that has been done. If no funds were provided by the Forest Department or the Local Board or the Public Works Department, we could improve that road and maintain it by a toll, I think, if we cannot get much in any other way, and I believe the people would pay willingly. I would, however, prefer a sufficient grant for road work to levying a toll.

Q. Referring to the third paragraph you say, "I do not think it is practical, as a rule to concentrate special kinds of trees in limited areas". Casuarina plantations have been successful on the coast?—*A.* On a small area only.

Q. What you can do in a small area, you can do in a large area?—*A.* That is an area which was not covered by anything—sandy ground particularly suitable to casuarina, and limited in extent.

Q. Teak plantations have been successful?—*A.* Yes, it is unusual to grow pure teak.

Q. You say, "Where the areas are not too extensive, and when funds are provided, teak and other valuable species are assisted and their percentage increased." What do you mean by "Where the areas are not too extensive?"—*A.* What I mean is this. When you cut a certain amount of forest every year, if you restrict your operations to the blanks in that cut area you can do a great deal of good, and, latterly, operations of this nature have been extended gradually by the Forest Department with success. Supposing one of these areas that you wished to fill up was entirely blank, you would not be able to do the whole of that in one year. You would have to concentrate on one area for a number of years. Our operations generally consist in trying to plant or sow trees in blanks in an area that has just been worked.

Q. But in those areas you can grow homogeneous trees?—*A.* Not very well. It would be a little group of trees here and there. You would not have a big area of any one species.

Q. You say, "Speaking generally, a forest grows those trees for which the soil is suitable." A particular area of the forest may be suitable for a number of different varieties of trees?—*A.* Yes.

Q. The soil is suitable for all these trees?—*A.* Yes, but the soil varies over the area, and so do the species.

Q. If you can, you can grow one kind of tree in that area?—*A.* No, you could only grow the one tree on those portions, often scattered, where the soil suits that particular tree. But some species will grow on most soils, others on few.

Q. You refer later on to the expense of grubbing up all the tree stumps unless fire were used.—*A.* You can do it at great expense over a small area. It is very difficult to do. The same trees shoot up again. If I had to clear a forest area, I would do it by cutting the branches and setting fire to the whole; even then many shoots spring up.

Q. Would it be too expensive a proposition to clear the forest area and grow plantations for special kinds of trees?—*A.* Yes.

Q. It could be done in non-forest lands, in lands where there is no forest?—*A.* I do not agree that it can be done in this case either. It would not pay to stock cultivable land with inferior soft woods.

Q. You say in the next paragraph, "I am certain that pure crops of soft woods could not be produced except at a loss." What do you mean by "except at a loss?"—*A.* A crop of soft woods is always of very little value compared to a crop of hard woods.

Q. That depends on the use it is put to?—*A.* I do not think it is a matter of what use it is put to. Supposing you take matchwood. You can never conceivably get soft matchwood to compete with teak or blackwood.

Q. You say, "If ordinary land is taken, the soft wood crop could not compete with the field crops." You say that the actual output of soft woods would not realise as much money as the output of field crops on the same area?—*A.* Yes.

Q. If the output of wood is used for a large factory, then indirectly it would give a very much larger amount?—*A.* I have no figures to go by, but I should imagine that whatever you did the soft crops would be worth very little.

Q. Is it not possible to grow field crops with the soft wood crops on the same area? That has been suggested by the Conservator of Forests of the Northern Circle.—*A.* You could do so, and, as a matter of fact, many people do have scattered trees in their fields either for fruit or for some other purpose. This would have one drawback, *i.e.*, that you would scatter your material over a large area, while it would interfere with the field crop if grown too close. A further disadvantage lies in the fact that the trees would grow on lands over which the

factory owner exercised no control, and most of the landowners would take no interest in the trees. The idea, under present conditions, is unworkable.

Q. You give certain comparisons between an 100-acre teak pole coupe 40 years old and the same area of bombax 40 years old. You say that the teak would sell from Rs. 5,000 to Rs. 30,000. It is a very wide margin?—*A.* It depends upon the situation of the coupe and the quality of the growth. I have mentioned the figures that have come to my notice. As a matter of fact, Rs. 30,000 is not enough. If I take the figures in East Kanara I would have to put it at a higher figure, nearly Rs. 40,000.

Q. Take an area within the easy reach of railway or water communication. What would be the average amount for that?—*A.* I always expect to get about Rs. 20,000 for that.

Q. You say, "Suppose it contained pure 40-year old bombax; it is doubtful if any one would pay Rs. 300 for it?"—*A.* I do not believe that it would fetch so much.

Q. Suppose in the middle of that 100-acre area there was a match factory. Do you say that the match factory would not give Rs. 300 for the bombax grown on that?—*A.* It might. But many hundreds of acres would be needed for a factory.

Q. How many trees would you grow on that area? What is the exploitable age of bombax?—*A.* We sold some wood in Surat that was probably 40 to 50 years old. The match factory in Belgaum uses a much smaller size of wood, but that is not bombax but char.

Q. Have you any idea as to how many cubic feet of bombax you would get out of a 100-acre coupe of bombax 25 years old?—*A.* No. It would vary a lot with the soil and the rainfall.

Q. How many trees would there be to an acre?—*A.* That would entirely depend upon the age. If they are very big, between 20 and 40.

Q. How many would you expect to get if you cut them when they are 25 years old?—*A.* You might get 400 to 500 an acre, because you could grow them fairly close. That is, assuming that you use small wood like the Belgaum factory uses. In Belgaum they prefer fairly small trees 6" to a foot in diameter. If you have field crops you would get them scattered, and I doubt if there would be more than 30 or 40 at the utmost.

Q. You would get 300 trees 25-years old if you have no field crops?—*A.* Yes.

Q. That would give 30,000 trees for 100 acres?—*A.* Yes.

Q. How many cubic feet will there be in a tree?—*A.* That is a very difficult question, because it depends upon the age, and also upon the soil and rainfall.

Q. What is the maximum cubical contents of a bombax?—*A.* 3 to 6 cubic feet at the utmost, for a 25-years old tree, on an average, but a great deal would depend upon the soil and rainfall.

Q. You say you can get 300 trees to an acre, and 100 acres will give 30,000 trees, and at the rate of 3 to 6 cubic feet a tree, it would give you at least 100,000 cubic feet?—*A.* Yes.

Q. Do you mean to say that the match factory would not give Rs. 300 for 100,000 cubic feet of wood?—*A.* Yes, probably it would. But the Belgaum Match Factory Co. informed me they would have to close down if the Forest Department made them pay even 4 annas per cartload (half a ton) of wood. They got their supplies free: 100,000 cubic feet of first-class teak would, at present market rates, be worth at least Rs. 3,00,000.

Q. It has been calculated that it would pay a factory to get white wood delivered at the factory at 7 annas per cubic foot and coloured wood at 3 to 4 annas per cubic foot. If these figures are correct, a 100,000-cubic foot immediately surrounding the factory would fetch infinitely more than Rs. 300?—*A.* I am only speaking from the point of view of what would be got now if you put up coupes with these species to auction. The cost of cutting and delivering wood at present market labour rates would be annas 4 to 8 per cubic foot; there could, therefore, be no profit whatever from soft woods.

Q. Because there would be no use for it? If it is used for a match factory or some other purpose, it would be of very considerable value? This crop would be valuable for the purpose of industry?—*A.* Teak and blackwood are in great demand. You have got that demand already. Why do you want to try and get rid of good trees in favour of those which are certainly inferior? Also, as stated, *no* wood can now be supplied at 4 to 8 annas per c.ft. except at a loss. Rupee 1 per c.ft. f. o. r. is the minimum rate now charged by the Forest Department to the Indian Munitions Board for wood, even for soft wood.

Q. You would confine the forests entirely to trees such as teak and blackwood?—*A.* Yes, and other good species.

Q. In your own opinion, it is not worth while going in for plantations at all for the purpose of industries, if that means growing trees?—*A.* I would not grow softwood trees. Use the land for cultivation that is fit for cultivation of field crops, and, if suitable for forest, then for the cultivation of the very best species of trees that will grow in the area.

Q. Is it not the fact that in Germany, Sweden, and Russia plantations are grown for the sake of matches?—*A.* I have known them grown in Germany for the sake of wood pulp, vinegar, furniture, etc. I did not see any forests in Germany used for match-making. As a matter of fact, they have wood in Europe in large quantities that is used for matches.

Q. You mention in your note. "The sooner this playing at match-making ends the better." You say that match industry is hopeless in India?—*A.* I do not say that. I say in all those parts of the Bombay Presidency with which I have been connected.

Q. You hope for it only in areas where there are homogeneous forests where such wood is found?—*A.* I understand that there is a good deal of bombax in Assam.

Q. But bombax is not considered suitable?—*A.* They used it in Ahmedabad.

President.—*Q.* Because it was recommended by the Forest Department in their Memoir on matches. The Bareilly factory took it up and grumbled at it, and it has been condemned by the Dharwar factory. It is more valuable for other purposes?—*A.* I was ordered to supply it for matches, and did so. The Ahmedabad Islam Match Factory demanded this wood. It is more than doubtful whether any of the so-called "match factories" in India is an authority on match woods. I understand it is valuable for packing-cases. But we have not got much in the south of Bombay; there is more in the north of the Bombay Presidency. They do not like bombax for fuel.

Q. Bombax is used for other purposes, for toys and picture-frame-making?—*A.* And packing-cases, water-troughs, dug-outs, etc.

Q. Do you think it would be more profitable to exploit it for these purposes than for a match factory?—*A.* There is little demand for these soft woods for any purpose, and very little revenue to be made out of them. I would convert them into charcoal and discourage their growth, as we now do.

Q. The cost is very great owing to its being scattered. Is there any part of forests where it grows in large quantities?—*A.* It is a scattered tree.

Q. The cost of extraction will be very high and prohibitive for the growth of industry?—*A.* Yes.

Q. To use that wood for any industry you must have plantations of it?—*A.* If you use it as suggested by me for charcoal or distillation, you can use it in conjunction with other woods.

Mr. C. E. Low.—*Q.* Is *Maharuk* successfully grown in parts of Bombay?—*A.* We have very little. It is scattered.

Q. Do you think that it will not be possible to make plantations of these woods?—*A.* I have never experimented with that tree, because it is looked upon as an inferior tree and discouraged. Really we do not know very much about this tree; for the last few years we have given all our attention to the propagation of the superior species like teak and blackwood and have ignored inferior kinds.

Q. You talk here about the Berad Settlement. Is that a kind of forest tribe or is it meant for land revenue?—*A.* The Berads are a criminal tribe.

Q. You say, "Each tree giving fruit worth at least Re. 1 a year." Do you mean to say that Government would get Re. 1 a year from it?—*A.* I mean that Government will get Re. 1 from it, because we could get fruits worth Rs. 2, but there is the cost of collection and transport.

Q. Have you got any blank areas of fairly fertile soil in the middle of forests which they are at present using for grazing, and, if there are, are they wanted for grazing?—*A.* The western part of Belgaum District contains areas which are rather open, but far from fertile. The forests are far away from the railway and the roads are very bad. My idea was that if there was a demand for the fruit of these trees we could fill up the blanks with them. They thrive everywhere in these forests.

Q. Do you think it would be better to grow myrabolams which are exported and not used in this country very much at present, or to grow something that can be made into matches by match factories in this country?—*A.* I was hoping that in future tanning would be done in India and *harda* (myrabolams) would consequently be required largely in India. The reason why I suggested putting *harda* on these blanks was this, that the communications are bad and it is simpler to move fruit than timber.

Q. You say under the head of tan products, "As a result of a short visit of the expert we now know that the cost of assembling raw *harda* can be reduced by crushing the nuts and still further reduced if the useless kernels are discarded." But that was common knowledge in other parts of India at least ten years ago. It was not known here?—*A.* No.

Q. Is there no means of communicating information between one provincial forest department and another?—*A.* No such arrangement. It is a common thing that one divisional officer does not know what another divisional officer does. One divisional officer will do a thing well, and another will do it worse. The same thing applies to conservators too. There is no communication between them in the above sense.

Q. I understand that you have not got a Chief Conservator in Bombay?—*A.* No, one is, however, just about to be appointed, I believe.

Q. Where is Dandeli?—*A.* It is south-west of Dharwar, about twelve miles from Tawargatti.

Q. You have got a saw-mill there?—*A.* They had one, but they move it about from place to place. I have no information of any saw-mills in Kanara.

Q. Do you know there was a proposal to construct a railway from Dandeli to join the main line west of Dharwar?—*A.* I heard there was. I am afraid I am no authority on that point. I do not know that part of the country: it is outside of my last division.

Hon'ble Sir R. N. Mookerjee.—Q. In answer to Mr. Thomas you said that you got some money and spent it on making roads and bridges. What amount of money did you thus collect?—*A.* Are you referring to my division?

Q. When Mr. Thomas asked you about roads and transport, you said that you succeeded in getting some money?—*A.* When I went to the Belgaum Division, I found practically no money was being spent, so I agitated for money and got a certain amount. Up to Rs. 15,000 was the most I had in any year.

Q. Who supervised the roads?—*A.* The Forest Department did everything.

Q. Are you an engineer?—*A.* Divisional Forest Officers are given a certain amount of engineering training, and the Forest Officers who are trained at Dehra Dun all get a little training. They are all supposed to know, and do know, enough to run a building or a road or a well.

Q. And who is to see whether that work is done satisfactorily or not? Who is to finally pass that work?—*A.* As a matter of fact, I used to ask the Collector or Conservator to come and look at the work.

Q. Is it not a case of amateur engineering spending money without organised supervision?—*A.* I do not think you can call it amateur engineering. In the last season the Divisional Forest Officer actually took the Executive Engineer round. That was a favour on the part of the Executive Engineer. The engineering work done by the Forest Department often compares favourably, especially in point of expenditure, with that done by the Public Works Department, and is invariably superior to work done by the Local Boards.

Q. At the present moment there is no Public Works Department engineer to see whether the work is properly done?—*A.* Recently the southern circle has been given an engineer for blasting a river bed. I am not saying we do not want one. We have been asking for engineers for a long time, but we have not got them, except that one officer who has been sanctioned lately. Still, I am convinced that the Forest Department do road building and well work very economically and satisfactorily. The main trouble is paucity of funds for really necessary and important works.

Q. Have you made any cut-and-dried scheme as to what is the cost of producing charcoal and whether it would commercially pay?—*A.* The work is going ahead very nicely now. Certain forests that were not worked at all a few years ago are worked extensively now, and not only so, but worked almost entirely for charcoal. For instance, Poona City is largely supplied with charcoal from a part of the Belgaum Division by the contractors of the Forest Department.

Q. You sell wood to them?—*A.* We sell wood in the ordinary way, *i.e.*, standing in coupes, and the contractor makes charcoal, and that work has been extended further now. We were selling charcoal first of all at Re. 1 a bag and it is now reduced to twelve annas, leaving a profit to the Forest Department.

Q. Do you think charcoal would be more profitable to consumers than coal?—*A.* Yes, I think it will be useful to people in towns like Poona. The people are now quite keen on using charcoal instead of the ordinary wood fuel. We are anxious to extend our operations, because it is better for us if we can turn wood into charcoal as about half or more than half of the transport is saved. It is open to one criticism, *i.e.*, that the other products are allowed to go to waste. There is a scheme under consideration for bringing a special charcoal retort from home fitted up in every way. The war has stopped that temporarily.

Q. Then, of course, it would be cheaper?—*A.* Of course the profit would be much greater. A number of by-products are lost now.

Q. You have got large teak forests in your division?—*A.* A fair amount of teak to the south and east.

Q. Can you tell me the cost of a cubic foot of teak and the cost of transit?—*A.* Two annas per ton per mile for the cart is the cost of transit.

Q. What would be the total cost after paying the Forest Department the cart hire, and bringing it down to the place where it can be transported by railway or river?—*A.* Rupees 3 to Rs. 4 a foot for selected teak is the selling rate now.

Q. Delivered where?—*A.* Delivered on the railway. There is a little extra charge for loading, that is, say Re. 1 a ton.

Q. What profit do you make?—*A.* I could not tell you. You have to take the establishment and all sorts of other things into consideration, but roughly we might put it at half the selling rate, at most. In the Belgaum Division expenditure to revenue was as 60 to 100.

Q. Do you realise that commercially if you ask Rs. 3 per c.ft. in logs in normal times, no one would be inclined to buy your teak?—*A.* This is not the case. We put the wood up to auction. I have seen people bidding about Rs. 5 per c.ft. for teak lately. There is much more likelihood of a further rise in price after the war, than of any fall. You can, of course, get inferior logs for much less, for, say, half that price.

Mr. A. Chatterton.—Q. You have a note on sandalwood. Is sandalwood in the Belgaum District and the Bombay Presidency the property of individuals?—*A.* No, it almost all belongs to Government. Government have the right to almost the whole revenue from it, and as most of our sandalwood is got from private people, a proposal was made to the Bombay Government to allow the owners four annas in the rupee to encourage them to grow that species.

Q. Do people in Bombay actually destroy the sandalwood trees?—*A.* Yes, this is largely done without any particular reason at all. The idea of giving four annas in the rupee was that the four annas would make that tree more valuable to them than any other tree for which they can get the full value.

Q. Is there much sandalwood in the district?—*A.* Not a very large amount, but we get about Rs. 5,000 a year from the Belgaum District. The tree is increasing rapidly in forests.

Q. You have not many trees of merchantable size—*A.* Not a great many. If we could get the people to co-operate with us it would be very easy to grow the trees as we know where they will grow.

Q. Is there any spike in Belgaum?—*A.* No.

Q. What is the present arrangement? Can a man cut down the tree if he chooses, or will he have to cut it with the permission of the Forest Department?—*A.* We have one or two men on special duty. They arrange for the cutting of the trees and the wood is all sent to a central depôt. Lately I think they have got the Public Works Department and the Local Board to agree to the Forest Department making all the arrangements for sale and taking a small percentage for the trouble involved.

Sir F. H. Stewart.—Q. If you had a considerably longer budget, you would like to see a good portion of it devoted to engineering questions and commercial questions?—*A.* Yes.

Q. In that case would your engineer and commercial man be a regular member of the Forest Service, or do you think they should be engaged temporarily?—*A.* I do not think it will be necessary to have regular members of the Forest Service as engineers any way. They have now got an engineer down in Kanara. He is not a forest officer but a Public Works Department man. Also a civil engineer is now running the new saw-mills. The commercial man might, with advantage, be a forest officer. I doubt, however, whether either engineers or commercial men are only needed temporarily.

Q. How are the forest products collected? Supposing I wanted to buy, would you collect them for me, or would I have to make my own arrangements?—*A.* Is it a small or a large quantity?

Q. Does it matter much?—Say a considerable quantity.—*A.* It does make a difference. Small quantities of certain products (minor products) are usually sold on permits: the purchaser collecting. Timber could be purchased from a contractor in auction at depôts from the Forest Department or standing in coupes. The right to collect large quantities of minor produce is sold by auction.

Q. Have the Forest Department a hold over the contractors? Do they supervise the work and see that contracts are carried out?—*A.* They do. There are penal clauses in the agreements under which it is possible to take action.

Q. Are you fairly well off for labour in the forests now?—*A.* No, very badly off indeed. There is constant trouble, both from shortness of coolies and of carts. A large amount of wood that we want to get out is not cut every year simply because we cannot get the labour. In the Belgaum Division we should get at least 25 per cent extra revenue were the necessary labour forthcoming.

Q. Is the difficulty due to trouble about grazing rights?—*A.* Not at all, there is no connection whatever between grazing privileges and shortness of labour in Belgaum or any other division I am acquainted with. We offer every inducement we can. I think it is partly due to the fact that labour goes elsewhere.

Q. It is not due to oppression of any kind on the part of the contractors?—*A.* No, if a contractor did anything in the way of oppressing the villagers he would not be able to carry out his own work.

Q. There was a suggestion made in the Madras Presidency that near the forests there is a lot of comparatively valueless undergrowth and that these might be cleared for cultivation to encourage the people to settle and part of that labour would be available for use in the forests too. Could that be done here?—*A.* Are you referring to the undergrowth which is round the fields in forests? Everywhere, as far as I know, in the Southern Circle, certainly in the Belgaum District, the people are not only allowed to clear such undergrowth, but encouraged to do so. There is no difficulty here. We are all trying to obtain settlers and we give them lands in the forest in order to get more people of the kind we want.

Q. I do not know what is the organisation of the Forest Department here. There is no Chief Conservator here?—*A.* No. But I understand this appointment is now being made. There are four circles, that is, the Central Circle in charge of the Senior Conservator, the Southern Circle, and the Northern Circle. These three are in charge of Conservators.

Q. How do you communicate with the Local Government?—*A.* Through the Senior Conservator.

Q. To one of the Secretaries to Government?—*A.* Yes.

Q. And there is a Member of Council in charge?—*A.* Yes, the fourth circle is held by a Deputy Conservator, who is not a Conservator at all.

WITNESS No. 305.

SIR STANLEY REED, *Editor, "Times of India," Bombay.*

(Submitted after oral examination.)

ADDITIONAL WRITTEN EVIDENCE.

For the witness' WRITTEN and ORAL EVIDENCE, *vide* pages 197 - 200 of Vol. IV of the Minutes of Evidence.

The Industrial Commission has been so good as to ask me to submit a supplementary memorandum on the following points:—

1. The question of establishing an industrial bank.

2. The relations which should exist between the officers of an Imperial and of Provincial Departments of Industries, or of any technical and scientific departments that may be established for the purpose of assisting industrial enterprises.

3. The possibilities and advantages of the formation of a local stock exchange in Bombay on lines similar to those of the London Stock Exchange.

The question of industrial banks cannot be dissociated from the general question of the mobilisation of the capital resources of the country. I regard the more effective organisation of our capital resources as the most urgent financial-economic issue which we have to face.

Hitherto very little has been done in this direction. There are few branches of the Presidency Banks; there are only four stock exchanges in India, for a population of 315 millions of people; the United Provinces, the Punjab and the Central Provinces are without any facilities for the transfer of stocks and shares nearer than Calcutta and Bombay. There are no mofussil clearing houses, with the result that prohibitive charges are levied on the realisation of that great credit instrument, the cheque. The organisation of Indian credit has been very largely—certainly until the issue of the last war loan—left to take care of itself, with the result that in a country where every available rupee should be mobilised for productive purposes, a large proportion of the capital resources is represented by inert and expensive currency.

It is often argued that Indian capital is so timid that no development of our credit machinery will bring it into circulation. To that proposition I have always demurred. Before the war the stock phrase was "the shortage of Indian capital." On the contrary, even with our most defective credit machinery, the supply of Indian capital was, if anything, in excess of the opportunities of conservative and reasonably remunerative investment. That is established by a study of the stock and share list in any of the years immediately preceding the war, and I may illustrate it by a concrete instance. In 1912 a friend wrote to me from London saying that he had a few thousand pounds to invest and asking me to lay it out in India. I sent him a list of our best stocks, with their market prices; he replied that he could secure a better return in London. That, in an undeveloped country like India, which was borrowing largely in the London market, illustrates that something is radically wrong. The huge subscriptions to the Tata enterprises shows that the money is here, provided there is confidence in the honesty and competence of the firm which asks for it. Moreover, I think that inadequate attention is paid to the revolution in the money-power of India caused by the increase in the prices of all classes of produce for which there is—and for many years after the war there will continue to be—an insatiable demand which has induced the very large balance of trade in favour of India recorded in recent trade reports.

In the years to come India will be thrown increasingly on her own capital resources, whilst the demand for capital expenditure will be immense. Apart from the needs of the railways whose magnitude is only dimly appreciated, the State will have to provide capital for a multitude of purposes. The demands of industry will be continuous. The money is here, if we first mobilise it, and then provide the means of applying it in the right direction.

The first need is an immediate and widespread extension of banking facilities. Our present deficiencies are in the main due to the too rigid application of banking practice derived from a highly developed State like England—where even there it has not been found well suited to modern conditions—to an economically undeveloped State like India. The advantages and profits accruing from the custody of State funds have been reaped by the Presidency Banks without requiring from those banks any corresponding service in the development of the Indian credit machinery. On the one hand the Presidency Banks, despite the antiquated restrictions on their operations, have made large, in view of their special relations with the State, excessive profits; on the other, mofussil India is deplorably starved of credit machinery.

The immediate task is to apply the Treasury Balances which now either are applied to the unserviceable profits of the Presidency Banks, or lie unproductive in the Reserve Treasuries, to the development of the credit machinery of India. Whether this is done through the agency of the Presidency Banks or through a State Bank is immaterial, as long as it is done, and done quickly. The easiest method is to act through the Presidency Banks, to strike off the obsolescent fetters which now hamper the legitimate operations of these banks and drive business from them; to abolish the Reserve Treasuries and keep all Treasury Balances with the Presidency Bank. But in return for the very valuable usufruct of these monies the Presidency Banks should be compelled every year to open a number of branches proportionate to the profit made on the use of the Government monies, until there is a branch of a reliable bank in at least every district headquarter. If this is found to be impracticable through the agency of the Presidency Banks, then a State Bank should be established without delay, to take over the whole management of the Government balances, the Paper Currency, the Gold Standard Reserve, and the Treasuries, and the Presidency Banks freed from all restrictions save those which govern all joint stock banks, be left to carry on a general banking business.

For the utilisation of the resources thus mobilised two entirely distinct agencies are required—the joint stock bank, which advances against the ordinary commercial securities, and the industrial bank, which devotes its attention mainly to the support of new industrial enterprises. The joint stock banking system demands no special State aid, beyond the continuous use of State funds for the development of banking facilities in the mofussil, on the lines which have been suggested. The question of the starting of industrial banks has really been solved whilst the Commission was sitting in Bombay. Whilst some witnesses have talked of the necessity of Government guarantees in order to raise a capital of fifty lakhs of rupees for an industrial bank, the Tata Industrial Bank has already received subscriptions to the extent of eight crores of rupees. I am confident that the Commission fully appreciate the importance of this event. In a country of whose poverty we are perpetually reminded, and where we are always being told capital is inadequate and timid, there has been made the largest single subscription to a financial corporation in, I believe, the history of finance. There could be no better illustration of the latent money-power of the country. The capital of the Tata Industrial Bank, with the credit which this large subscription will give it, solves the question of industrial bank for as far ahead as we can see. The profitable employment of this capital will demand branches in the chief industrial centres, and there is no present necessity to talk of Government guarantees in order to secure the capital which is required.

But a very important issue indeed is raised when we consider what should be the attitude of Government towards this, and any similar industrial banks, which may be formed under reliable auspices. Many suggestions have been made for direct Government co-operation. I believe little in Government guarantees of direct assistance, which are apt to be embarrassing on both sides: I am a great believer in the attitude of mind. I therefore urge that Government should treat substantial industrial banks as seminational enterprises, with whose success the economic future of the country is largely associated. I hold that Government should recognise that the success of these banks is a question in which the State has an intimate and vital concern, and that the resources of the State should be freely and generously utilised for the purpose of encouraging the industries fathered by the industrial banks. In India we cannot get away from the State. In all questions affecting the land, forests, irrigation, railways, technical staff, market, etc., the State is always an important, sometimes the dominant, factor. If it is understood that this great influence will be continuously used for the encouragement of indigenous industry both through and outside the industrial banks, then the assistance of Government will be far more effective than any form of guarantee of capital, which experience has shown to be unnecessary.

2. With regard to the relations which should exist between the officers of an Imperial and of Provincial Departments of Industries, or of any technical and scientific departments that may be established for the purpose of assisting industrial enterprises, it is not easy to express an opinion when the relations between the Imperial and Provincial Governments are in the melting pot, and we shall certainly see a radical measure of Provincial autonomy. But whatever be the fabric of government, the principle I suggest is clear; the functions of research and the higher technique should be entirely Imperial; the Imperial Government should also have co-ordinating authority to prevent overlapping: the functions of the Provincial Governments should be mainly administrative.

3. I see no reason for the establishment of a Government Stock Exchange in Bombay. The dissatisfaction at the methods of the old exchange has now found expression in the establishment of a competing exchange; and I understand that a sum of Rs. 25 lakhs has been promised for the erection of suitable premises. Possibly legislation might be passed prescribing the general lines on which stock exchanges shall work; but Government activities can be better devoted to the establishment of new exchanges, where none now exist, than to displacing existing agencies.

WITNESS No. 307. *Mr. T. W. Bonner.*

MR. T. W. BONNER, *Locomotive Superintendent, Great Indian Peninsula Railway, Bombay.*

For the Witness' Written Evidence, *vide* pages 218—219 of Volume IV of the Minutes of Evidence.

ORAL EVIDENCE, 19TH NOVEMBER 1917.

Mr. C. E. Low.—Q. You say, "I am occasionally asked to allow students from various colleges to attend the workshops for practical instruction during college vacation": have you

ever taken any in under those circumstances?—*A.* Yes, we have taken a large number both from Bombay and Mysore, Bangalore and Roorkee.

Q. How long do you keep them for practical instruction under those circumstances?—*A.* It varies from three weeks to four months.

Q. And what do you try to show them within that time?—*A.* Well, they are generally allowed to go about the workshops, and make notes if they think proper.

Q. Have you any control over them?—*A.* We have no control over them whatsoever. They take notes for the benefit of their professors in their colleges.

Q. Do they keep to shop hours?—*A.* More or less, but they are not compelled to.

Q. You are not responsible for their work? Do you assign them to any particular branch of work?—*A.* We have nothing to do with them.

Q. Do you think that sort of thing does them any good?—*A.* No, I think in some cases it does harm. They do not work with their hands.

Q. Do any of them do any work?—*A.* Not to my knowledge. One or two may have done some work, but not to my knowledge.

Q. And this arrangement is entered into simply at the request of the college authorities?—*A.* The professor of the college writes to us every vacation and asks us to take two or three boys.

Q. And then they go back and say that they are trained in the Great Indian Peninsula Railway workshop?—*A.* They go back and say that they have put in so many months in a certain workshop in the Great Indian Peninsula Railway.

Q. What would an employer understand about his qualifications?—*A.* Nothing, I think it is misleading. I think I pointed that out at their last meeting at Poona.

Q. What meeting do you refer to?—*A.* The College of Science there. I am on the Advisory Board.

Q. Where do they come from, I mean what caste do they belong to, the apprentices who come to your workshop with the idea of qualifying for an engineer certificate?—*A.* We get no educated Indians, none of the middle or higher classes.

Q. Well, I see a good many Brahmin engineers in small mills in gins and so on in Berar and the Central Provinces. I see a good many of these men sufficiently qualified to take charge of small mills?—*A.* They are men who have got probably a boiler certificate, and they work their way up and then get into these positions upcountry in the several ginning and other mills, but they are not constructional men, they are maintenance men. If you put them in the workshop and ask them to construct something, you cannot trust them to do such work, they are wanting in many respects.

Q. You see men of that type in charge of engines up to h. p. 300 or 400 in small spinning mills. They say they have undergone training?—*A.* That is equivalent to a driver, a glorified driver, a driver of a locomotive. He is of course worth his value. He has his market value, he probably gets 350 or 400 a month; he is very good in that position; but he would be a hopeless failure if you put him in the workshop. These men of course look after mills, but they are merely drivers.

Q. The man who is in a corresponding position in England as engineer in charge of a small plant or mill, is he a man who has been through the workshop?—*A.* He is a man who has been through the workshops; he is a mechanic.

Q. You were in charge of the Great Indian Peninsula Workshops at Jhansi at one time, I understand?—*A.* Yes, that was some eight years ago.

Q. Well, did you have any educated upcountry men, say, Hindus, coming for training there?—*A.* We had, I think, three. One of these is rather a valuable man at the present moment, he is an educated man, he is a Mahomedan; I saw his value and eventually after he had been through the workshop I brought him into the Drawing Office, and I may say at the present moment he is one of the best draftsmen I have seen out here and would compete very favourably with many Europeans. He is one of the educated class that I have managed to get hold of.

Q. Do you take apprentices in the Great Indian Peninsula Workshops in these days?—*A.* Oh, yes.

Q. What class of men are these?—*A.* They are men of the fitter class, sons of the fitters and sons of the men in the shops.

Q. Have you had any experience of the pupils from the technical college here, the Victoria Jubilee, in the Bombay or Jhansi workshop?—*A.* They only come to the workshops for the vacation.

Q. But you never had any of them doing jobs for you and employed under you?—*A.* No. But I might tell you as an example that about a month ago I took a man on from the Poona college which is somewhat similar; he came to me for a job and he was recommended; he brought a letter from some firm in Bombay saying that they thought that he might be very valuable to us, that he had passed very highly in this college, and that he was willing to start on Rs. 75 a month. For example's sake I have taken him on Rs. 75 a month, but his work

in the shops is worth only Rs. 5 to me; the man has had no practical training, he has only visited the various mechanical shops during vacation.

Q. We have had various propositions put before us as means of training mechanical engineers. I am talking of the educated type of man; one of them is this, that a man who takes up mechanical engineering does not know quite what he is up against, when he leaves the college he finds that he cannot get on with the practical part of it in workshops in order to become a fully qualified mechanical engineer. Partly to get over that and partly to get over the difficulty of practical training, which is the principal criticism made against students in engineering colleges and institutes, it is proposed, before he begins his course in the college at all, that he must put in two or three years in a workshop and work as an apprentice; if he comes through that, he goes to his college and finishes up with his theoretical. Well, there are two objections against that: one is that you won't get the educated classes to do it, and the second is that during those years in the workshops he would have forgotten whatever education he has had to such an extent as to make it very difficult for him to take advantage of his theoretical training. Now what is your own view of that position? What would you recommend in such cases?—*A.* I would recommend that first of all they should go into the workshops for the first two years, and then start their technical training. Now these men go into the workshops at a late period, and then they do not care to work, or in other cases they are not physically fit. So the first thing is that the man should like the job and secondly he must be physically fit to do hard work there. You must give him two years in the workshops, and after that he should get technical training simultaneously with work in the shops. That is to say, you must give him two half or three half days a week to go to the technical school; that technical school should be part of the workshop.

Q. In other parts of India they recommended that the Government should help the railway companies by adding technical classes to the big railway workshops?—*A.* Well, of course that is a very nice idea if they get assistance; but my experience at home is that the railways found that it was to their benefit to go out of their way to educate their apprentices because they thereby get valuable men. They can select their men from the school. Of course there are a very large number of men whom they cannot offer posts, but the pick of them they get hold of and offer them very good posts. Thus, it is to the benefit of the railway to educate these apprentices.

Q. Then you think it will pay the railway?—*A.* In my opinion it would pay them in the end.

Q. Have you any technical classes at present here?—*A.* No, we are at present negotiating for a man. We have just got a teacher and I think we will start on the 1st January. I think it will be necessary for him to come down two or three mornings a week. We pick the best of these boys for our service. We would only take educated men.

Q. When you say that, what standard do you mean?—*A.* Indians who have passed the sixth standard.

Q. I suppose as a rule you give preference to the sons of your employés?—*A.* We should give them preference, but as a rule the sons of our employés are not educated up to that standard.

Q. But, do you think you will get the educated types, the really intellectual classes, the Brahmins to come and put in two year's practical training?—*A.* Well, I may tell you this. When you wrote to me asking me to give evidence and after my reply to your letter, it occurred to me to give it a trial by advertising throughout India, and I advertised in all the vernacular papers for educated youths to come forward and take up their apprenticeship in the workshop. I pointed out that they would receive Rs. 15 a month to start with. I made a special grade for them giving them Rs. 15 rising to Rs. 40 in their last year. Of course it is a most unusual thing to do: you are not supposed to pay youths to learn trade, it is generally the other way about. But with a view to seeing how many men I could get, I advertised in the Punjab, the Central Provinces, and in Khandesh, and up to date I have received 11 and these boys have passed the sixth standard according to their school certificates. One of them has left, he could not stand, the work was too strenuous for him; and three others who are rather big men one of whom comes from Dharwar, the other two from the Central Provinces, I think, have asked to be transferred because they find the work too severe, they want to go into a lighter job. So that leaves six. I forget the date of my letter to you, but my advertisement was published about a week afterwards. Up to the present I have had 11 applicants, and I think you may take it that the advertisement went through most parts of India. I have not had time to see, but so far nine are working.

President. Q.—About these apprentices, how long did you advertise that they should serve their apprenticeship?—*A.* Five years.

Q. And what prospects did you put before them?—*A.* Of course I have told them and they have also got it in writing, that they will be promoted according to their ability. After they have served their time, they were told that for instance if the man was a boiler-maker he would be expected to mark off copper plates and other work in connection with boiler-making, and if the work was done satisfactorily, say to the satisfaction of the foreman of the works, he would be started on, say, Rs. 100 a month, and that his promotion after that would depend entirely on his ability.

Mr. C. E. Low.—*Q.* Rs. 100 and he has got to work with his hands?—*A.* He is a mechanic.

President.—*Q.* Did you advertise in the vernacular papers only?—*A.* Yes, vernacular papers.

Q. But are not these boys that you want to get more likely to read English papers?—*A.* Well, I forget, I think we put the advertisement in a large number of papers; there were one or two English papers, but I could not tell you exactly.

Mr. C. E. Low.—*Q.* Did you try any of the provincial Education Departments as well?—*A.* I simply advertised.

Q. The experience one gets in the Agricultural Department is very different?—*A.* Well, the boiler-maker I was speaking of just now, his is very hard work right way through.

Q. Up to what time if he does well is he likely to be there before he becomes a charge. man?—*A.* If he has to do work with his hands, probably 15 years.

Q. That would not appeal to the highly educated man in other countries?—*A.* They have all to do it at home. I am not speaking of professors, I am speaking of mechanics. We don't want scientific experts as mechanics. The man we bring out, the covenanted man, in some cases he comes out as a chargeman, he does not have to work to the same extent with his hands as the mechanic; he takes charge of a work and sees that it is done properly; probably after two or three years he is promoted to foreman; we bring the man out with the object of making him foreman; we do not covenant mechanics and boiler-makers who are probably never going to be promoted, we train our own staff for that work.

Q. I am talking about officers?—*A.* The officer comes out as an officer.

Q. What is his training at home?—*A.* He is trained in the same way exactly. He starts at the bottom of the ladder, he goes in as a mechanic, and he gets all the kicks and knocks, the same as every other boy. He is called a premium man, he is very different from the ordinary men, but he comes out in the end as an officer and gets a good salary. Now, for instance, take the son of a mechanic in a shop at home; that boy goes in as what they call in some cases a half-grauad apprentice; he is taken into the shop, he starts probably in the fitting shop, he goes then into the metal shop, the foundry shop and so on in turn he goes through several shops, and then probably he is not certain of getting a job, he goes to Westminster and puts his name in one of the consulting engineers registers, and a job turns up for him.

Hon'ble Sir R. N. Mookerjee.—*Q.* How long does it take him, the premium man, to go through his training?—*A.* It varies from 4 to 5 years.

Q. With what qualifications does he go there, what general educational qualification, does he usually possess a University degree?—*A.* He has probably passed through public school, the same standard as the secondary school in this country.

Q. You are supposed to be there at 16?—*A.* Yes, as a matter of fact the majority of them go there at about 16 or 17.

Q. But the Indian has not got the same prospects here.

President.—*Q.* You say that you have only 7 or 8 apprentices in your workshop. Mr. Page of the Bombay, Baroda and Central India Railway says that he has got 139 apprentices?—*A.* Then I have got about 300.

Q. I am referring to educated men, men of the premium type?

Hon'ble Sir Fazulbhoy Currimbhoy—*Q.* Can you tell us what is the highest salary an Indian gets in your department?—*A.* What nationality?

Q. An Indian. How much does he get?—*A.* I have got one in the drawing office getting Rs. 175. It is very difficult to remember, I could not be certain. I have got several on 200, I have several between 200 and 300.

Q. Do you think a boy who goes through a 5 years' apprenticeship in a mechanical workshop can turn out a better workman?—*A.* I think he would if he puts his mind to his work and has ability for it.

Q. You take a boy who has passed the sixth standard as an apprentice for five years at Rs. 15 per month?—*A.* He will pass into the workshop at Rs. 15; if he has passed the sixth standard, he will get from Rs. 15 to Rs. 40 a month in five years. We will pay him that to learn his trade, whereas it would cost him Rs. 1,000 to get that training outside.

Q. Will he have the prospect of going up to 200 or 250?—*A.* He will have the prospect of going up to 250 or more provided he shows the ability.

Q. Will he get the same pay if he is as capable as a European?—*A.* He can get the same rate.

Q. Is your company giving any scholarships to students to go to Europe for study?—*A.* None.

Q. Are the literate class of people physically fit for the workshop? Can they use their hands?—*A.* Some are physically fit, many are not.

Q. That is your trouble? Do you get men from the Mahomedan class in the Engineering Department?—*A.* We get both Hindus and Mahomedans.

Q. Are they Deccanis? Do you get any Guzeratis?—*A.* Guzeratis, Hindus, Mahomedans.

Q. But generally by what class is engineering taken up? The Mahrati or the Guzerati class?—*A.* Mahratis more than Guzeratis, but Mahomedans are generally more numerous.

Mr. G. A. Thomas.—*Q.* You have probably read the report on technical instruction made by Mr. Dawson and Colonel Atkinson of the Victoria Jubilee Institute published a few years ago, and you are probably aware that they made certain recommendations for the Bombay Presidency, and one of the recommendations was to the effect that a term of two years of apprenticeship in outside workshops should be included in the courses of mechanical and electrical engineering, and that certificates should be granted on such courses being completed. Col. Atkinson and Mr. Dawson reported that they had made enquiries and nearly every employer of labour invited was willing to co-operate in that scheme of apprenticeship. These expectations, however, were not realised, subsequently the suggestion was made that a marked distinction should be made between certificates granted for purely theoretical education and those granted for education both in theory and practice. The Board of the College of Engineering at Poona were asked to submit proposals for giving effect to the recommendations made for the inclusion of two years of apprenticeship in outside workshops in the courses of mechanical and electrical engineering and to the grant to students of these courses of two distinct forms of certificates, namely a provisional certificate to be signed by the principal only and given to those students for whom apprenticeships cannot be found, and a permanent certificate to be granted by the Director of Public Instruction to those students who have completed a two years' practical course in outside workshops. I believe that this was discussed at a meeting of the Board of the Poona College of Engineering, and the general opinion there was that it would not be fair to give different classes of certificates unless you could find apprenticeships for those boys that have already left the College. Have you any suggestions to make as to how places could be found for these students that have left the College of Engineering?—*A.* No, I have none.

Q. Is it your opinion that private workshops in Bombay would be willing to agree to such a proposal?—*A.* I do not think that they would.

Q. Do you think it possible for apprenticeships to be found for them in the railway workshops provided they go through the course? Would you fall in with that view?—*A.* The railway works would not agree.

Q. Why?—*A.* Because it is not a practical suggestion.

Q. Do you think that theoretical training should follow practical training?—*A.* I think that practical training should be given first. After a boy has put in a certain period in the shops, then give him his technical training simultaneously. That is what I have proposed, and that is the custom throughout England and Europe.

Q. In your written evidence in paragraph 4 you speak about technical schools and you say that these schools and other existing institutions might be endowed by wealthy gentlemen of this country in order that scholarships might be given to deserving students to enable them to finish their training in Europe. Do you think that the training given in the colleges in India is inadequate?—*A.* In India we have a very limited field of instruction. We are almost 20 years behind the time in India; we try out here to start where everybody else has left off and we always find that we are behind the time. We have to bring ourselves up to date. The boy here gets his grounding, he has got his education, then send him home. I have got many of my apprentices, European apprentices, I send them home and get them into places at home through my friends; they will do exceedingly well.

Q. Do you suggest that every boy who shows certain intelligence should be sent home?—*A.* Every boy who shows a certain amount of aptitude for mechanical work should, I think, be sent home, and when he comes back, he will be of more value.

Q. Do you think Government should give scholarships?—*A.* You have got lots of wealthy gentlemen in this country, the same as they have at home, to endow scholarships.

Q. What is your opinion of the Engineering College at Poona?—*A.* It is now being run on wrong lines.

Sir R. N. Mookerjee.—*Q.* Have you any European or Anglo-Indian apprentices in your workshop?—*A.* We have got a few, very few Anglo-Indians and Europeans.

Q. Do youprovide them with boarding houses?—*A.* No.

Q. Do they live outside same as everybody else?—*A.* They find their own quarters.

Q. Do you live outside same as everybody else?—*A.* They find their own quarters. We have an idea of establishing a dormitory and fitting it out for suitable apprentices, but we have not arrived at that stage. If we could get a number of educated apprentices to come forward, I think we should be able to do so.

Q. In Howrah in the East Indian Railway workshop there are both Indians and Europeans, but although they go through the same work and pass the same examination, there are two grades of pay, the European gets R75 or so, whereas the Indian gets only R35. Have you got the same scale of pay here?—*A.* We pay the European more than we pay the Indian.

Q. Though the work and the examinations they pass are the same, and they go through the same apprenticeship, but the Indians begin on lower pay?—Have you any proposal to

do away with that distinction or in other words to encourage better class Indians to come more readily, that is to put them on the same rate of pay if their practical training and education be on the same level with Europeans?—*A.* No, I do not think it would be fair.

Q. I understand that one of the drawbacks of the present system from which educated Indians do not like to take the profession of mechanical engineering is that although they go through the same course, do exactly the same work, pass the same examination, they get only half the pay of Europeans, which they think is most iniquitous?—*A.* Well, I have a little experience of the mechanical workshop; you take the two, Indian and European, put the European or Eurasian whoever he may be, alongside the Indian, at the end of the day you will find that the European has turned out more work than the Indian: the Indian has not the same physical capacity for doing the same work.

Q. But you get exceptions in both classes?—*A.* I am speaking generally.

Q. In Howrah I believe they have got a fixed rule that the Indians should get half the pay of the Europeans?—*A.* I thought you were speaking of the intrinsic value of the men.

Q. The educated Indians complain that though they go to that workshop and get the same training and pass the same examination, when they are taken into the service they are put into a much lower pay than their class fellows who happen to be Europeans or Anglo-Indians. This is their grievance. I want to know whether you consider it fair?—*A.* Well, of course that is a question of market value. They may pass the same examination, but whether you get the same work out of them in the twelve months as the Europeans is doubtful. Their market value is not quite the same.

Q. I will repeat that my information is that though they may possess the same market value the European starts on ₹75 while the Indian holding the same position is taken on ₹35?—*A.* There are different market values for both classes, the one can live on ₹35 a month, while the other cannot. Don't you think that this should be taken into consideration?

Q. I am only asking what is the rule and your opinion?

Mr. A. Chatterton.—*Q.* I suppose you have a large drawing office in your workshops. Are the men all Europeans?—*A.* Europeans, Eurasians, Indian Christians, and Indians. I think there are only two Indians, they are Mahomedans, and the others are Native Christians and Europeans.

Q. Do you put any of the apprentices in the drawing office?—*A.* As soon as we find that a man is likely to make a good draftsman, we take him up and give him a trial.

Q. What pay do draftsmen get?—*A.* They get 50, 60, 120, 300, 350, 600.

Q. I suppose you have a head draftsman on 600?—*A.* We have one, he has of course European training, a man brought from home.

Q. Could you possibly use your drawing office for training apprentices, for giving theoretical training?—*A.* No, we could not afford it, there is no room for development; it would not be big enough; you could not give lectures in a drawing office.

Q. There is a proposal, I think it was sanctioned in Madras, for establishing a technical school in the neighbourhood of the Perambur railway workshops and three or four private workshops, and the employers have agreed to boys going to the school for three afternoons a week.—*A.* That is a sound proposition.

Q. And instead of training boys exclusively in industrial schools, the Government have instituted a number of apprenticeships and have allotted so many apprentices to each workshop. Whilst they are under-going apprenticeship, they are under the control of the workshop manager who has to report as to how the apprentices are getting on and to provide for proper systematic training. You have no systematic arrangement for training apprentices of any kind?—*A.* We propose on the 1st January to start a school. The class of apprentices we have get no systematic training, they just go through the workshops, they may be told to do for instance the smith's work, or something of the kind, but there is no routine.

Q. There is no regular supervision of their work?—*A.* There is supervision of their work, but there is no regular course for them to go through.

Q. So there is an impasse: that is, it is very difficult to get the educated Indian to come in?—*A.* Very difficult. As a matter of fact they do not like going through the shops: it is too severe, too arduous, too rigorous.

Q. Do you consider railway workshops a good training ground for apprentices? Do you think they are as good for this purpose as a small general engineering shop?—*A.* I think a man will get very good knowledge in a railway workshop. If he goes to a small engineering workshop, of course he will probably not have to do the same heavy work. There is not much scope to learn in small engineering workshops, but it is not so in railway workshops where all sorts of things are done especially during the war when we do almost everything.

President.—*Q.* With regard to these apprentices, do you take any responsibility in any way, do you grant them any certificates?—*A.* No.

Q. At what age would you take these educated apprentices?—*A.* We will take Indians when they are 16 to 18 years.

Q. And then you would put them all through the various works in turn?—*A.* Yes, this will take four or five years.

Q. I think you said that you would put them for two years in the workshops, and give them another two years combined workshop and technical training?—*A.* The first two years would be entirely spent in the workshops, the second two years will be for technical training in the technical institute.

Q. Which you have not got at present, but which you are going to start?—*A.* Yes.

Q. Then these men at the end of that time should be competent mechanics from your point of view, they would require no further training?—*A.* Of course he would probably want more training, but he would be sufficiently competent to go out into the world and claim his pay as a mechanic.

Q. What pay, Rs. 100 a month?—*A.* Yes, 100 or 80.

Q. But are you likely to get these superior classes for this kind of training?—*A.* I do not know, it all depends on whether they are willing.

Q. You mean educated Indians?—*A.* I could not say: I am looking out for them. I will be very pleased to get such men for training.

Q. Then you really had about 10 applicants under this scheme, though you were willing to give them a small pay?—*A.* We are prepared to give them Rs. 15 to Rs. 40 a month, 15 in the 1st year, 17 in the 2nd year, 20 in the 3rd year, 30 in the 4th year and 40 in the 5th year. Of course I do not know whether that would be looked upon by other workshops as a proper thing to do, but we have just thrown out this suggestion to see if these are coming in for the pay that we offer. Of course it is quite contrary to the custom in any part of the world.

Q. Then with regard to the other apprentices of whom I understand you have about 300 . . . .?—*A.* Between 200 and 300.

Q. Who are they?—*A.* Well they are all sorts of people. I believe they are lower castes.

Q. But would they have any chance of getting into this apprentice class we have been discussing?—*A.* No, they have not got the education: it is no use trying to make scientific men out of men with no education. The men must possess a certain amount of education if you are going to train them on scientific lines at all.

Q. This class is quite uneducated?—*A.* They are quite uneducated. They are usually sons of our own mechanics and probably in some cases they are young fellows who come into the shops as coolies. Some of them are of course good mechanics, but they are half-finished. You could not give them training, for instance they cannot read a drawing, they could not scale it. That is the object of getting a certain number of educated men in the shops so that they can teach these in such things.

Q. Of course you might get exceptional men amongst them?—*A.* There are exceptions here and there. I may say there are two men here I know, they are Punjabis, self-made men, and they have been able to read drawings and that sort of thing, but generally speaking they are uneducated. But my main difficulty is that educated men do not come forward as they don't like to go through the rigorous training.

Q. These apprentices you were referring to who go through the workshops and qualify in an all-round way, you said that they have the prospect of getting a pay of something like Rs. 80 or 100; do you think that you are likely to attract a man of the educated class for the prospect you put before him?—*A.* He does not finish at that, he can go on to Rs. 150, 200, 220; he has got really good prospects.

Q. Outside or within the railway?—*A.* He can get within the railway.

Q. If any European boy came in on the same terms, would he begin on the same pay as the Indian? Would he not begin at about Rs. 80? You have not the same rule as they have in the East Indian Railway for giving the European a higher rate?—*A.* It all depends on the quality of work that they do. We have a uniform rule, we start the educated Indian on exactly the same as the European on Rs. 80 or 100, and we hold out exactly the same prospects.

To Sir F. H. Stewart. We have only just started taking apprentices. This question was taken up after you wrote to me. As I said, I advertised in the papers, and I have told those who have come forward, and also have given to them in writing a promise that if they pass their practical examination together with their theoretical examination they will start on Rs. 80 or 100 just the same as Europeans.

Hon'ble Sir R. N. Mookerjee.—*Q.* I understood it differently?

Witness to Sir F. H. Stewart. If I get a good class of Indian, a good boy, I pay him exactly the same as the European boy; but so far as the first period goes if we pay the Indian Rs. 80 we pay the European Rs. 100: If we pay the European Rs. 80 he cannot live, whereas if the Indian gets Rs. 100 he will become a rich man.

Hon'ble Sir R. N. Mookerjee.—*Q.* That is not the point now. Now take the higher services, the Civil Service for example, they live both the same, the Indian and the Englishman: their responsibility is not in any way less?—*A.* But the barrister will live on as a briefless man whereas the Englishman will die.

Q. But there are briefless English barristers also?—*A.* I quite agree.

Q. With regard to these educated apprentices, do you put them on the same rate ? *A.* We have just begun to take these apprentices within the last few months; after their training they will probably start on Rs. 80, if they showed exceptional ability, they might start on Rs. 100.

Q. Do you think that it would pay to make any distinction; that is to say, if you did make any distinction, are you likely to attract the best class of Indian to apply?—*A.* Probably not.

Q. You have to pay, say, a weaver a little more than that, you cannot get an educated Indian on 15 to 40 Rs. for a five years apprentice course? Have you any system like a provident fund, by which they should pay into a fund say one-twelfth of their pay, that is to say, one month's pay of these apprentices; do you do the same?—*A.* I have heard of that, we have nothing of the kind.

Mr. H. N. Morris.

WITNESS No. 319.

MR. H. N. MORRIS, *Chairman of the Eastern Chemical Company, Limited.*

WRITTEN EVIDENCE.

Financial aid to industrial enterprises.

Capital.

My experience in India is limited to the one pioneer chemical industry, the Eastern Chemical Company. The extraordinary difficulties experienced in starting this enterprise point to the fact that Government assistance in some form is desirable.

Methods of Government assistance.

Q. 5.—(*1*) Grants-in-aid for experimental work. *Illustrations*: (*a*) experimental work on the manufacture of *magnesium* chloride from salt pan liquors; (*b*) experimental plant for treating paddy husk and manufacture of acetic acid and acetone therefrom; (*c*) experiments with fertilizers on land to demonstrate the value of fertilizers.

(2) Subsidies in the case of manufacturing plants which can be adapted to the manufacture of munitions of war in the interests of the safety of the country. An industry that is indispensable or sufficiently important should either be subsidised or kept in existence by means of bounties. *Illustration*: the dye manufacturing industry in England which had been allowed to pass into the hands of Germany before the war. Bounties are not advised except in the event of meeting bounty-fed or subsidised competition.

(3) Guarantees by Government of a minimum dividend for the first five years, with repayment thereafter of any payments made, at the rate of not more than 1 per cent per annum. This is, however, not strongly recommended.

(4) Loans at a low rate of interest and repayable out of a portion of the net profits after an agreed percentage has been paid to the shareholders.

(5) This is not recommended. The nature of chemical manufacturing plant makes it undesirable.

(6) This is worth serious consideration where munitions of war or other products are required for national safety, but other methods preferred if they can be arranged.

(7) This is recommended in the case of products used by the Government. At equal rates Government should guarantee to purchase all their requirements from industrial concerns in India in preference to either buying or being supplied with an imported article.

(8) Exemption from income-tax for a term of years is to be recommended but unnecessary in the event of 5 (2), 5 (3), 5 (4). Exemption from taxation on materials used for erection of plant and raw materials for manufacture is strongly recommended. The Eastern Chemical Company, Limited, has suffered severely by having to pay import duties on a large portion of their plant and machinery which had to be imported, and by payment of tariffs on some of the raw materials used in manufacture. At the same time, the manufactured products were allowed to enter the country in many cases free of duty.

5 (3), 5 (4), 5 (5) would necessitate a representative of the Government being on the board.

Pioneering industries.

5 (1), 5 (2) would require the appointment of a Government auditor with access to the books. Government pioneer factories are not recommended; Government should not pioneer industries.

Co-operative societies.

Co-operative societies are adapted for the manufacture of articles of household use; more suitable for the packing and distribution of goods, buying in large quantities in the cheapest markets and eliminating the profits of the middleman.

Government control of chemical industry.

The heavy chemical industry must be in the hands of large concerns and should be in few hands. This has been the weakness of England and the strength of Germany in the present war. There must be a cycle of manufactures, one dependent on the other, if it is to be successful. No chemical industry should be allowed by the Government to be started without a licence granted, and inspectors should be appointed by

Government to keep in touch with what goes on and report. The Alkali Act Inspectors appointed by the local Government Board in England are a good example of what is required.

Q. 14.—This depends on the kind of aid given by the Government.

Technical aid.

Q. 15.—Scientific aid now provided by the British Government: Results so far not satisfactory.

Q. 16.—No personal knowledge.

Q. 17.—Results of work should be accessible to all *bonâ fide* inquirers. Where possible to patent, it should be done, all users paying the same royalty. A manufacturers' association is desirable, such as that formed in England recently.

Q. 18.—Results should be published either by patent or in records under the control of a committee of publication. Representatives of the manufacturers should be on the board of publication.

Q. 19.—Agricultural experimental work.

Q. 20.—See previous answer.

Q. 21.—No experience.

Q. 22.—The Indian manufacturers should have the same advantages as the British and should, if possible, become members of the Association of Chemical Manufacturers.

Q. 23.—See 22.

Q. 24.—The Research Department in India should act in conjunction with, if not as a branch of, the Research Department of England.

Q. 25.—Yes.

Q. 26.—A Board of Industry to act in co-operation with the Department of Agriculture and Geology.

Q. 27.—By joint reports.

Q. 27-a.—Each industry should engage its own consulting engineers.

Assistance in marketing products.

Qns. 28—36.—Commercial museums and exhibitions are recommended, as although not important to the basic chemical industry at present, they will be more useful when colours are manufactured.

Q. 37.—Both.

Other forms of Government aid.

Q. 42.—Care should be taken that the chemical industry is not ruined by overproduction. The demands in the country are limited, but will develop, and no one can tell how quickly and to what extent they will develop.

Training of labour and supervision.

Q. 50.—Under a Department of Industries, Joint Committee of Educationalists and business men.

Q. 89.—All food-stuffs and medical preparations: The Government should fix standards of test for various fertilizers.

Q. 90.—This could be a department of the Government under the Director of Industries.

Q. 91.—Adulteration of all foods and drugs.

Q. 92.—See 90.

Q. 93.—No proprietary article to be sold without depositing the particulars of constitution with the Government department concerned.

Q. 95.—Patents should be carefully examined by an expert committee and, if once granted, their validity should be incontestable.

Q. 96.—Yes.

Q. 97.—(*1*) In Bombay the creek round the island should be made into a navigable canal.

(2) A railway siding to the Eastern Chemical Company's Works should be provided either at the expense of Government, or on "assisted" terms. Proper railway and water service is indispensable for the proper development of the industry.

Q. 102.—Everything possible should be done to encourage the production of cheap electricity. The Eastern Chemical Company has several developments in prospect when cheap electricity is available.

Q. 104.—Any ores containing sulphur, bauxite, barytes, magnesite, limestone, manganese all important to the Eastern Chemical Company's developments.

General.

Chemicals a key industry.

Q. 110.— There are certain key industries essential to the development of every civilised country. The most important of these is the chemical industry, and it should be the first concern of the Government to encourage and assist this industry in its infancy. Practically every important industry is dependent more or less upon chemicals. The textile trades alone require—

Sulphuric acid.
Hydrochloric acid.
Soda salts.
Soaps.
Magnesium chloride.
Magnesium sulphate.
Common salt.
China clay.
Starches.
Dye stuffs.

For agriculture artificial fertilizers are essential such as—

Sulphate of ammonia.
Nitrate of ammonia or soda.
Superphosphates.
Potash salts.

For the manufacture of glass—

Soda ash.
Sulphate of soda.

For the electric storage battery industry—

Sulphuric acid.

For paper-making—

Caustic soda.
Bleaching powder.
Sulphate of soda.
Barium sulphate.

For mineral water manufacture—

Carbonic acid gas or
Bicarbonate of soda and
Sulphuric acid.

For artificial stone—

Magnesium chloride.

For the leather trade—

Alum.
Bichromates.

These are a few examples to show the importance of the chemical industry to the other staple industries of the country.

There is no reason why all of these essential products upon which the various industries depend should not be made in India.

Salt.

Salt is already manufactured by solar evaporation, but not in sufficient quantities to supply the present demands. In the making of salt from sea water, *magnesium chloride* is produced and could be separated out and purified. The Eastern Chemical Company have their works in the centre of the salt pan area at Matunga, and are therefore well situated for doing this, but the separation and purification of magnesium

chloride would involve a considerable amount of experimental work. Moreover, the salt industry in India is carried on under Government supervision. I think, therefore, that the Government *might reasonably* be asked to co-operate with the Eastern Chemical Company in the early stages of the manufacture of magnesium chloride, on a large scale from the mother liquors of the salt pans.

This could be done either by—

(1) means of a "Research Allowance," to cover the cost of the preliminary work, until the plant begins to earn a profit;
(2) granting supplies of the salt pan mother liquor containing the magnesium chloride on reasonable terms;
(3) providing a proportion of the capital for the development of the industry on low terms of interest;
(4) partial control and guaranteeing a minimum dividend to the shareholders.

Magnesium chloride is required in increasing quantities for the manufacture of artificial stone, the two essential constituents of which are magnesite, which is obtained in Central India, and magnesium chloride. This manufacture is therefore of great importance to the country.

Sulphuric acid.

Sulphuric acid is now being manufactured in India in quantities more than sufficient to meet all the present demands, and for the last 12 months only unimportant quantities have been imported. The manufacture of this acid is the chief of the key industries. It is necessary, not only for direct use in some of the industries, but it is indispensable for the manufacture of other chemical products. The sulphur required for the production of sulphuric acid has up to the present been imported from Sicily, Europe or Japan, and consequently the cost of manufacture of the acid is higher than is the case in Europe. The manufacture can only be carried on profitably on account of the protection afforded by the freight on the imported acid, which is generally high because of the dangerous nature of the acid. There are, however, known to be deposits of pyrites and other ores containing sulphur in India, and if these can be utilized, it is possible that the sulphuric acid industry of India may be carried on as cheaply and efficiently as anywhere in Europe or America.

Hydrochloric acid.

Hydrochloric acid is now being manufactured, but the demand is small. When, however, it becomes more generally known that this acid is being made locally, it is reasonable to expect the demand to increase. In such event, no doubt, a larger and more efficient plant will be erected, and neutral sulphate of soda, suitable for the manufacture of glass, will be produced on a large scale as a by-product.

Nitric acid.

Nitric acid is now being manufactured in sufficient quantities to supply the local demand. It will be required in larger quantities as the number of coke ovens and by-products plants increase in number. The nitric acid at present is made either from imported Chilian saltpetre or from Indian nitrate of potash. The residue from the manufacture of this acid from nitrate of potash is being used for making a potash fertilizer. It can also be used for the manufacture of other potash salts, and a process has been designed by the Eastern Chemical Company for the conversion of the residue from the nitric acid manufacture into permanganate of potash by treatment with manganese ore, which is also found locally. The production of potash salts from a by-product of the nitric acid manufacture is of national importance, and should be treated in the same way as has been suggested for the magnesium chloride manufacture.

Sulphate of magnesium.

Sulphate of magnesium (epsom salts) which is used in large quantities by the textile trades, and which three years ago was imported from Europe in quantities of from 3,000 to 5,000 tons per annum, is now being produced by the Eastern Chemical Company and others in sufficient quantities to supply all the demands of India, and considerable quantities have also been exported.

Sulphate of alumina and alum.

Sulphate of alumina and alum are not being produced. The amount imported in the year prior to the war was 5,050 tons value £101,088. It is the intention of the Eastern Chemical Company to take up this manufacture as it is one of a cycle of manufactures which are interdependent and for which all the materials required are in the country.

Fertilizers.

Fertilizers properly fall in the cycle of manufactures referred to. The most important is that of superphosphates, for which the sulphuric acid and bone-meal are at present available. No mineral phosphate of value has been found in India yet, but for a large industry the mineral could be shipped from Red Sea ports.

Before India will be a large consumer of artificial fertilizers, the country will have to be educated, and in this the Government could do much to help. It is by a close co-operation between the Government and the manufacturer that the development of this branch of the chemical industry can be expected. The agricultural colleges will have to educate the students, and large scale demonstrations will have to be made by the Government or other authorities before the conservative cultivators can be induced to see the great benefits to be derived from scientific treatment of the soil.

In addition to superphosphates, sulphate and nitrate of ammonia will no doubt be made where ammonia is available, *viz.*, where there are gas works or coke oven by-product works, but this is not likely to be a large industry, unless it is found possible to manufacture

ammonia synthetically, which can only be done by means of cheap electricity. If cheap electricity were available, the erection of plant for the manufacture of ammonia and nitrates from the atmosphere should be considered by the Government.

There is no doubt that when once the cultivators begin to see the great benefits derived from fertilizers, the demand for nitrates and ammonia will be enormous, and with cheap electricity, the Government should see that a synthetic ammonia and nitrate plant is started without loss of time.

Caustic soda.

Caustic soda is used in large quantities. In the year prior to the war the amount imported was 5,000 tons, value £53,504.

There was also a large quantity of soda ash imported the same year, and there is no means of ascertaining how much of this was for conversion into caustic soda or bought because it was cheaper per unit of soda.

Whilst it would be impracticable to erect a plant for the manufacture of soda ash by the ammonia soda process, there is no reason, given cheap electricity, why caustic soda or carbonate of soda should not be manufactured economically in India from the salt manufactured locally.

The increasing uses of electricity in chemical operations, and the importance of cheap electricity, make it most desirable that an investigation should be made by the Government into the possibilities of the cheap production of electricity.

Bleaching materials could only be produced economically at the same time and by the same process as the soda. The pre-war imports amounted to only 3,000 tons per annum, value £59,344, but I think when it is made locally, the demand for disinfecting purposes will rapidly increase. The consumption in paper mills and by the textile trades will also increase.

Monazite sand thorium.

Monazite sand rich in thorium is found in Travancore, and the question of its treatment in India for the extraction of thorium and mesothorium is worth serious consideration. This is on the programme of the Eastern Chemical Company, and although I do not suggest it is one of the most urgent of the proposed developments of the Indian chemical industry, it is manifestly a wasteful system, which allows the export of the monazite sand to Europe when by treatment with sulphuric and nitric acids the thorium can be extracted and collected as thorium nitrate of about one-tenth the weight of the original sand, a saving of nine-tenths of the freight.

Utilization of waste products.

Reference has already been made to the waste liquors from the salt pans and the manufacture of magnesium chloride.

Another waste product is the paddy husk, which is produced in the rice mills in different parts of India and Burma. The Eastern Chemical Company has a process for the treatment of paddy husk and the production of acetic acid or acetone, naphtha, gas and charcoal therefrom. Prolonged negotiations were carried on immediately prior to the war with the India Office in London, with a view to the sale of the process to the Government for the manufacture of acetone, but the war prevented the proposals made by the Government being carried out. Owing to the bulky nature of the paddy husk the first treatment must be made at the rice mill. It is suggested that plants for treating the husk shall be erected at various rice mills, and the products obtained sent to a central factory to be refined, and if desired converted into acetone, etc. The war has interfered with progress in this direction. This is a case needing Government assistance either by—

(*a*) providing the capital necessary for the erection of the first plant to be paid for out of the profit on the products, the most important of which, *viz.*, acetone must be taken by the Government or by—

(*b*) subsidising or making a grant for experiments to such a pioneer company as the Eastern Chemical Company to an extent which would justify them in taking the risk of a first installation of plant.

The waste products from gas works and coke ovens contain not only ammonia, of which I think every producer knows the value, but also benzol and other tar products, which could be purified and used for the manufacture of nitro compounds, aniline and aniline colours.

Colours and explosives.

It is imperative if the security of the country is to be considered, that the manufacture of sulphuric and nitric acids should be in few hands, and that those few should be under strict Government control and subsidised.

These acids are necessary for the manufacture of aniline and aniline colours. Many of these colurs can be made from the waste from coke ovens. This war has made clear the close relation between the aniline dye manufacture and the explosive manufacture, and the fact that within 24 hours of the declaration of war many of the large chemical works in Germany had diverted their aniline and dye manufacturing plant to the manufacture of high explosives, gave them an enormous advantage. This is all part of the programme of the Eastern Chemical Company and provides another illustration of the need for a close co-operation between the Government of India and such a company. This is clearly a case for a Government subsidy.

Natural colouring matters.

Of these, indigo is the most important. The revival of this industry since the beginning of the war, owing to the supplies of synthetic indigo from Germany being stopped, has emphasized some of the decided advantages of the natural product.

It is by no means proved that the artificial product can hold its own against the natural product if the latter be cultivated and extracted under modern scientific control.

The Eastern Chemical Company will be specially interested in the manufacture of the synthetic product which requires nitric and sulphuric acids, benzol, acetic acid, and caustic alkali, all of which are contemplated in the company's cycle of manufactures. They will at the same time be equally interested in the scientific fertilization of the land which will undoubtedly have the effect of increasing the yields and the value of the colour from the plant.

Financial assistance.

I suggest that the Government should make a grant to the Eastern Chemical Company of an amount equal to the subscribed capital of the company up to £250,000 to be taken as a debenture on the assets of the company, and to be called up as required. The interest on such loan to be a first charge on the company's profits and the principal to be repaid in instalments after the end of a period to be arranged, or by conversion into ordinary and/or preference shares at the option of the Government.

General remarks.

In spite of all initial difficulties, the Eastern Chemical Company has already demonstrated that its activities are of great value to India, that it is, or has the makings of being, a successful enterprise, that it has large possibilities of development and that arising out of the experience and knowledge so far gained, and by avoiding mistakes, an even better chemical works could be established on the other side of India, in Bengal or other provinces, provided Government would support such enterprise by rendering some measure of support and financial assistance.

The opening up of branches in other parts of India has always been one of the objects in view from the formation of the company.

Q. 111.—All the new chemical industries referred to in the particulars herewith.

Q. 112.—Pyrites or other sulphide ores. Mines not developed.

Q. 112-a.—Suggestions have been made in the particulars herewith.

Q. 112-b.—No.

Q. 112-c.—The chemical industry partly dependent on sulphur and nitrates from abroad. Suggestions have been made in the particulars herewith for overcoming this.

Q. 113.—Pyrites of all kinds, mineral phosphates, nitrate of potash.

Note.—*Witness did not give oral evidence.*

Mr. W. T. Pomfret.

WITNESS No. 328.

MR. W. T. POMFRET, *Professor, Textile Department; Victoria Jubilee Technical Institute, Bombay.*

Extract from ORAL EVIDENCE, 23RD NOVEMBER 1917, *vide* page 346 of Vol. IV of the Minutes of Evidence.

* * * *

Mr. A. Chatterton.—*Q.* Regarding the reason for closing the handloom weaving class at the Victoria Jubilee Technical Institute: Why was it closed?—*A.* (1) Red tape and (2) the unsympathetic attitude of men in office, by their interference with the work of which they now know very little. Instead of being encouraged to push on with the work, it was just the reverse.

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Mr. R. B. Ewbank.

WITNESS No. 353.

MR. R. B. EWBANK, I. C. S., *Registrar, Co-operative Societies, Bombay.*

Extract from ORAL EVIDENCE, dated, 30th November 1917, *vide* page 559 of Vol. IV of the Minutes of Evidence.

* * *

Sir D. J. Tata.—*Q.* Do you know anything about the Churchill loom? Mr Churchill gave evidence before us on the subject, and you made reference to that to-day in your evidence.—*A.* I know it fairly well.

. Can you tell us anything about it as to whether it is a practical thing that the handloom weaver could take up, and whether they have taken it up? Can you give any inform-

ation on the subject ?—*A.* Of course I can only give my own opinion and in doing so I do not wish to damage his chances.

Q. Your answer can be confidential.—*A.* All I want to say is that the loom has gradually become a more and more expensive affair. To start with he said that he would produce an 80 rupee loom similar to the Salvation Army loom ; well he produced one, but before he got it complete he got the idea that he could produce a better loom for Rs. 100. Then his work was stopped because Government stopped giving a grant ; and there was a delay for a year, then I saw him at Nagar myself when I went down there to his institute, and he explained that this time he was on the brink of success ; it was a very ingenious looking loom, and we thought that it would be worth while giving him another chance. I wrote to Government through the Collector, and Mr. Mead supported me saying that although the handloom weaver at present can only afford to buy a loom for 20 rupees, there is a class of master weavers who could afford to buy a loom costing 100 rupees. Such men would be able to make use of it, and we thought he might be given another chance to bring his experiment to success. Government agreed, and gave him another 12,000 rupees. He had thus had nearly 23,000 rupees. At the end of a year he had still not finished, he asked for a further grant ; by that time the estimated cost of the new loom was 200 rupees. The loom has since then become more and more expensive until it has passed clean out of the reach of the ordinary weaver. It is still incomplete and the finally perfected model keeps on receding. In addition to its capital cost it requires imported long yarn which means beaming and warping machines, sizing machines, and all sorts of machines.

Q. But its outturn is relatively very very good, is it not ?—*A.* I believe so. But if you are going to spend 700 or 800 rupees on the loom and its accompanying warping machines and so forth, you may as well get a small power loom.

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WITNESS No. 375.

Mr. H. Calvert. MR. H. CALVERT, I.C.S., *Registrar, Co-operative Societies, and Joint Stock Companies, Punjab.*

Extract from WRITTEN EVIDENCE, *vide* pages 197 & 205 of Vol. V of the Minutes of Evidence.

* * * *

2 (a) There is ample capital available in the Punjab but there is little confidence. The shares in indigenous companies are not readily saleable ; most of them cannot find purchasers. We do not seem to have advanced so far as to secure quotations in the share market. The existing companies (with few exceptions) are not working satisfactorily ; there are about 68 companies in liquidation ; and proceedings are dragging along very slowly. The result is there is practically no confidence in joint stock concerns run by Indians and from the returns filed with me I should say that liquidation awaits all of them in the near future. I do not think there is a single such company whose shares sell at a premium.

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Extract from ORAL EVIDENCE, dated 13th December 1917.

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Hon'ble Sir Fazulbhoy Currimbhoy.—*Q.* In answer to question 2 (a) you say, "There is ample capital available in the Punjab but there is little confidence. The shares in indigenous companies are not readily saleable ; most of them cannot find purchasers." Do you think you need a Stock Exchange here ?—*A.* No, I have not said that at all.

Q. You say they are not saleable ; they can only be saleable if you have a Stock Exchange here. How can they sell unless there is a Stock Exchange ?—*A.* I know nothing at all about Stock Exchanges, and cannot give any opinion on that point. I understand the Punjab shares are not quoted on the Calcutta and Bombay Exchanges at all. On the Calcutta and Bombay Exchanges you can buy English companies' shares, but not indigenous companies' shares in the Punjab.

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WITNESS No. 379.

RAI BAHADUR GANGA RAM, C.I.E., M.V.O., *Lahore.*

Rai Bahadur Ganga Ram.

Extract from WRITTEN EVIDENCE, *vide* page 246 of Vol. V of the Minutes of Evidence.

* * *

If there is any department of Government which has immense possibilities of doing good to the people, and which can best develop the resources of the country, it is the Forest Department, and yet they do more mischief than good, in fact if anything, they are cursed by the people. Financially they justify their existence by selling products of old forests, trees of spontaneous growth from protected areas. *Forest Department.*

I would refer the Commisson to Sir Robert Carlyle's speech delivered in England in which he said that the average return of Forests in India was one anna per acre.

I can understand the motive of prohibition from grazing on newly planted areas, but why should the grazing be forbidden from old forests, indeed if they allowed such grazing the land under forests would be considerably improved by the animal dung.

The summary powers for fine and compounding of offence are unique, they are vested even in low officials like forest guards, which necessarily leads to corruption and extortion.

People are so afraid of this Department that they cannot even utilise the nature's sources of manure, namely, leaves of trees.

Fuel is selling at thirty seers per rupee in Lahore. Who is to blame but this Department, who allowed the large forests from Lahore to Multan to be burnt as fuel for Locomotives.

The Department lives on fines, grazing dues, price of old trees, and profits of old forests of Native States, from whom they have taken them on lease on very favourable terms.

The Department if properly directed should prove a blessing to the people, and should be a source of wealth to the country, and to Government.

The Turpentine Factory in the Punjab is a great success. But the credit is due to Sir Louis Dane and not to the Forest Department.

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WITNESS No. 391.

Hon. Babu Radha Binod Das. HON'BLE BABU RADHA BINOD DAS, *Pleader, District Court, Sylhet.*

EXTRACT FROM ORAL EVIDENCE, dated 3rd January 1918, *vide* page 374 of Vol. V of the Minutes of Evidence.

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Hon'ble Pandit M. M. Malaviya.—*Q.* Why is it that people have no confidence in joint-stock concerns ?—*A.* Because joint-stock concerns by native agency are run in a very half-hearted way, and fail. There are many companies which have failed. I have been through that bitter experience myself.

Q. Is there any joint-stock concern which is flourishing ?—*A.* There are one or two I know of at Silchar. Now there is litigation going on. I might cite some other instances.

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WITNESS No. 411.

Mr. James Blair. MR. JAMES BLAIR, *Managing Director, Surma Valley Saw Mills, Bhanga Bazar.*

Extract from ORAL EVIDENCE, dated 14TH JANUARY 1918, *vide* page 488 of Vol. V of the Minutes of Evidence.

* * * *

Mr. A. Chatterton.—*Q.* You make the Forest Department select your timber for you ?—*A.* That is right.

Q. Under this system have you leases from the Forest Department of large areas ?—*A.* We have applied for concessions, one of which we are temporarily working, but the lease has not been signed yet, principally on account of a dispute about the time for which we were to get the lease, and the royalties to be levied. Government proposed a very short lease ; we refused it and insisted on having a long lease, so that we could develop our resources. In the meantime we are working the forest practically on the lines I have intimated here ; that is, every tree had to be marked by the Forest Department before being felled. We have Europeans in the forest to see that this is done.

Hon'ble Sir R. N. Mookerjee—*Q.* In the same jurisdiction others are working too ?—A. Not in the area we have recently taken over for which we have applied to Government for a concession.

Q. No one else is allowed to go there ?—*A.* Not in this part ; that is not permitted. Until the lease is signed we only are allowed to work at the present time. Previously all and sundry were allowed to work in the area as they pleased.

* * * *

Mr. A. Chatterton.—*Q.* How long is the lease you are asking for ?—A. We wanted 30 years with the option of renewal for another 30 years. The timber is often away back from the rivers, probably 2 to 4 miles, and it has now to be dragged this distance by elephants : we propose making railways and adding mechanical traction or haulage.

Mr. C. E. Low.—*Q.* The evidence we have had from the Forest Department bears out what you say about there being no working plans?—A. The conditions of Assam and the Surma Valley are slightly different. We are possibly extending to Assam.

* * * *

Mr. C. E. Low.—*Q.* Is it a few hundreds of miles?—A. Our area is approximately 500 to 600 square miles and in that area there are possibly many hundred miles of rivers.

* * *

Mr. C. E. Low.—*Q.* We were informed by a witness that he had a lease from 1900 allowing him to cut timber in unreserved areas in four districts?—A. He is a remarkable gentleman. He got a lease and sat on it. He has never done anything.

* * *

WITNESS No. 424.

Mr. T. T. McCreath. MR. T. T. MCCREATH, *Joint Manager of the Indo-Burma Oil Company.*

Extract from WRITTEN EVIDENCE, *vide* page 540 of Vol. V of the Minutes of Evidence.

* * *

Regarding the acquisition of land by Government.—A case has recently come before me where a portion of Government land was leased to drill a water well. Water was struck but after it was struck it was found that the land in question was surrounded by freehold land and owner of this land refused to grant way the leave for pipes over his land.

If Government cannot find an excuse to acquire the land, by getting the persons who drilled the well to supply outsiders with water the owner of the land can demand his own terms which may be several hundred times the real value of his land.

* * *

It is just possible that my company may later wish to lay a pipe line over a large stretch of country, to develop an oil area which it will be impossible to develop otherwise. Presumably Government will acquire the land on our account by calling us public carriers although it is unlikely we will be called upon to carry any one else's oil. This should not be necessary and the Act should consequently be amended.

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WITNESS No. 425.

Mr. W. H. C. Prideaux. MR. W. H. C. PRIDEAUX, *Inspector of Factories, Burma.*

Extract from WRITTEN EVIDENCE, *vide* pages 542 & 549 of Vol. V of the Minutes of Evidence.

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The following paragraph I wish to be considered as confidential. It is founded on several conversations which I have held with several different people whose names I am not prepared to supply.

I believe that one factor which has to some extent prevented the development of the province has been the difficulty which certain Europeans appear to meet with in this country in acquiring land in the districts. I do not know whether it is the avowed intention of Government to oppose the formation of a planter community or not, and I realise that there is much to be said in favour of such a policy, but I think it must be recognised that such a course will tend to prevent development.

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Extract from ORAL EVIDENCE, 23rd January 1918.

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Mr. C. E. Low.—*Q.* What is the fact which is in your mind when you say that Europeans experience difficulty in acquiring land in certain districts? We had evidence yesterday which went to show that very special terms were proposed for rubber plantations.—*A.* Although of course it has nothing to do with what I have said, I think these suggestions have come out since I wrote that note.

Q. Does what you say refer to concessions of forest or waste land or restrictions on the purchase of agricultural land?—*A.* It applies to both. It came out in conversations that I have had with various people. I have not had any personal experience. I have not tried to acquire land.

Q. You could not mention any facts without mentioning names?—*A.* I would rather not say too much.

Q. This has reference both to the purchase of agricultural land from existing Burmese cultivators and to the obtaining on lease or otherwise of waste or forest land from Government?—*A.* Yes. The underlying idea seems to be that in some cases the district officials are not very anxious to see Europeans in their districts.

Q. The district officer knows how things are as they are at present and he does not know how they might be in the other case?—*A.* Yes.

* * * * * * * *

Hon'ble Mr. H. Thompson.—Q. You say in your written statement, "I do not know whether it is the avowed intention of Government to oppose the formation of a planter community or not." Are you aware of the fact that in June of last year a committee was formed in which there were two of the chief leading planters of the province, and as a consequence a set of rules framed by the committee were issued by the local Government in July of last year for the grant of waste lands for rubber cultivation and that these rules were accepted by the whole of the planter community practically as entirely suitable?—*A.* I know. I wrote this before the formation of the committee. My written statement was written in February of last year. Moreover, I believe that these rules apply to the cultivation of rubber only.

Q. A further matter which is under consideration is the question of financing but the rules for the grant of waste lands were issued in July of last year.—*A.* (No answer).

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WITNESS No. 439.

Mr. J. Coggin Brown. MR. J. COGGIN BROWN, M. Sc., F.G.S., M. INST. M. M., M.I.M.E., *Assistant Superintendent, Geological Survey of India, Tavoy.*

WRITTEN EVIDENCE.

1.—Technical aid to industries.

Results of Government aid to industries.

As an officer of the Geological Survey of India for almost twelve years, the greater part of which has been spent in Burma, I have personal knowledge of the advice and assistance provided by Government towards the development of the mineral industry. I have undertaken alone or in conjunction with others, the investigations mentioned in the following list, the results of which have been made public or brought to the notice of those concerned:—

1. Location of quarries in the Sittiang district for special purposes.
2. Early investigation of the lead-silver-zinc ore deposits of Bawdwin.
3. Examination of the placer gold deposits of Mong-long.
4. Examination of coal, iron ore and various metalliferous deposits of the Northern Shan States.
5. Advisory work on the Burma Oil Fields.
6. Examination of the mineral deposits of Kumaun in the Western Himalaya and of the Upper Brahmaputra valley in the Eastern Himalaya.

This list might be lengthened but it is sufficient to show from one officer's personal experience that the Geological Survey Department does render scientific aid to the mineral industry. In October 1915 I was deputed to the wolfram field of Tavoy as Technical Adviser to the Deputy Commissioner on special mining duty. During the period which has elapsed since then, my advice has been sought continually by concessionaires and mining firms engaged in the wolfram business. Acting under the orders of my Director, I have given it as freely as possible. The Department also maintains a laboratory in Tavoy where free advice is available on mineralogical subjects and assays are undertaken for the public at current market rates.* A geological map of the whole district is also being prepared, and the numerous requests received for it indicate not only its likely value, but also the desire of those engaged in the industry to work on modern principles.

The Geological Survey with its small staff cannot possibly undertake all the problems that arise as the mineral industry of India expands, and for the same reason the loan of Government geologists to private firms is impracticable.

Research.

I have not found that the aid afforded by the Scientific and Technical Department of the Imperial Institute has been of any value in the work that I have been called upon to do personally, and I do not believe that it has helped the growth of the mineral industry to any noticeable extent. I would rather deal direct with the trade when commercial information is wanted, and analytical chemical work which cannot be undertaken departmentally can be submitted to professional specialists. There are abundant research problems in geological, mineralogical and metallurgical chemistry in this country, the solution of which would probably have far-reaching economic results, and I am in favour of the creation of some central bureau such as a Department of Chemistry with facilities for the study of these important inorganic questions.

* The laboratory has since been closed.

Need for geological surveys.

Our existing knowledge of the mineral resources of certain parts of Burma is scanty and there are vast regions that have never been traversed, to say nothing of prospected. The Geological Survey of India is concerned primarily with the preparation of a geological map of the country, and such mineral deposits as are met with in the course of surveys for this purpose, are examined. Sometimes the pioneer work has resulted in private firms sending out prospectors and geologists, but although there are many individuals masquerading under such titles, properly trained men are hard to obtain and results have seldom come up to anticipation. Of course there are exceptions. Practically the whole of the Southern Shan States, a large part of Tenasserim, the head waters of the Irrawaddy and Chindwin and their tributaries and some portions of the Arakan Yoma are to all intents and purposes unknown, and they are likely to remain so for many years to come, in view of the small cadre of the Geological Survey of India, although there is a certain amount of general evidence for presuming the existence of valuable mineral deposits in some of them.

2.—Assistance in marketing products.

Bringing sellers and buyers into touch.

The only suggestion I have to make under this heading is that lists of firms and individuals dealing in, or desirous of buying, specific mineral products and their derivatives in India, should be compiled and kept up-to-date for the information of Government Departments like the Geological Survey. The Director of the Survey has mentioned the case of China clay in his published evidence before the Commission, and I have met with the same experience in the case of garnet, ochres and barytes. Occasionally one meets a person wishing to market a particular product and at another time learns of someone else who would have been willing to buy it. More publicity is required on both sides and trade would be stimulated if buyers and sellers would make their requirements more freely known through the medium of a central agency.

3.—Training of labour and supervision.

Lack of skilled labour.

One of the reasons why the wolfram industry of Lower Burma has not advanced further is the lack of skilled labour and trained supervisors on the mining fields. The handful of trained Indians who have engaged in prospecting work proper have not been successful. This I regard is due largely to the unusual conditions prevailing in Southern Tenasserim, where mountainous forest-clad districts are drenched with rain for the greater part of the year and an outdoor life is a daily round of fatigue and physical misery. Until quite recently the few Europeans who have taken up such work have not been trained or qualified by experience, with a few notable exceptions. Shortage of labour and lack of supervision have resulted in an extraordinary growth of a primitive form of indigenous mining best referred to as the "Tavoyan tribute system." This is extremely wasteful when applied to easily won ore deposits and utterly incapable of expansion to meet the necessities of proper mining in hard ground.

When a new district is entered for the first time, the preliminary stages of jungle prospecting are best undertaken by local Karens; indeed some of the more important wolfram deposits in Tavoy were originally located by them. They have no qualifications beyond their wits and a natural aptitude for travelling through the arduous country which is their home.

When lodes have been located, or alluvial deposits proved, supervisors are required possessing more knowledge than the average cooly ganger, to overlook open-cutting or flume construction, as the case may be. Trustworthy assistants of this kind are practically unobtainable and it is not work on which subordinate European assistants can be advantageously employed at the high wages prevailing in a country of this description.

Technical schools for supervisors at centres of industry.

I am of the opinion that trained Burmese, Chinese and Karen subordinates would find employment on the existing and future mining fields of the province as geologists, underground bosses, assayers, surveyors, fitters and similar situations which modern mining practice demands and creates. I advocate the formation of a technical school where tuition in such subjects would be made available. It is essential that such a school should be founded in a centre where practical training may be combined with theoretical instruction. As a general rule I think that any industry enjoying Government aid should be required to train assistants in that particular occupation.

Training of labour.

I can make no suggestions regarding the training of mining labour, because I believe that each field must gradually work out its own evolution. There is an exceedingly varied assortment of races employed on wolfram mining in Tavoy, but the supply is insufficient, the rates of pay too high, and the quality of the labour poor. Southern and Western Chinese, Indians of every kind, Burmese, Shans, Siamese and Karens all find work here. The Chinese make up the bulk of the actual wolfram producers and are drawn mainly from the Federated Malay States, to which they often exhibit an anxiety to return after the accumulation of a little capital. The local labour market cannot be relied on for the supply of really good men, and mining companies have either to be content with second-rate workers or import what they require. For the testing of deep alluvial deposits one company introduced a gang of trained Chinese from the Straits. For hand-drilling in deep adits and also for machine-drilling, Malayalees with Kolar experience were obtained. Another company recruited mica miners in Hazaribagh for underground work in granite, while a third brought down Maingthas from Mogok for hand-drilling and shaft-sinking. The influence of skilled gangs of these sorts is all for the good and will assist in the gradual establishment of a local supply.

4.—Future development of mineral and related industries in Burma.

Suggestions for mineral development.

The systematic survey of the unknown portions of the province is a first essential. Lack of sufficient means of communication has tended to retard progress and will doubtless continue to do so. Among the subjects which call for attention I should like to mention the following:—

(1) The expansion of alluvial tin-mining: One small dredge is working in Tavoy at the present time. I understand that two others have been imported for erection on a concession in Thaton. In the districts of Mergui and Tavoy, and probably also in Amherst and Thaton, there are large areas of ground which are likely to contain tin ore in profitable quantities. The testing of such deposits is neither lengthy nor expensive, and once they are proved and a suitable dredge started, the recovery of the ore becomes a matter of simple mechanical engineering. Very successful results have been obtained in Siam and the Federated Malay States and the business deserves more consideration than it has received in Burma up-to-date.

(2) Further investigation into the potentialities of the coal-fields of the province: Reports have been written from time to time dealing with the coal-fields of Burma and most of them have concluded that the available material is unsuitable for purposes of steam generation by ordinary means. Yet the demand for fuel is so great, and its present cost so high, that it seems necessary to decide finally whether the Burmese coals cannot be made use of in some special manner or not, in view of what is being done with similar low grade material in other countries. I refer specially to briquetting and producer gas plants.

(3) The utilization of the sulphide ores of Burma, for the preparation of sulphuric acid: I refer especially to the recovery of sulphur in some form as a by-product in the smelting of the Bawdwin ores.

(4) The production of tungsten powder and ferro-tungsten in Burma or India: This question is bound up with the possibilities of manufacturing locally other ferro-alloys such as those containing molybdenum, chromium and manganese.

(5) The production of metallic copper and aluminium in India.

(6) The examination of the kaolin deposits of Yamethin and Bhamo.

(7) The composition and extent of the so-called soap sands of the dry zone.

Hydro-electric power surveys.

There are splendid opportunities for the development of hydro-electric power schemes in Burma, and the subject has already received attention both in the Northern Shan States and in Tavoy, for the provision of a cheap source of power to be used in mining operations. In Tavoy one proposal is already being carried into effect and a large storage reservoir is completed. The whole details of a large hydraulic and ordinary mining plant will be electrified. Another similar proposal has recently been brought forward, and I have no doubt that the advantages of such installations will become more appreciated as soon as the pioneer ones are in operation.

The only suggestion I can offer is that Government should encourage hydro-electric schemes as much as possible as they are bound to assist in establishing the mineral industry on sure foundations.

N.B.—Witness did not give oral evidence.

WITNESS No. 447.

Mr. T. E. Mitchell.

MR. T. E. MITCHELL, *Resident Manager, Burma Mines, Limited.*

Extract from WRITTEN EVIDENCE, *vide* pages 606, 609 and 610 of Vol. V of the Minutes of Evidence.

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Q. 105. Yes, in the following respects—

Forest Department.

(*i*) To our observation, the staff of the Forest department is inadequate, especially in those grades of men who come into direct and daily contact with firms engaged in working the forests, *viz.*, in Extra Assistant Conservators and men of lower grades. This branch of the department caused us considerable delay in our felling operations in the period October 1916 to March 1917, and the situation —to us— only saved by our men doing Government work as well as their own. Had it not been that we had men who were capable of doing this work, our production of lead for Imperial purposes would have been greatly interfered with, as fuel one of most important factors in our operations.

(*ii*) Members of the subordinate Forest Service in general and some even of the Superior Service require to have their view points in regard to their dealings and attitude towards private firms considerably widened and altered. A more liberal and helpful attitude towards such firms should be insisted on and every instance of delay or obstruction severely dealt with.

The following are suggested as remedies for the present state of affairs—

(*a*) Special and extensive concessions should be made by the Forest Department in areas where the value of forest products are wholly dependent on the development of an industry of measurable life.

(*b*) Improving the pay and allowances of the Subordinate Forest Service, thus attracting a better grade of men and enabling them to live in greater comfort with a view to maintaining health and vigour in unhealthy places, such as nine men out of ten in the Forest Service are compelled to live and work in.

In the case of the lowest grades of Rangers who are practically all Easterns the increase in the number of Extra Assistant Conservators would do much to reduce petty peculation.

(*c*) Increase in the proportion of Europeans in the Subordinate Services.

(*d*) The spirit rather than the letter of the law should be impressed on all members of the staff and a broad interpretation applied to forest rules, especially in reserved areas, and to this end considerably more responsibility and freedom of action should be given to Extra Assistant Conservators and others who hold positions bringing them into direct contact with firms.

(*e*) A better appreciation of the factor of time in all commercial undertakings by the Forest department would be of very great value to all companies or individuals operating in the Province.

(*f*) Prompt replies to all correspondence and immediate action in regard to forest offences. The present procedure is very much involved and requires a great deal of unnecessary correspondence with head-quarters even in very trivial cases. Greater responsibility and freedom of action to the man on the spot will help this.

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Extract from ORAL EVIDENCE, 28th January 1918.

(Mr. A. F. KUEHN accompanied MR. MITCHELL.)

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Mr. C. E. Low.—*Q.* Have you any complaints to make in regard to the railway freights charged by the Burma Railways?—*A.* The freights, though previously reduced, are still high.

(*Mr. A. F. Kuehn*).—*A.* We have applied to the Burma Railways and we hear that though it has not been officially sanctioned, we will have facilities given us approximating those given in town works.

Hon'ble Sir R. N. Mookerjee.—*Q.* You have not got them yet?—(*Mr. Kuehn*) *A.* They have not come to a decision, but the intention is to cut down the freight rate.

Q. Do you think you will be able to win that concession?—(*Mr. Kuehn.*) *A.* I think so.

Q. Have they promised to give you the concession with retrospective effect, say for the last two years?—(*Mr. Kuehn.*) *A.* Yes.

* * * * *

Mr. C. E. Low—*Q.* You suggest certain remedies in regard to the present state of things in the Forest Department; you say "The spirit rather than the letter of the law should be impressed on all members. Considerably more responsibility and freedom should be given to Extra Assistant Conservators, etc."; do you think it is sound to give discretion to lower subordinates?—*A.* (*Mr. Mitchell*). Yes, a greater amount of latitude to the subordinates mentioned would facilitate forest operations of private concerns.

Q. When they deal with ordinary people, don't you think they might make it a means of extortion or of petty theft?—*A.* If the men referred to are Europeans, I think the benefits to be derived from granting them greater latitude would more than offset any peculation that might result from the greater freedom.

Q. I am referring to the subordinates of the Forest Department: would you extend greater freedom to subordinates of all grades?—*A.* Not below the Extra Assistant Conservator.

WITNESS No. 451.

MR. J. WATSON, *Irrawaddy Match Company, Mandalay.*

Extract from ORAL EVIDENCE, 31st January 1918, *vide* pages 644-647 of Vol. V, of the Minutes of Evidence.

Hon'ble Sir R. N. Mookerjee.—*Q.* Under the heading "Transport facilities and freights" in your note you speak of the high railway and steamer freights: is the railway freight here higher than that on any of the railways in India?—*A.* I could not say that, but I have made one or two little notes on freights which I might read out to you. The first thing I would like to say about railway freights and steamer freights is this. Mr. Troup in his monograph makes the following statement: "Railway freights are distinctly in favour of imported articles." You would like to have that verified. Now about matches I would just give you the relative pre-war rates. On matches from Japan to Rangoon, taking a certain unit, I am not taking a ton, I am taking a certain unit, the freight from Japan to Rangoon was Rs. 3-8; from Mandalay to Rangoon unpacked for shipment to India it would be Rs. 3, but packed for shipment would be Rs. 3-8. From Rangoon to Mandalay it is just the same, but the same thing from Mandalay to Madras cost Rs. 13-8, Rs. 10 being the freight from Rangoon to Madras; and Mandalay to Calcutta it was Rs. 9-4 of which Rangoon to Calcutta was Rs. 5-12. We represented the matter to the British India Company, and they reduced the rates early in January 1915; the reduced rates per unit were then :—

	Rs.
Japan to Rangoon	3-8
Mandalay to Rangoon	3-8
Mandalay to Madras	8-8
Mandalay to Calcutta	6-6

Q. Was this all due to war conditions?—*A.* No, they were pre-war rates.

Q. But you say they were reduced in 1915?—*A.* Early in 1915. The value of the product at that time was about Rs. 22-8 to 24, just the same.

Q. In the next sentence you say "There is a working arrangement between the railway and steamer companies whereby all competition is eliminated": Can you enlighten us on this point more fully?—*A.* Wherever the railway touches the river such as at Mandalay, Mvingyan, Prome, etc., they have a working arrangement as to freights. The rates of freight are the same whether carried on the railway or steamer between any two towns on which the railway and steamer meet.

Q. Are you sure of that?—*A.* Well, I have been told so, I would not like to take my oath on it. I know this for a fact that they agreed to raise the rates recently; they held a conference between a member of the River Company's staff and the Assistant Traffic Manager, Railways, at Rangoon and they arranged their increased rates.

Q. Is the railway a State or guaranteed railway?—*A.* I think it is a guaranteed railway.

Q. Have you represented this matter to the higher authorities, the Railway Board, or to the local Government in any way?—*A.* No. We brought a shipment of pine timber from Kalaw to Mandalay. The timber landed at Mandalay cost us Rs. 500-7, the railway freight on it was Rs. 506.

* * * * * * *

Sir F. H. Stewart.—*Q.* Why, if I may ask, are you shutting down the Irrawaddy Match Factory?—*A.* Because the concern is not paying. Well, pardon me, we would have shut down before this if the concern was not paying, but we have got stocks of material. We are not buying any materials now because prices are at the very top, and if we bought further supplies and the war finishes to-morrow we might lose heavily.

Q. As the result of your experience do you think match-making in India is an industry that can be made to pay?—*A.* I think it can.

Q. Without any definite Government assistance?—*A.* That is hard to say but I may tell the Commission in confidence that I propose going to Japan myself to study the conditions there and to see what methods they follow.

Q. With reference to what you say about the military authorities buying Japanese matches at higher prices, were your samples found unsuitable by the Military authorities or by some department?—*A.* They were supplied to officials in Rangoon. We were asked to tender for matches and we did. They said that our samples were unsuitable for Turkish prisoners. Later, they themselves approached us and now our matches are purchased. There could be no question about the suitability of our matches because we have been manufacturing for 5 years and selling all round the districts here.

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Sir D. J. Tata—*Q.* The Military authorities you say purchased and paid for at a higher price than yours, Japanese matches. That is to say, Japanese matches were imported into this country at a much lower cost, because of the lower freight that they have to pay. As

you say, Japanese matches pay only Rs. 3-8 from Japan to Rangoon per unit. Is that your contention?—*A* Japanese matches are imported into Burma at a lower cost, the high freights made it impossible for us to export to India.

Q. And in your case the freight is the same from Mandalay to Rangoon?—*A.* Not quite so; if the tins are not packed for export, it is only Rs. 3, if we pack it in packing cases it is Rs. 3-8.

Q. Where are they delivered? At Rangoon?—*A.* No. They are required for the camps in Thayetmyo and Meiktila.

Q. They have to pay further freight from Rangoon?—*A.* The freight would be about the same to Thayetmyo.

Q. For the remark that you make under the heading "Technical aid" with regard to the training abroad of Indian youths, you generalise from the one instance you give, that there is no use sending them abroad at all?—*A.* I give it as one instance.

Q. How did this young man fail to meet your requirements? Was his knowledge insufficient? What was he brought in for?—*A.* He was recommended—I forget by whom—we heard of him from some Government official somewhere; any way he came from India; he said he was in a match factory near Calcutta; he was in England, in Germany and in Japan. His trouble with us was that he would not take his coat off; he wanted to be a sort of master of the whole concern without doing any work.

Q. Was his knowledge of chemistry of any use to you?—*A.* I do not know that he was trained in chemistry, but he had sufficient chemical knowledge; he had been through all the branches, and he knew something about them all.

Q. Was his knowledge insufficient?—*A.* I think his knowledge was sufficient, but he would not take his coat off.

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Mr. C. E. Low.—*Q.* Do you know if the monograph of Mr. Troup's was based on any practical experiments on a commercial scale?—*A.* He says that he made these experiments with a Mr. Evance whom he strongly recommends in his monograph, and also with a German firm in Berlin.

Q. Was this a match-making firm or a firm selling machinery?—*A.* Match machinery firm. Then later we had experience of this Mr. Evance; who proved to be unsuitable.

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WITNESS No. 452.

Mr. C. G. Rogers. Mr. C. G. ROGERS, V.D., F.C.H., F.L.S., *Chief Conservator of Forests, Burma.*

Extract from WRITTEN EVIDENCE, *vide* pages 650-651 of Vol. V of the Minutes of Evidence.

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IV.—Other forms of Government aid to industries.

Supply of raw materials.

The one thing to be avoided in the future is the granting of monopolies for any kind of Forest produce.

Practically the only timber exported from Burma in large quantities is teak. The supplies of this species are practically in the hands of three firms. The profits made on the extraction of teak are so large in comparison with that of other woods, that these firms will not extract any of the other species associated with it.

The three firms who command over 70 per cent of the total outturn of teak in the Province, are in a position to demand any price they like for their timber and can force the price up far above that at which they could sell it and make a reasonable profit. This is very bad for the Province as a whole and only benefits the monopolists. Teak does not grow pure but in mixed woods. It is economically unsound to work out one out of many species of trees growing together and the effect of the establishment of the monopoly referred to is that it is extremely difficult to extract the other species of wood associated with teak at a profit. This is more particularly the case because teak floats (practically all the other valuable timber trees do not float) and this property allows of its being extracted much cheaper than other woods which will not float. Teak commands a much higher price than the other timbers of the Province.

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IX.—Other forms of Government action and organisation.

Transport facilities.

The lack of roads and the monopoly which exists of both rail and water transport have very materially interfered in the past and still continue to interfere with all development in the Province.

The Irrawaddy Flotilla Company have the monopoly of transport by water and the Burma Railways Company have the monopoly of transport by rail.

Until some independent steamship and railway companies are established in the country, all development in the country is entirely dependent upon the good-will of these two companies who, if I had been informed correctly, have a working agreement by which they divide the trade of the country which passes through Mandalay. The only remedy to this most undesirable state of affairs is to make it possible for other independent parties to place a fleet of steamers on the Irrawaddy and to construct other railways.

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WITNESS No. 460.

Burma Provincial Industrial Committee. THE PROVINCIAL INDUSTRIAL COMMITTEE, *Burma, Rangoon.*

Extract from ORAL EVIDENCE, 7th February 1918—*vide* page 1690 of Volume V, of the Minutes of Evidence.

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Mr. A. Chatterton asked whether Burmans availed themselves of apprenticeships in the Flotilla Company's dockyards. Mr. Polson replied that they did not encourage Burmans because their object was to encourage apprentices to become engineers in steamers and Burmans did not co-mingle well with European engineers afloat. They employed a number of Eurasian engineers; European engineers are difficult to procure at present.

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WITNESS No. 469.

Mr. A. C. McWatters. MR. A. C. MCWATTERS, I.C.S., *Controller of Hides and Wool, Indian Munitions Board.*

WRITTEN EVIDENCE.

The special measures which have been taken by Government during the war to utilize the Indian tanning industry and India's supplies of hides for war purposes have been discussed at some length in a note which I wrote recently for the Indian Munitions Board's Handbook and to which I beg to refer the Members of the Indian Industrial Commission. The note includes statistical information showing the changes in volume and direction of the export trade both in raw and tanned hides and skins. The information there given has not been repeated in this statement.

2. The necessity of supplying to the War Office the particular class of tanned hides required for the manufacture of 'uppers' for Army boots, *viz.*, the so-called "rough-tanned" hides, East India tanned kips, has involved the concentration of the resources of Indian tanneries on this particular line. There has been no corresponding development of the trade in finished leather during the war, except for the supply of boots and equipment for the Army in India and the forces supplied from India, and in one or two small lines, such as roller skins and picker bands, where there has been an opportunity of replacing imported goods of this class by articles made in India. But, generally speaking, the development of the industry in the direction of producing finished leather in this country has had to be postponed to the end of the war.

3. With regard to the development of the industry after war conditions are removed, there are so many uncertain factors that the exact line of development cannot, in my opinion, be forecasted with certainty. In the note which has been sent for my opinion I find it stated—

(*a*) that the future lies very largely with chrome leather, and
(*b*) that the contribution which India is able to make is of sufficient importance to enable her to dictate in what form it shall leave the country.

I should prefer to see both these statements expressed in a much less positive form.

4. There is little doubt that there is a promising future for chrome-tanning in India, but the opinion of most experts in this country with whom I have discussed the question is that as India is the natural home of large numbers of tan stuffs, there should be great possibilities of developing vegetable tanning in this country.

5. This vegetable tanning would include finished leather as well as the partially finished "rough-tanned" hides from Madras and Bombay. The latter are likely, I think, to retain their popularity in the United Kingdom market, provided they can be supplied at prices which will be attractive to the United Kingdom tanners and curriers; but the post-war demand is not likely to be so great as the present special demand for war purposes. The question of price is important, since when the Government purchase scheme comes to an end, East India tanned kips will have to compete with other forms of leather and other sources of supply. The price of the tanning bark principally used in preparing these hides, *viz.*, *Cassia auriculata*, is the largest item in the cost of tanning at present, and it is, in my opinion, essential to the future of this trade that there should be large supplies of this bark available at prices much

lower than those prevailing at present. It is with this contingency in view and not solely with a view to war conditions that the increased cultivation of this bark is already being actively taken up by Local Governments. "Rough-tanned" skins also, especially those from Dindigul, Coimbatore and Trichinopoly, are likely to continue to command a good market in Europe and America and elsewhere.

6. The future of vegetable tanning in India however need not be confined to rough-tanned hides and skins. The experiments which Government is conducting with various tan stuffs are still in an early stage and there is an immense amount of research work to be done before the full possibilities of Indian tanstuffs are realised. I believe that both for upper leather and sole leather for boots and for finished leather goods of all sorts, suitable tan stuffs can be found in India and it should be possible to make them available for tanners in all parts of the country at reasonable prices.

7. It must however be emphasised that the development of a finished leather industry will be slow because it requires—

(*a*) technically trained men with knowledge of the best European and American methods,

(*b*) tanneries and leather manufactories fitted out with the best and latest machinery, and

(*c*) a very great improvement in the finish of the leather before India can compete with any chance of success in the world's markets.

At the present time there is such a famine of leather in the civil market at home that almost any reasonably well-finished leather would sell well, but there is very little finished leather being produced in India to-day which would have a chance of competing, after the war, with the leather made in Europe and America. European markets will not absorb anything which India chooses to send them. They will only take Indian finished leather if it is equally attractive in quality and price with leather produced elsewhere. This is why I think it is a mistake to write as though India had a monopoly of supplies and could dictate the form in which she will supply.

8. It is important, I think, that the British and Indian firms who are interesting themselves in the raw hide export trade from India should also take part in the tanning industry, and it is one of the most hopeful signs of the present situation that several of these firms at Calcutta are contemplating the institution of tanneries. There will for years to come be room for exports both of raw hides and of finished leather and a firm which is interested in both lines will be in a strong position. This may also help to solve the problem of the competition between the raw hide exporter and the Indian tanner.

9. I think that the future of Indian tanning will depend on a continued control of raw hide exports. The extension of hide-tanning in India during the war has led to Southern Indian tanners entering more and more into the Northern Indian raw hide markets and a large proportion of the tanned hides now being exported from Madras and Bombay are hides from Cawnpore and Calcutta and other Northern Indian markets. Before the war the Southern Indian tanner did not as a rule obtain the better class of Northern Indian raw hides but was content mainly with local supplies. After the war, unless raw hide exports continue to be controlled in some form or other, the raw hide exporter will again compete with the Indian tanner for the Northern Indian hides, and if there is a great demand from Europe for Indian raw hides at high prices, the Indian tanner may be seriously handicapped.

The limits of the Commission's enquiry debar them from the consideration of a tariff policy: otherwise it might have been permissible to consider the question of an export duty on raw hides as a possible form of control.

Oral Evidence, 14th February 1918.

Mr. A. Chatterton—*Q.* The description of the work that is done by the Indian Munitions Board in the note which you have contributed to the Handbook, I may assume, refers to the development of the industry purely and solely under war conditions?—*A.* Yes.

Q. What we have to deal with here is, of course, mainly what will be the position of the hide, skin and leather trade when normal conditions are restored, and we should like to know to what extent the work that is now being done under the Munitions Board is likely to result in a permanent improvement in the conditions under which the leather trade will be carried on in the future?—*A.* It is really very difficult to say what features of the present control are temporary and what are permanent. In the first place, the control now exercised over the trade in rough-tanned cow hides in Madras and Bombay is for a special war purpose. I do not think that the tanning of these hides will continue to the same extent after the war, so that we may say that the attention now being paid to tanned cow hides as opposed to skins is not a permanent feature. It has only been by repressing the tanning of skins that we have been able to turn the whole of the south Indian tanneries on to tanned cow hides.

Q. That is to say, the amount of tanning material in the country at present is limited?—*A.* Yes.

Q. And quite insufficient to deal with the amount of raw material that is now available?—*A.* The amount of tanning material of the kind which is known and understood by the south Indian tanners up to date is limited. In fact, we have found difficulty in getting sufficient quantity to produce the amount of leather required by the War Office.

Q. Is there likely to be a permanent outcome of the efforts which are being made to increase the supply of the well known raw materials?—*A.* I think the prospects are very hopeful indeed. Not only in Madras and Bombay are both the Agricultural and the Forest Departments taking up the cultivation of tarwad bark but also in the United Provinces and in Northern India generally.

Sir F. H. Stewart.—*Q.* Are there suitable areas?—*A.* I think there is no question that tarwad will grow in other parts of India. In the United Provinces the plantations are very promising and I think there is no doubt about the possibility of extending the cultivation of that particular tan stuff.

Mr. A. Chatterton.—*Q.* Can you tell us exactly how these plantations have been formed?—*A.* By actual scientific plantation and cultivation, I believe, and not merely by indiscriminate sowing. I have not however seen the plantations myself.

Q. How long does it take for the plantation to grow?—*A.* Some of the plants put in last year or less than a year ago are now, I am told, seven feet high and are ready to yield bark which is useful for tanning. The usual period before the bark is mature is about three years.

Q. Do you know whether samples of this bark have been used?—*A.* I do not think they have as yet, but some of the bark is being collected now and we have been promised samples.

Q. You think there will be a permanent increase in the supply of *Cassia auriculata*?—*A.* Yes.

Q. Has the economic aspect been considered as to whether it will pay to grow tarwad?—*A.* Do you mean whether this particular kind of tanning will pay?

Q. Not quite. Whether *Cassia auriculata* is an economic agricultural crop?—*A.* I think of course, at the present price of bark it will pay well. It is very difficult to say what the price will be after the war. If the price of bark is too high, I do not think you will get an extension of this class of tanning because it will not command a market at home unless it is cheap.

Sir F. H. Stewart.—*Q.* Suppose it is carried by railway must it be carried in bulk?—*A.* At present it is packed fairly loosely and it could be packed more tightly. Mr. Fraymouth has strong ideas about educating tanners to pack their bark better.

Mr. A. Chatterton—*Q.* By means of a grass-baling machinery?—*A.* I think it is a question of pressing the bark.

Q. What is the result of the experimental work up-to-date in regard to the introduction of absolutely new tannin materials such as is being done by the Esociet Company?—*A.* I should say that at present very little in the way of definite results have been obtained. There is no doubt however that a number of tanning materials to which attention has been directed by Esociet are being used in larger quantities. For instance, *Kahua* bark was scarcely used at all a year ago and now orders have been placed by Cawnpore tanneries for very large quantities. It has been supplied with the help of the Government Forest Department and Esociet. It is not a new discovery in any sense of the word, but new attention has been directed to it and the methods of collection have been greatly improved.

Q. It had not been used by tanners before?—*A.* Yes; but not to this extent.

Hon'ble Sir R. N. Mookerjee—*Q.* You have been connected with this work since the formation of the Munitions Board?—*A.* Since July 1916, nearly a year before the Munitions Board was created.

Q. You had no previous knowledge of it?—*A.* I pretend to no expert knowledge of the trade. I came in originally as an administrative officer to control the purchases of tanned hides for the War Office. Later on raw hide exports were added, and the work of control, which now includes the whole trade from the raw materials to the finished article, has enormously increased, especially since the formation of the Munitions Board.

Mr. A. Chatterton.—*Q.* We may assume for the present that we have got to look to the old sources of supply for tanning barks and that there are no new materials?—*A.* I do not think I can accept that. I say little has been proved as yet but there are immense possibilities of new materials.

Q. Apart from the tanning which is done with *avaram* bark and *babul* bark, is there any other material now being used which will give equally good results?—*A.* Not at present. When however you say *babul* bark, you have to remember that there are various mixtures, used such as *babul* and myrobalams mixed and *babul* and *kahua* mixed and so on, and some of the biggest tanners like Messrs. Cooper, Allen use a great variety of tan stuffs and also import tanning materials and extracts. But of the Indian tan stuffs *avaram* and *babul* still hold the field.

Hon'ble Sir R. N. Mookerjee.—*Q.* Do you mix on account of cheapness or for better quality?—*A.* Mainly for quality. Different materials give different results in tanning. If you are tanning for sole leather or upper leather, you want a different class of tanning. In

some of the Bombay tanneries *babul* is mixed with *avaram* because it is cheaper, although the mixture does not improve the leather.

Mr. A. Chatterton.—*Q.* Do your experts who have examined these hides say that the use of new materials in the place of *avaram* and *babul* produces absolutely as good a leather?—*A.* We have seen leather produced which was quite as good, but we have not been able yet to obtain a continuous output of leather of the same class.

Q. Have you formed any opinion as to what would be the best course to adopt to develop the tanning trade in India to the maximum possible extent after the war when the demand for this lightly tanned leather has ceased on the part of the military authorities?—*A.* The last sentence of my written evidence expresses my opinion. I think there is going to be intense competition immediately after the war between the raw hide exporter and the Indian tanner and the Indian tanner will have to be protected against the raw hide exporter.

Sir F. H. Stewart.—*Q.* Failing that, your solution would be the combination in one man of both the raw hide export business and the tanning business?—*A.* Yes.

Q. Which part of his business is going to pay to him?—*A.* At different times one part will probably pay more than the other. He will be able to accommodate himself to the markets at home. Very often in the auction sales in London where most of the Indian tanned hides used to be sold, the tanner was badly hit. The hides were sometimes sold at a complete loss. It was a speculative business.

Q. Who took the risk? The exporter?—*A.* The tanner took the risk in most cases by sending hides home to be sold on commission. In the long run he usually came out all right. What used to happen in Madras was that most of the tanners did not work the whole time. When the market conditions were favourable at home, they used to work at high pressure, and when there was a slump at home, they simply stopped work.

Hon'ble Sir R. N. Mookerjee.—*Q.* I have heard that the auctions are held promiscuously and that there is no consideration, and that for a bad thing they pay a very high price and *vice versa*. Is that so?—*A.* I have never heard that exactly, but the exporter here must have been very much in the hands of brokers at home.

Sir F. H. Stewart.—*Q.* There is reason to hope that things will be much better organised after the war? *A.* That particular trade, that is, rough-tanned leather, will probably revert very much to pre-war conditions.

Q. Where did all this rough-tanned leather go to?—*A.* All to England.

Q. All sold by auction?—*A.* The bigger firms sent direct to their own agents in England and their marks are well known. The smaller tanners usually sent on commission to the auction sales.

Mr. A. Chatterton.—*Q.* If there is a reversion to that, the tanning industry will never be established?—*A.* As soon as the war is over, the old methods will automatically be resumed, I take it. Tanners and exporters have got to find their market in England.

Q. Have you any knowledge of what finished materials are made from the half-tanned leather which is sent home?—*A.* At present it is being used entirely for the uppers of army boots.

Q. For that purpose is a combination tannage used?—*A.* It is treated in different ways I believe. I do not know the details.

Q. Have you any opinion as to the quality of the chrome-tanned leather which is now made in India and which was shipped home in considerable quantities till the export was stopped? *A.* I am not in a position to give an opinion about that. I have heard opinions that it was good. I have seen a good deal of Chambers and Company's chrome leather which is good.

Q. Would it be a probable line for development in the future when the demand for military purposes falls off—to make these chrome-tanned box sides.—*A.* I think so certainly. What I wanted to emphasise in my note was that there was also an opening for vegetable-tanning. I do not think that one ought to go so far as to say that chrome-tanning is the only hope. That I gather was the tone of the note.*

Q. As far as the note is concerned, what is expressed there is that chrome-tanning is the hope of the future in regard to light leathers. That is an absolute fact?—*A.* Very probably.

Q. The bulk of the hides of the best class which were exported from India were chrome-tanned in Germany or in England, and there is no earthly reason why we should not do it in this country?—*A.* No, but there is no reason why one should not also vegetable-tan in this country.

Q. Taking leather either tanned or in the raw state as hides and skins, India makes a very large contribution to the world's market. In your opinion is that contribution so large as to enable us more or less to dominate the situation?—*A.* I do not think so.

Mr. C. E. Low.—*Q.* Is our contribution so large that a withdrawal of it would have a serious effect on the leather trade of the world?—*A.* It would have an appreciable effect.

Q. A very serious effect on it?—*A.* I would not go so far as that. I should like before expressing an opinion to work out the figures of India's production.

Mr. A. Chatterton.—*Q.* That is not the point exactly. It is not the total production. Each country, of its own production, requires the major portion and there is only a certain

* Witness refers to a note on which his opinion was invited.

percentage which goes to the open market. There is no surplus material at all in some countries whereas India possesses by far the largest amount of surplus material which can be disposed of outside its own markets.—*A.* I rather doubt whether India is the largest exporter of the raw material. I should like to compare the figures of South America.

Q. Would the withdrawal of the Indian surplus from the open market create a revolution in the tanning trade.—*A.* It is very hard to answer that question. There would be a considerable stir. There will certainly be intense competition for Indian hides after the war.

Q. Then within certain limits we do dominate the situation?—*A.* Within certain limits.

Q. Putting it in this way, we can either offer raw material as we had been doing in the past, or we might offer finished goods. Hitherto a trade in raw hides has been developed with certain countries by virtue of their fiscal regulations. Is the demand for products of Indian leather from Indian hides so great that if we say, you must take finished material, it will be taken? Can we compel them to use our material in the finished form rather than in the raw state?—*A.* I should hold strongly that they won't give you decent prices for the leather unless it is well finished.

Mr. C. E. Low.—*Q.* You must also consider how long it will take before we can produce that material?—*A.* You will have to work up the quality here to a higher standard before it is worth while thinking of that proposition.

Mr. A. Chatterton.—*Q.* Is the quality that has been turned out hitherto sufficiently good?—*A.* I would not like to say, but people who ought to know tell me that it is not. One expert out from home told me that he had not seen any leather produced in India which was of the best finish and could command a good market at home in ordinary times.

Q. Can you state whether this result is due to the inferiority of the hide or to lack of skill in manufacturing the leather?—*A.* It is not the inferiority of the hide because the same raw material has been producing a good finished article in other countries.

Q. That is to say, you have got to improve the methods of tanning and currying leather?—*A.* Yes.

Q. Supposing that steps are taken to import experts and workmen to manufacture a good class of leather and we start the manufacture of chrome box sides and glace kid, it will obviously take a certain number of years to develop the industry so that it can absorb all the suitable material available in the country. Is our position strong enough to compel other countries, who would prefer to take only our raw material and work it up for themselves, to take finished leathers to whatever extent we can supply them, gradually increasing the amount as the local industry expands?—*A.* I doubt whether this is practicable.

Q. You have not a sufficient hold on the market?—*A.* No, I do not think they will take leather unless it is suitable in quality.

Q. Assuming we are giving them suitable leather? Look at it from another point of view. You have probably gone into the figures of the hide trade for the past 10 or 15 years. Is it not a fact that since the end of the nineties the price of hides has been steadily rising in the world's market?—*A.* Yes.

Q. And especially these light hides from India?—*A.* Yes.

Q. That is to say, there is a steadily increasing demand for them?—*A.* Yes. There has also been much improvement in the methods of collection and organisation of the trade.

Q. That shows that there is a very strong demand for them. If we withhold a part of that supply the prices would go up still further?—*A.* You mean you would prohibit export.

Q. If you withhold a part of the raw material for the purpose of manufacturing it into finished leather,—supposing there were three million hides available for export, at the commencement we export two million hides and hold up a million in the country.....?

Mr. Low to Mr. Chatterton.—By the tanner paying a higher price, or by direct Government action?

Mr. A. Chatterton.—*Q.* There might be direct action. The direct action we contemplate is by putting an export duty on the raw material. Supposing we have three million hides and we hold up a certain proportion of them to manufacture into high class leather in the country, is it likely that we shall be able to get a market for that leather in the markets which hitherto took the raw material?—*A.* I think you will certainly get a market for leather from India if it is good enough.

Q. We have got to try and formulate some policy as to what should be done in connection with the manufacture of leather in India?—*A.* I think that what is suggested in the note is quite correct. It must be a gradual development. You cannot proceed very fast with the development of skilled tanning out here, but the result will eventually be the replacement of the export of raw hides very largely by the export of finished leather.

Q. From the discussions that you have had on this question with experts, do they attribute the inferiority of the Indian finished leather to climate, or the raw material, or simply to the lack of skill on the part of tanners?—*A.* To want of experience.

Q. If we get thoroughly competent tanners out from home, there is a good prospect of turning out first-class leather in India?—*A.* Yes.

Sir F. H. Stewart.—*Q.* What prevents the manufacture of better leather in this country?—*A.* It is a question of technical training and experience. There is one important

matter which I should like also to emphasise and that is that the Indian tanner did not before the war get the best classes of Northern Indian hides, which used to be exported. He is now getting better hides than he ever got before. This is purely due to war conditions, but after the war he will expect to get these hides.

Q. What about the legislation introduced under the Defence of India Act?—*A.* It is emergency legislation.

Q. Should that be continued after the war?—*A.* I should like to see some of it continued, for instance, on the question of adulteration, but it will be better if the trade can do it for themselves by some combination among the tanners.

Q. Will the simplification of the number of marks make the auctions fairer?—*A.* I cannot say whether the trade will retain our simplified selections after the war or not. The selections have been now reduced in number as a matter of convenience for the particular purposes we have in view. The trade is highly specialized and a greater variety of marks are likely to be reintroduced after the war.

Hon'ble Sir R. N. Mookerjee.—*Q.* Don't you think that the prospect of getting better price for good leather will stimulate the quality without having an Act for it?—*A.* That is the best stimulus always in the long run. I do not like the present penal method of preventing adulteration. It is purely a war measure. I would much sooner see it done by a combination of tanners themselves. They have learnt the value of it now.

Q. Will they stick to it?—*A.* I do not know that they will.

Mr. A. Chatterton.—*Q.* Most of the adulteration is done on inferior hides?—*A.* No. 'Bangalore' hides, that is, some of the best hides, used to be badly adulterated. There are two kinds of adulteration; either by the addition of actual adulterants in the course of tannage, such as magnesium salts and sugar, etc., which is very difficult to detect, or as in the particular 'Bangalore' tannage by the addition of plaster and chalk to the flesh side after tannage. This is merely an addition of artificial weight.

Sir F. H. Stewart.—*Q.* You have been able to effect some improvements in the matter of flaying and bad branding?—*A.* We have done so only in certain small localities. We have scarcely touched the fringe of the question. We are doing what we can by generally circularising information and endeavouring to educate the people.

Q. The cultivator does not like to contemplate his animal as a mere bearer of a hide?—*A.* No.

Q. If you wish to convert the demand in the countries which are going to take the hides into one for the manufactured article, will there not be an increasing demand for it in India?—*A.* Yes.

Q. Is that not the line which should be developed?—*A.* I do not think the market for finished leather in India will ever be sufficient to absorb a large proportion of the outturn of Indian hides and we shall have to depend on foreign markets.

Mr. A. Chatterton.—*Q.* Is not the demand in India decreasing owing to the fact that other materials in the place of leather are being used for agricultural purposes such as well buckets?—*A.* Yes.

Q. That affects the position materially?—*A.* Yes.

Mr. C. E. Low.—*Q.* Turning to page 26 of your Note,* did the Cawnpore factories use East India kips before the war?—*A.* No. They tanned the hides themselves from the beginning.

Q. Why do they do it now?—*A.* It is in order to double their capacity. They are tanning only buffalo leather now for soles and using the East India kips tanned in Bombay for the upper leather.

Q. It does not follow that they would agree to take East India kips in normal circumstances?—*A.* No.

Q. Do you know why the War Office would not take any chrome leather?—*A.* They are not taking any finished imported leather. I do not know the reason. Their policy apparently has been that all Army leather must be finished in England.

Q. But I thought a little while ago the position had changed a bit and the English tanners were unable to deal with all these kips.—*A.* That was the case only in regard to our exports of raw hides, which were ahead of requirements. They have taken all the rough-tanned hides they could get.

Q. On page 27 you say with reference to hide-pickers, "The Board has made enquiries from home regarding the best processes and the subject will be carefully investigated."—*A.* We have got a reply from home on this subject, but I should have to refer to the papers to give you details. Jute mill pickers are being made out here now very successfully. The difficulty is only in regard to cotton mill pickers and experiments are being made with these.

Q. Do you think that the future question of tannin research in India, whether with regard to the increasing of the local produce or with regard to the use of the various vegetable tans, should be imperial or provincial?—*A.* I think myself that there is room for both. I think that local problems for some time to come will demand enquiries, say, in Madras, Calcutta

**Vide* Indian Munition Board's Handbook.

and the North of India. But there should be, I think, an Imperial department to co-ordinate the working of the local research institutes and there should be a number of experts in different specialised lines.

Q. Owing to the multiplicity of special problems?—*A.* I think there ought to be several experts. There are certain problems to my mind which are general, for instance, improving the standard of chrome-tanning. That particular expert could give advice all over India; but enquiries into the particular classes of tan stuffs most suited to particular localities would be provincial enquiries.

Q. And utilising them?—*A.* Yes.

Q. You think that some sort of research or enquiry is required for the improvement of chrome-tanning?—*A.* For finished leather generally. I think we should bring out the best expert we can get at home.

Q. Should you have a research institute or a model tannery, or would the expert have simply to go round?—*A.* I do not think myself that a model tannery is necessary.

Q. A research institute?—*A.* Yes, something in the nature of an institute.

Q. You want it on a laboratory scale?—*A.* Yes.

Q. You can get all you want in the way of practical tests from the firms?—*A.* Yes, I think so.

Mr. A. Chatterton.—*Q.* Certain Indian tanning establishments can turn out chrome leather which is supposed not to be of the highest quality. Is it a fact that research is wanted to improve matters, or is it simply a question of working, as is done elsewhere on a big scale with a highly trained and highly differentiated labour?—*A.* It is not so much a question of research in this case.

Q. Is it purely a question of applying the methods which have already been fully recognised elsewhere?—*A.* Yes, with adaptation to Indian conditions.

Q. Should we be justified in drawing this deduction that it now would be reasonable to start in India a very large tannery on modern lines provided we can import competent supervision and trained labour from some other country which has already established a reputation for the manufacture of the best class of leather?—*A.* Yes.

WITNESS No. 471.

MR. G. S. HART, C.I.E., *Inspector-General of Forests.* *Mr. G. S. Hart.*

WRITTEN EVIDENCE.

I—The best means of keeping the forest staff in touch with industrial needs and possibilities.

Knowledge of industrial needs and possibilities must go hand in hand with knowledge of the growth, occurrence and best means of regenerating the various species of forest trees. The latter knowledge depends largely on research, while if the former is to be obtained and maintained the first essential is, in my opinion, that in future Government shall take a much larger share in the exploitation and disposal of the produce of its forests than it does at present: for this purpose it will obviously be necessary to give the trained forest staff special assistance as regards exploitation, transport, and sales of forest produce. For the control of exploitation the various provinces will require a number of special exploitation officers, not necessarily trained forest officers, but men of the class of the assistants now employed by large timber trading firms. These men should be engaged by Local Governments as required, it will probably be found necessary to employ them permanently on terms similar to those granted to members of the Imperial Forest Service, after a period of probationary service.

For improvement in the methods of exploitation and transport a staff of trained forest engineers is a necessity: this question is dealt with in a subsequent section of this note.

2. The question of commercial development in the forest department has been discussed in the public press on various occasions during the past two years, both in the form of original articles and in reports of, and comments on, the evidence given to the Commission by various gentlemen. It has indeed been suggested that there should be an entirely separate commercial forest staff, and that the sales of Government timber throughout India should be carried out by an Imperial branch consisting of a capable business man with a small staff of assistants. I regard any idea of this kind as almost fantastic, for to my mind it is most undesirable, and indeed impossible, to divorce the officers of the Forest service from general control over the disposal of forest produce, while the great differences in the various provinces as regards the quantity and value of timber available for commercial use, the improbability of any one man being able to obtain an adequate knowledge of the timber trade throughout India and Burma and the certain objection of Local Governments to more or less complete centralisation of disposal, make any scheme for a general sale agency impracticable.

3. As far as timber is concerned the best means of keeping in touch with industrial possibilities and of replacing by the use of Indian woods the very large quantities of foreign timbers now imported into India will be, I think, to establish Government timber depôts in

commercial centres, such as Calcutta, Bombay, Madras and, later on, perhaps in some of the larger trading centres in Upper India. These depôts should not ordinarily be concerned with timbers such as teak, sal and deodar, the uses of which are well known and which are already saleable to the fullest extent to which they can be put on the market. They should be concerned principally with pushing the utilization of the lesser known Indian timbers from the forests of Burma, the Andamans, Western India, both below and above the Ghats, the North-Western and Eastern Himalayas (particularly pine and fir from the former), Eastern Bengal, Assam, and Central India. Timber should be shipped or railed to these depôts by the Governments concerned, the remainder of the business being placed, at any rate at first, in the hands of commercial firms working as agents on behalf of Government. In addition to the depôts these firms should maintain show-rooms for the exhibition of timber samples, while it will probably be necessary to provide the depôts with some sawmill machinery and with seasoning plants. The agents should, of course, be in touch with Government Departments using timber and with Directors of Industries.

This matter is now under the consideration of the Government of India and when I meet the Members of the Commission I may be able to explain the scheme in further detail, if desired.

4. The further utilization of minor forest products in connection with the expansion of existing industries, or the commencement of new industries, must obviously depend to a large extent on the results of research. Apart from this side of the work it is certainly desirable that there should be some agency, not only in touch with commercial requirements but also in possession of adequate knowledge regarding the occurrence, possibility of extraction and of increase in the supply of the various products concerned. This might be secured by the adoption of one or other of the methods referred to in paragraph 43 of the preliminary draft of the Commission's report, or by the employment of one or more officers attached to the reorganized Economic branch of the Forest Research Institute, working in touch with Provincial Departments of Industries. I should prefer to postpone the expression of a definite opinion on this matter until I meet the Members of the Commission, though I am inclined to prefer the last mentioned method as I am doubtful if a separate officer would be required for each province, and am by no means certain that the work in two or three provinces could be combined without giving rise to friction.

II—*The organisation of scientific services and of research.*

5. I take this to refer, as far as I am concerned, to the organisation of forest research only. I assume, also, that as far as may be possible forest research should be carried out in India, that where this cannot be done reference should be made to the Department of Research recently established in England and that enquiries connected with the possibilities of trade in forest products between India and the United Kingdom should be addressed to the Indian Trade Commissioner.

6. The Forest Research Institute has done much good work since it was started some 12 years ago: but, if proper progress is to be made, the staff, buildings and plant must be largely increased with as little delay as possible, for these are entirely inadequate at present, particularly as regards the Economic branch. This matter is already under consideration, but it may be advantageous if I give the Members of the Commission an outline of my own ideas on the subject.

7. The duties of the President of the Research Institute and College include the supervision of the educational work connected with the training of the Ranger and Provincial Service courses of instruction, as well as the general control of research work of all kinds. It has now been decided to provincialize the training of forest rangers so that the educational side of his work will be decreased shortly. On the other hand, the reorganisation of the research staff will add to his work very considerably, while the size of the Provincial Service classes must be increased very shortly. At present the President is a selected Conservator of Forests; but under the altered conditions, which will, it is hoped, be brought into being without much delay, the post should be raised to a Chief Conservatorship.

8. The branches of the Institute are as follows:—

(*i*) *The Botanical branch.*—The present staff consists of the Forest Botanist and two Indian assistants. This is probably sufficient for the work carried out at present, though if the branch is to deal adequately with the fungoid diseases of forest trees it will require considerable enlargement.

(*ii*) *The Sylvicultural branch.*—The staff now consists of the Sylviculturist and two Indian assistants, one employed in the field and the other in the museum and experimental garden. In addition seven posts are sanctioned on provincial cadres, and more are likely to be sanctioned shortly, for local and mainly sylvicultural research, on the understanding that the officers holding these posts will work in collaboration with the central institute. I do not think this arrangement is satisfactory. If regular progress is to be made, if the work is to be carried on throughout India on the same lines, and if overlapping is to be prevented, arrangements must be made to ensure thorough collaboration. I am not prepared to say that the local sylviculturists should be absorbed into an Imperial branch and with headquarters at Dehra Dun, but at the least they should be under the general direction of one officer and

should visit the central institute annually in the rains so that their results may be co-ordinated, the repetition of work already done on one species in any province be avoided and the course of research work during the next field season be settled. Accordingly I hold that the Sylvicultural branch should be under the control of a senior officer of the standing of a Conservator of Forests whose duty it should be to co-ordinate Sylvicultural research throughout India and arrange for the compilation and distribution of all the resulting information. He should at the same time keep up-to-date with progress in working plans, that is to say, with the application of sylvicultural systems of management, on the Continent, in the Colonies, in America and in India. On this very important subject he should act as adviser to the Inspector-General of Forests and to Chief Conservators. He should be freed from the conduct of actual research work himself other than work of this class done at Dehra Dun, and should tour to the extent necessary to carry out the duties mentioned above. He would require two assistants, one for working plans and one for the museum, the sylvicultural garden, ledgering work, etc.

(*iii*) *The Economic branch.*—The present staff is confined to the Forest Economist with one assistant. This staff is hopelessly inadequate to deal with the work which has to be done and the branch should comprise at least the following:—

(*a*) Wood Technologist: This officer would deal with the properties and uses of the numerous Indian timbers and with the antiseptic treatment of timber. On the first of these subjects there is a vast amount of work to be done for: with the exception of a few of our principal species, our knowledge can only be described as elementary.

(*b*) Pulp Expert.

(*c*) Tan and Dye Expert.

(*d*) Minor Produce Expert.

These officers should confine themselves to research. As in the case of the Sylvicultural branch the Economic branch might be in charge of an officer of the class of Conservator who, in addition to the general supervision of the work of the branch, would form the connecting link between the Research Institute and the commercial community. He should also be in touch with the agents in charge of the Government timber depôts, referred to in paragraph 3 of this note, and might indeed supervise the management of any of these depôts established by the Government of India. He should advise regarding, and if desired to do so by the Local Governments concerned could also supervise, the management of Government forest industries, such as the resin industry of the United Provinces and the Punjab, or such other demonstration plants as Government may erect with the object of proving the commercial possibilities of industries depending mainly on the utilization of forest products. Should the suggestion made in the concluding portion of paragraph 4 above be accepted, the officer or officers concerned should work directly under the head of the Economic branch.

(*iv*) *The Zoological branch.*—The sanctioned staff consists of the Forest Zoologist and one Indian assistant. A second assistant has been asked for and with this addition the staff may be sufficient for the present.

(*v*) *The Chemical branch.*—I understand that the Commission is likely to suggest the formation of a Chemical Department from which officers will be deputed to the various Departments requiring their services. I trust this is so, and that arrangements will be made for the publication of the results obtained by these officers under the control, and with the approval of, the head of the new Department. As things are at present the state of affairs in the Chemical branch of the Forest Research Institute is not quite satisfactory. Neither the President of the Research Institute nor the Inspector-General of Forests can possibly control or offer any opinion on the value of the work done by the Chemical Adviser, and this has led to the Government of India ordering that before results are published an outside opinion on them shall be obtained. This procedure, which under present conditions is in my opinion very necessary, is strongly resented by the Chemical Adviser with the result that things are not working smoothly.

The Research Institute will probably require a Forest Chemist with one general assistant and, in addition, another assistant to deal specially with distillation products—oleo resins requiring treatment by distillation or in a solvent plant, essential oils from grasses, destructive distillation (Stockholm tar, wood tar, wood spirit, etc.). This officer's work will be almost entirely in connection with the Economic branch of the Institute, but obviously he should work under the control of the Forest Chemist.

(*vi*) *The Forest Engineering branch.*—This matter is dealt with in the concluding section of this note.

III.—*The establishment of a service of Forest Engineers.*

9. The necessity for a regular service of Forest Engineers is now undisputed. Some little time ago the Government of India addressed Local Governments on this subject, suggesting the formation of such a service and making enquiries as to the number of Forest Engineers likely to be required. Later they asked the Secretary of State for India to depute a senior forest officer, who is on leave in England and who has devoted great attention to the

subject throughout his service, to visit Canada and America with the object of making enquiries regarding mechanical appliances now in use in those countries and suitable for use in India, the possibility of obtaining a few trained Forest Engineers to start the service, and the best method of future recruitment.

Replies have not yet been received from the Governments of Bombay and Burma, but 10 posts have been asked for by other Local Governments. I consider that at least 15 Forest Engineers could be profitably employed at once, if we could get them, and that within a few years time the strength of the service is likely to exceed this number considerably.

10. As it is by no means certain that all Administrations will require one or more Forest Engineers permanently and as the members of the service will naturally specialize in the various branches, such as sawmills, portable or otherwise, logging rail roads and tramways, wire ropeways, timber hauling appliances, etc., the service should be Imperial so that men can be sent to provinces as required. The officers in the service should be graded and paid on equality with the Imperial branch of the Forest Department, and there should be a Chief Forest Engineer, graded as a Conservator of Forests, as head of the service who should be attached to the Research Institute. He should tour sufficiently to supervise the principal forest engineering works in progress and should pass schemes drawn up by the officers under him.

11. I do not consider that this sketch of the required reorganisation of the Forest Research Institute represents finality in any way. I regard it only as sufficient for the present, for I am convinced that as time goes on all branches, and more particularly the Economic branch, will require still further expansion.

APPENDIX.

In the first paragraph of my note I have stated my opinion that in future Government should take a larger share in the exploitation of its forests than is the case at present. This seems to be essential if the Government forests which can be worked mainly on commercial principles are to be managed with the object of securing the greatest possible benefit to the general tax-payer. Still I do not mean that extraction by purchasers' agency should be generally discontinued. There are parts of India where the market for the whole of the outturn is so fully assured and where communications are so good that excellent prices are obtained by the sale of each year's outturn to traders, while there are other parts of the country where the kind and quality of the outturn makes it more advisable to trust to gradual development by traders than to attempt to work by departmental agency: again there are areas where there are no particular difficulties as regards extraction and where the demand and the state of communications are good enough to make it possible for Government to insist on the removal of most of the possible outturn and onthe payment of royalty proportionate to market values. In these cases, or at any rate in those belonging to the two first classes, it would be foolish to work otherwise than through the agency of purchasers. But there are many other localities, often yielding timber of high quality, where the system of purchasers' agency, either by long or short term leases, has resulted in Government obtaining a very poor price for its produce, or indeed in considerable loss, where extraction by departmental agency has been replaced by leases of outturn. It is in cases of these kinds, and more particularly where capital has to be sunk to improve methods of exploitation, transport and conversion that Government should extract at least a fair proportion of its forest outturn through the agency of its own officers. It is useless to expect commercial firms to sink capital in permanent improvements. They are out, and naturally so, to make the greatest profit they can within the period of their leases, and the condition in which the forests are left at the end of the leases is a matter in which they are not greatly concerned.

Oral Evidence, 15th March 1918.

Mr. C. E. Low.—*Q.* In order to facilitate discussion on one particular point in your written evidence we sent you a note* on this particular aspect, *viz.*, the translation into commercial practice of the results of researches on a laboratory scale. Have you any remarks to make?—*A.* Perhaps I did not make myself quite plain. It is proposed to go beyond the laboratory scale at Dehra Dun. We have a plant coming out from home for the antiseptic treatment of timbers. It is not a play thing, but a fair-sized plant, with which we hope to be able to work on the treatmant of timbers, by any of the methods generally used. We also propose to put up, for the manufacture of pulp, two digesters, one of Mr. Raitt's and one of Mr. Milne's, for bamboos and grasses, and we have now in India a tannin extract plant. It is proposed that these plants should be worked at Dehra Dun on a scale sufficient to produce commercial samples. We have got Mr. Raitt at present, and if we cannot come to terms with him, it is proposed to get another man for the pulp work.

Q. You do agree then that, in the past private enterprise might have come forward more quickly, if you had been in a position then to put the results on your experiments on a commercial basis?—*A.* Certainly. As regards matches, for instance, many years ago Mr. Troup, when he was Forest Economist, tried hard to get a small-sized plant to be worked by Government, but Government would not touch it. The United Provinces Government had a scheme to put up a small plant for dealing with grasses for pulp. Mr. Raitt got the scheme ready for them, but it was considered that the thing had not been sufficiently proved to allow

*Not printed.

Government to spend the money on it. As a rule Government has refused to put down money for this kind of thing unless it has been absolutely proved to be commercially successful. We have got to try these things first, and it is impossible to progress until this is done.

Mr. Chatterton.—*Q.* Do you agree with our note?—*A.* I do with the general principle that if projects of this kind are to be worked at all, it is most desirable that Government should undertake small pioneer factories, with plant big enough to let the work be tried on a small commercial scale.

Mr. C. E. Low.—*Q.* My point is that, although a number of firms of repute have been holding concession for pulp making for years past, no step has been taken practically to exploit those concessions.—*A.* That is quite true. Government ought to have done it themselves.

Q. The reasons very largely are that the firms are uneasy about the practical working of the concessions; as, for instance, how much it would cost to get out the material; what the rate of renewal would be; etc.—*A.* We have always told them that there is plenty of bamboo to be had.

Q. This monograph of Mr. Troup's was issued under considerable difficulties, in the absence of any agency of this kind for actual Government exploitation on a small scale.—*A.* Mr. Troup suggested the establishment of a Government pioneer factory at a capital cost of about R2 lakhs with an expert to work it and investigate possibilities. But Government refused to have anything to do with the project, which Mr. Troup regarded as an essential accompaniment to the monograph.

Q. He had to rely on experiments made by the seller of a match-making machine, which, of course, was not satisfactory. On the other hand, the Forest Department made a very great success of the distillation of turpentine. Can you tell us what share was taken in that by the Dehra Dun Institute?—*A.* That was one of the supplementary questions sent to me to which I was not able to send the replies before, as I only just got the questions in Burma before I started. What I have written is this:—

"The officers of the Forest Research Institute, particularly the Economist and the Chemical Adviser, undoubtedly gave much valuable assistance to the Government of the United Provinces in the establishment of the resin distillery at Bhowali. But neither of these officers, nor any of the United Provinces forest officers concerned, were experts in the production of turpentine and rosin from pine resin, so that the distillery at Bhowali was not constructed on up-to-date lines, and has reached its present form largely as the result of trial and error. I do not think that the officers of the Research Institute can be said to have given much assistance as regards the more up-to-date distillery which has been erected by the Punjab Government at Jallo. The success of this distillery is due almost entirely to the foresight of the Punjab Government in deputing Mr. Gibson to America and France to study the methods of distillation adopted in those countries, and in subsequently sanctioning the purchase of a complete plant from a well-known firm of resin distillers in Bordeaux."

I think the share of the Research Institute in the success of the resin industry, was mostly confined to assistance given to the United Provinces Government.

Q. By tests?—*A.* Yes, and by helping to put up the plant, and helping to design it. The Bhowali plant is quite out-of-date.

Q. You agree that it is the kind of arrangement that ought to be taken up?—*A.* Yes in the way that it is taken up at Jallo. That is the way it ought to be done.

Q. This was, perhaps, not a matter in which the Research Institute could help much. It was a fairly straight ahead proposition?—*A.* No. They could not give much assistance. It is a well known process.

Q. Would you be prepared to say that it is a matter that should be left open, and dealt with on its merits as to which Department should take up anyone of these small commercial test process the Forest Department or the Department of Industries, or private concerns?—*A.* I would not mind in the least who took them up, provided they were under Government control, where forest matters are concerned. If Government is prepared to put down a plant at Dehra Dun I don't see why the Dehra Dun people should not do it. If the research is to be done in Dehra Dun, it would be more convenient that the plant should be erected there.

Q. We hope, if our recommendations are accepted, to have an Industrial Department with an organisation capable of handling things of this sort. Probably there are many cases in which it could be done by the Forest Department or by a Department of Industries working with the Forest Department.—*A.* I should not object at all. It would be quite an open question, as long as it was done.

Q. You agree that the position of the Forest Economist is an impossible one, not only because of the diversity of the subjects he is supposed to give information on, but because he has no opportunity of translating the reports of the scientific workers into commercial practice.—*A.* That is it: that is why I think we should have these small plants at Dehra Dun.

Mr. A. Chatterton—*Q.* Whom would you put in charge of the working of these small plants?—*A.* Special men. Supposing we had Mr. Raitt, he would be in charge of the paper pulp.

Q. Whom would he be responsible to?—*A.* To the Principal of the Research Institute. We should work on a scale big enough to produce large samples of the pulp, marketable samples, and hand them over to paper manufacturers to try.

Q. Take the instance of the creosoting plant for sleepers?—*A.* As you know, the railway authorities have practically decided to put up their own treatment plant. Mr. Dove-Wilson has just submitted a most excellent report on the various processes at home. I saw it the other day. We want our plant simply to try and ascertain, on a decent-sized scale, the processes best suited for treating the various Indian timbers, which we know, as far as their strength is concerned, are quite suitable for sleepers. It is merely a matter of getting them immune from white ants and decay.

Q. On what scale is your plant?—*A.* It will be just a one-cylinder plant, but up to date, with a regular cylinder and pressure tanks.

Q. Would it be on a sufficient scale to treat, for instance, 10,000 sleepers?—*A.* Yes, in course of time. The object of getting the plant is not to undertake work on a large commercial scale, but to ascertain the process best suited to any particular timber.

Q. Then you think your scale of operations would be quite as big as you think necessary?—*A.* Yes. The railway would put up their own plant. All that would be wanted would be a knowledge of the best system for treating the timber.

Mr. C. E. Low.—Q. Supposing the railway would not do it, you would want a plant run on a fairly large scale, so as to give reliable figures as to the cost of placing the sleepers so treated?—*A.* The cost of placing them is merely a question of railway freight and shipping. Burma is one of the places which can supply enormous quantities of timber, and no one would think of taking timber from Burma to Dehra Dun to treat it. They would have their treatment plant at Rangoon. What the plant at Dehra Dun would do is to ascertain the best method of creosoting sleepers. Then we should be able to say, "Here are 5,000, or whatever the number may be, treated sleepers, and the cost of the actual treatment is so much."

Q. This is not an instance of the plan we had in mind. Ordinarily speaking, if the railway would not do it, would not the most satisfactory method be to put the plant in a place where ordinary business considerations suggest, and see how it works. Then you can tell whether the thing can be run on a profit or loss basis. Would not your proposal impose rather a serious burden on the head of the Institute, who is, presumably, much more of a scientific man than of a business one.

Mr. A. Chatterton.—Q. Take the case of bamboos. To obtain commercial results of any value, your plant would probably have to be on a fairly large scale?—*A.* There would be two full-sized digesters.

Q. I have had complete plans and estimates worked out by Mr. Raitt of a plant of that kind for the Mysore Government, and the cost comes to, approximately, 25 lakhs of rupees?—*A.* The plant that we propose to have at Dehra Dun is nothing of that description.

Q. This would turn out 20,000 tons of paper pulp a year, which would be on a considerably large scale to test the suitability of the pulp. This is based on the assumption that no private firm would take the matter up. Would you recommend that we should work on such a big scale as that?—*A.* No, I would not work on any bigger scale than was necessary actually to test the thing commercially.

Q. This is considered to be the smallest plant from which to get any commercial results. You cannot get together all the data necessary, unless you work on such a scale?—*A.* I know that Mr. Raitt drew up a design of a plant which was to be put up in the United Provinces the cost of which was under six lakhs. It was to be put up as a commercial proposition for the production of pulp from grass. We don't propose to put up anything at Dehra Dun which is going to pay but will only put up a thing which is big enough to enable us to turn out commercial samples.

Q. Between that stage of preparing commercial samples and the stage in which private enterprise is going to enter into the matter, there is the question where it is going to be put up.—*A.* The plant can be put up at any place thought suitable. It does not matter where such a small plant is put up.

Mr. C. E. Low.—Q. The smallest plant capable of giving results on which commercial data could be obtained, especially with reference to the cost of collection of materials, would need to be put up in a commercial position.—*A.* If you are going to work the plants in that way, they must obviously be put up in a commercial position. If, for instance, you are going to work plant like that in Burma, you want it put up where you can collect your materials.

Q. I think half measures of that kind are a waste of money. Have you reason to believe that the mere production of commercial samples will bring the matter any further?—*A.* It would be one step in the right direction, at any rate.

Q. Is not the real difficulty which the private individual or company finds very often that he does not know what it is going to cost him, either in regard to the collection of the materials or their manufacture.—*A.* You cannot find that out until you have got a plant just large enough to work on a commercial scale and to furnish commercial data.

Mr. A. Chatterton.—Q. In other words, we want a pioneer factory?—*A.* Yes, if Government is going to take up the matter in that way, then we want a pioneer factory.

Sir F. H. Stewart.—Q. Your idea is more in the nature of a demonstration. The other scheme which Mr. Chatterton is talking about is distinctly a pioneer commercial enterprise.—

A. Yes; as far as the research institute or any research institute is concerned, I don't think they can go much beyond the first stage. Once you have shown the commercial community that the thing can be done, it is up to them to try it, if they think there is any profit in it unless you can induce Government to put up regular factories which in some cases might be a good thing.

Mr. A. Chatterton.—Q. Take the example of a wood distillation plant. That would have to be put up near the forest on which you are going to draw for your material, and wood need to be on a tolerably large scale to yield commercial data of any kind.—*A.* Yes. Immediately before the war, the wood distillation industry in America was on its last legs absolutely. It was very nearly expiring.

Q. That was for obvious reasons, because they had given up the manufacture of charcoal iron.—*A.* That was the position.

Q. The wood distillation industry depends entirely, for its success, on having a local demand for your charcoal. In India the conditions are favourable, because where the forest exists, coal is expensive, as a rule.—*A.* I don't know of any place in India where you could start one now and get rid of your charcoal. Take Burma, take the Punjab pine forests where there is a huge waste of timber. The wood distillation business depends entirely on your guaranteeing that you can get rid of your charcoal. Unless you can do that, it will be a failure.

Q. That would be a matter for the Department of Industries to take up rather than the Forest Department, because they would be in a better position to create a market for charcoal. For instance, we are using large quantities of charcoal for pumping stations. That kind of work is likely to develop enormously in the future, when the work we are now proposing to take up is developed.—*A.* You have got to have your demand for the charcoal pretty close to your factory, or have good communications. For instance, in England—in the forest of Dean they had huge godowns stocked full of charcoal, which they could not get rid of before the war.

Mr. C. E. Low.—Q. Returning to your evidence, you say, under the heading of "Economic Branch," "These officers should confine themselves to research." Do you mean by that, laboratory research, or work of the type which you described just now, *i.e.*, the making of commercial samples?—*A.* That is what I mean; not purely laboratory propositions.

Q. Coming now to the question of the general yield from the forest, per acre, in cash results to Government, do you consider that, with the forests in their present state, the actual yield to Government from the forests is satisfactory?—*A.* No. Not in real forest provinces, *i. e.*, provinces which contain large areas of high forest like Burma, the Himalayas, and the West Coast.

Q. Do you think that improved communications and a different system of forest working, in the case of Burma, would improve matters from the point of view of the revenue?—*A.* I am quite sure they will. The outturn that is now extracted from the Burma reserved forests, is just over 1 cubic foot per acre, per annum. This is for the whole of the reserved forests in Burma. This is absurd, if you take the total area.

Q. The annual average increment is what?—*A.* Many times that; not less than ten times.

Q. We had some rather discordant views by witnesses, who ought to be in a position to know, on the subject of this question of forest communications. We had it stated by some witnesses that no system of railways or tramways, other than that of a purely temporary nature, would be of any use, and that purely temporary ones should be set up by exploiting firms; and we find a good deal of vagueness generally about the information as to the working of things like ropeways, and so on. Have you any views either on ropeways, or on the question of railways or tramways for forest exploitation?—*A.* I think they are absolutely essential, if Government is to work the forests properly, and exploit, not only one species, but all the timber there is.

Q. Take the case of the Topla forests do you consider that a tramway would pay, or a railway?—*A.* No, I don't think so; the jungles are not good enough.

Q. I thought the idea was that it would pay.—*A.* I never thought so, not in the Central Provinces. It would pay in Singhbhum, and in the Buxar Dooars. It is paying in Goalpara.

Q. What type of tramway is that in Goalpara?—*A.* A steam tramway, 2 feet 6 inches

Q. That enables wood to be removed with more profit than would otherwise be the case?—*A.* Yes, it is saving money on the transport.

Q. Is that a stationary tramway, or is it contemplated to move it about?—*A.* Mainly stationary. It is not working to its full capacity at present. A stationary section with temporary branches would be the general scheme of forest light railways in Burma, which is the country where they want them most. They are considering a scheme for a light railway in the Tharrawaddy division.

Q. Would those be forest propositions?—*A.* Entirely.

Q. With regard to the rivers, do you think that it would be advantageous to improve rivers by removing snags?—*A.* River training works have proved to be very satisfactory in Burma,

Q. By whom were the snags removed?—A. Entirely by the Forest Department. This work has proved to be extremely profitable, as very little timber is now being lost.

Q. Turning to the question of sylviculture, would you agree with the proposition that for certain kinds of demand, plantations are necessary?—A. Yes, very necessary. I don't think we could do very much without them in some cases.

Q. Have we the sylvicultural data to start in on a comprehensive plan of plantations in any of those cases?—A. In parts of the country where you can get plantations made by what is known as the *taungya* method, we have; but if you turn to actual formation of regular plantations by planting, that is a very much more expensive business.

Q. You would support the idea of further sylvicultural research for that purpose?—A. Most certainly. I think the results will be profitable if we can form plantations at small expense, utilising the people who practise shifting cultivation to raise our forest crops. This will pay, presuming the demand is adequate.

Q. I gather that the supervision hitherto has not been sufficient to get good results?—A. To a certain extent, but there are instances of magnificent results in Burma.

Q. Is that only in the case of the valuable species?—A. That is with regard to teak. It is being done in Assam now with the *simal*.

Q. There are instances, of course, where a deliberate effort has been made at creating plantations on the west coast, and there are fewer instances in other parts of the country. We saw a small plantation near Prome of teak.—A. This is probably a small regular plantation started in the sixties by the late Sir D. Brandis. There are large teak plantations at Nilambur, eucalyptus plantations in Ootacamund, the casuarina plantations on the coast.

Q. Has anything been done in the Himalayas in that way?—A. We do a great deal of deodar planting in the hills. It comes to this, that you cannot afford to spend more than a certain sum per acre. You have to allow for the fact that it will take a long time for the trees to come to maturity, and you have to work out what the capital cost will amount to.

Q. When you do that, what would you assume to be the value of the timber 50 years hence?—A. It would not be safe to presume much more than the present value. It is possible it would be more valuable, but on the other hand, suppose that with a larger production the rates went down.

Q. How are you off for data regarding the rate of growth of things like fuel species, and low grade timbers?—A. I don't think very much is known about low grade timbers. For certain species there are data, but nothing very definite. If you only want to produce fuel, you can say safely that within 15 to 20 years the outturn will be big enough to yield fuel. Even in Changa Manga it is still a moot question whether the best rotation to adopt is 18 or 20 years.

Sir F. H. Stewart—Q. With reference to your suggestions about development on the commercial side, you suggest that the men should be employed on the temporary establishment. What do you mean by "temporary establishment"?—A. In the copy of my written statement sent me to correct, I altered that. We had a conference on that question in Burma, where these men will be mostly required. We arrived at the decision that they ought to be taken on on a permanent basis after 3 years' probation. The scheme is to take them on permanently on practically the same conditions as the ordinary forest service.

Q. They would not be eligible for the higher administrative appointments?—A. Not in the ordinary line: but already it is proposed to start a special circle of this kind in Burma and another in the United Provinces.

Q. They would be in positions of great responsibility. You would want a man of ability and integrity. How would you get them?—A. The Bombay-Burma Trading Corporation get them. I don't know why Government should not. I hope to give them posts equal in pay to the higher administrative posts at present.

Q. That, in your opinion, will be distinctly preferable to giving a business training to forest officers?—A. I think so.

Q. Then with regard to your suggestion for the establishment of depôts at some of the big centres, there is nothing of that sort now?—A. I hope there will be very soon. There is a scheme for one in Calcutta.

Q. How would that be regarded by the trade generally?—A. It is not proposed that the depôt we are going to establish here—if Government agree—should generally deal with teak and sal and well-known woods. What we shall do will be to send down pine timber from the United Provinces, fir timber from the Punjab, and a lot of miscellaneous timbers from other Provinces and Burma, which are now being used by the Munitions Board; then if necessary we shall put up a little saw mill machinery to allow it to be worked up. This is the only way that I can see of getting these timbers on the market.

Q. Do you mean that Government should run these depôts?—A. I anticipate that it will be so successful, if run by a good commercial firm, that Government will not want to put its own man in charge.

Q. Would they be wholesale or retail concerns?—A. Mainly wholesale. I don't suppose they would be willing to sell you single planks.

Q. It might do a lot to popularize these timbers and get more and more business people interested in the trade, but will it interfere with the existing system of granting leases at all?—A. No. One result of the war will be that Government will certainly endeavour to take a much greater share in working the forests than it has done in the past. If you take the case of the Burma teak trade, you will see what I mean. I have taken three particular years and worked out the royalty which the firms have paid to Government, on the average, during those three years, and the average price at which the timber was sold in Rangoon. It comes practically to this that the Government royalty has varied in those 3 years by about 1 or 1-8 per ton; whereas the price has run from something like Rs. 60 to Rs. 100, on the average, per ton, out of which Government has had nothing whatever.

Mr. C. E. Low.—Q. Do you mean the price has risen from Rs. 60 to Rs. 100 per ton?—A. The average sale rate in Rangoon was something between Rs. 50 and Rs. 60, for the second year, and in the third year it was something between Rs. 60 and Rs. 100; while the rate that Government have received from firms was practically the same in all the three years.

Sir F. H. Stewart.—Q. Is anything done in the way of seasoning now?—A. Nothing on a very large scale, although experiments have been in process for a long time. There is no seasoning as good as open air seasoning. It is only in special instances that you require seasoning plant. We should certainly want seasoning plant at this depôt; but it is not an expensive article.

Q. Does it mean carrying very large stocks of timber?—A. For open air seasoning, one dry season in the hot weather would make scantlings fairly well seasoned. The actual time depends largely on the kind and class of timber.

Q. You make proposals for the better equipment of the Research Institute. Do you contemplate something more elaborate in the future; something on American lines?—A. Yes, I think we ought to come to that in time.

Q. Do you think that sort of expenditure would repay Government?—A. We shall work up to that.

Q. What is the position of the President of the Research Institute with regard to the other people there: is it more or less advisory?—A. No, he controls.

Q. You suggested that he should be made a Chief Conservator, and the Economist a Conservator?—A. The head of the Economic Branch.

Q. These experts whom you recommend employing, would they be under the Economist?—A. Yes, under the head of the Economic Branch.

Q. You think that would be preferable to having an Economic Section in different provinces?—A. Yes, I think Economic Research should be centralized, otherwise there would be much overlapping work in the different provinces.

Q. Then about the Chemical branch; assuming that the chemical service is instituted, the Research Institute would employ a chemist from there, and while attached to the Institute, he would be under the orders of the President?—A. Yes.

Q. Who gives an opinion on the work of the Chemical Adviser?—A. At present we obtain an opinion from an outside chemist, when necessary.

Q. About the Forest Engineers, are there any men in India whom you could get straight off?—A. I don't think so.

Hon'ble Sir R. N. Mookerjee.—Q. These Assistant Engineers who come out from England: don't you think that after giving them a training of six months or so, they could become satisfactory Forest Engineers?—A. There are no Forest Engineers in England except those who may have been developed since the war.

Q. If such men were sent to places like Canada?—A. That is one of the ideas as to how they should be recruited, *viz.*, that we should get young fellows who have been through ordinary engineering training and send them to Canada or somewhere where they could get special training, and then bring them out to India. At present we shall have to try and get a few men from Canada, as we want them very badly now.

Sir F. H. Stewart.—Q. Do they deal with questions of river survey?—A. I don't think it would be necessary for them to do any survey work, as we can get that done by the Survey Office.

Q. Do you think that the superior staff of the forest service needs increasing?—A. If you mean the controlling staff, I think it is hopelessly inadequate.

Sir F. H. Stewart.—Q. Can you give us your views as to the transference of officers from one place to another; as for instance, from Burma to Assam?—A. That was one of the suggestions I made myself in giving evidence before the Public Services Commission. At present a man is rarely transferred until and unless he becomes a Conservator. I have always been of the opinion that it would be a very good thing if selected men, after 10 or 12 years' service, who have shown themselves to be particularly promising officers were transferred and given a turn in other provinces. The great difficulty is the language question. The Divisional Officer has to deal direct with the people. If you take a man from Burma and turn him into India, he is at a loose end for a bit; the same in the case of a man from India sent to Burma. On the whole, however, I am in favour of selected men being transferred.

Q. Does the appointment of officers to the different provinces rest with you?—*A.* No, with the Secretary of State.

Q. In the case of transfers, would that be guided by you?—*A.* At present if a transfer is required—supposing a man got sick and it was necessary to transfer him to another province—what is done is to address the Local Government concerned and ask them to agree to the transfer and send an officer in exchange.

Q. Are you consulted in any way as to the disposal of the forest revenues? I suppose they go into the provincial purse?—*A.* I am not consulted in any way.

Q. Can you say, for instance, "I consider that, for the expansion of the forests you should set aside so much"?—*A.* I can say so; I can give Local Governments my opinion that they should spend more money; but they need not take any notice of it.

Hon'ble Sir R. N. Mookerjee.—Q. You are the head of your Department and yet you say the Provincial Governments transfer officers and recommend their promotion. —*A.* Promotion to the class of Conservator rests with the Government of India. Supposing there was a vacancy for a Conservator in the Punjab, and that in the ordinary course of promotion the first man on the list happened to be serving in Bengal, the Government of India would then address the Bengal Government and say they propose to appoint the man in question to the Punjab as Conservator. The Government of Bengal could not very well refuse; but if it was a question of the transfer of a Deputy Conservator to another Province the Government of India would place the matter before the Local Government, and the Local Government would be within its rights in refusing to let the man go.

Q. What administrative control have you over such officers?—*A.* None whatever.

Mr. A. Chatterton.—Q. In regard to the Research Institute, is the previous training of Forest Officers, before they go to Dehra Dun, suitable for men who are to engage in research work; or would it be better to get specialists?—*A.* You don't want outside specialists for sylvicultural research. Again the forest service should always be able to supply men for Economic work, other than special work such as pulp, tans and dyes, and for zoological work also.

Q. For all the technological work you would have specialists?—*A.* Yes.

Q. Would you select your experts from the general run of the forest officers, or would it be better to get out men of probably higher scientific training than the average forest officer with a view to making them research officers after 5 or 10 years' experience of forest administration?—*A.* I think it would be a little dangerous to recruit young men with the idea of making them into sylviculturists or botanists, and so on. There is always a certain proportion of men in the service who pay particular attention to these subjects outside the ordinary general day's work. I think we shall always be able to find men for these posts.

Q. The forest officer engaged on ordinary forest work would only get limited opportunity of making a special study of, say, botany?—*A.* That is so: but up to the present at any rate we have always had some men who were devoted themselves to this and other scientific subjects.

Q. There will be no necessity to suggest certain officers to specialise along certain scientific lines before they actually go up to Dehra Dun?—*A.* Not for the actual forest posts.

Q. All over the country there is great difficulty in getting fuel supplies. Could not anything be done to establish a larger number of local plantations under the control of the Forest Department?—*A.* That depends entirely on local conditions. If you have got the necessary facilities to grow certain species quickly, and the necessary land available, you can do it.

Q. I imagine that this fuel question will become exceedingly important in a few years' time.—*A.* Yes. Take the Punjab. That has been recognised by the decision to form new irrigated plantations in the Canal Colony areas.

Q. You have in the Punjab the Changa Manga plantation; how long ago was that started?—*A.* It was started in 1866-67.

Q. Does that plantation pay?—*A.* In the 3 years ending 1915-16 the average gross and net returns were Rs. 2,14,436 and Rs. 1,35,835. These are equivalent to annual returns of approximately Rs. 22 and Rs. 14 per acre on the planted area and to Rs. 17 and Rs. 11 per acre on the whole area, including portions not irrigated. The value of the land at Changa Manga, when it was originally taken up, was about Rs. 11 per acre. The value now, at the rates paid for agricultural land all along the edge of the plantation, is, I believe, about Rs. 100 per acre. These are rough figures.

Q. Sooner or later local forests for fuel purposes will be absolutely essential?—*A.* That depends on local conditions. Take the Central Provinces, for instance. There will always be plenty of fuel over the greater part of that province. There may be trouble in Berar, where there is very extensive cultivation. The United Provinces also are badly off; but they are doing valuable work in Etawah, and propose to expand the afforestation branch considerably. The problem may give a good deal of trouble in the delta country in Burma. The Burma Government proposes to establish village forests.

Q. They had the same difficulty in Madras in the deltas.—*A.* I have no knowledge of Madras conditions; but generally speaking it is very difficult to grow anything on poor land which will pay as fuel. If a species is going to pay as a fuel producer, it must be very fast growing and bear a very heavy crop per acre.

Q. The Forest Department own a number of fuel plantations in Madras?—*A.* I believe so: but the Madras Government appears to be gradually getting rid of its Casuarina plantations.

Q. I gather from your note and your present conversation that in the future you are rather in favour of the extension of Government agency to work the forests?—*A.* Very much so.

Q. Would that apply to minor forest products?—*A.* Do you include the resin industry.

Q. Yes, and the collection of various seeds and nuts. You would take that up?—*A.* Not necessarily, unless it is found desirable to do so.

Q. We have had many complaints from people about the difficulty in getting material out of the forest, owing to the fact that the forest is leased in coupes to contractors, and directly they go to the contractors and ask for any specific plant or nut, the contractors at once put prices up, rendering it impracticale to get the material.—*A.* It is very difficult to collect products of that kind departmentally. The department has had some unpleasant experience with myrabolans in the Central Provinces.

Q. Take a plant like Nux Vomica, or any other medical plant. It is almost impossible to get them at present. I would like to know if it is practicable to arrange terms in leases for the collection of such things?—*A.* It ought to be practicable to arrange terms in leases, if it was anything important. At the present juncture I think the Forest Department is making arrangements of this kind for certain products.

Q. In regard to the appointment of Forest Engineers, is it possible to get men from Canada or America with the experience that is necessary for working under Indian conditions; or will you have to train these men out here?—*A.* They would have experience as to the right class of machinery required and the way it should be used. They would have to apply that to local conditions.

Q. Will it take considerable time before you get practical results in this way?—*A.* If we get the men it won't take long. It will take a shorter time than if we were to recruit half a dozen young fellows at home and send them to Canada for the necessary training and then bring them out here.

Q. It would be necessary to give these men opportunities of gradually developing methods suited to the country. You don't expect to get men who can put down a system of working the forests straight away?—*A.* I think we can get out men who would be able to tell us how we ought to set to work, what class of machinery we should get, and so on.

Q. Are the conditions not very different in the hill forests of India from those in the plains of Canada?—*A.* I am not aware that there is much in the way of forest engineering in the plains of Canada. The conditions in the hilly country are very analogous to those of the Himalayas. In the forests of Burma, they are different; but the men will come out knowing what can be done.

Q. Would these men be recruited as specialists on short-term agreements?—*A.* No; the idea is to form a regular cadre of Forest Engineers.

Q. They will not be permanently attached to any province?—*A.* I cannot say definitely what will be decided. The suggestion is that they will not be definitely allotted to any particular province, because some of them will probably be specialists in saw-mill machinery and others in rope-ways, etc. They are certain to specialize in various branches of work.

Mr. C. E. Low.—Q. You support the idea of a chemical service, *i.e.*, that all or most of the chemists should be recruited for this service with certain expectations, and should be seconded to other departments of Local Governments. Do you carry that on into the zoological and botanical services?—*A.* No.

Q. For what reason?—*A.* Because we can find our own men [illegible] our own work.

Q. You don't think that your men who attain to a knowledge of zoology or botany in the Forest Department may not desire to exchange into the zoological or botanical services?—*A.* I don't think they would.

WITNESS No. 472.

MR. J. W. MEARES, M.I.C.E., M.I.E.E., *Electrical Adviser to the Government of India.*

Extract from ORAL EVIDENCE, 21st March 1918—*vide* page 727 of Volume V of the Minutes of Evidence.

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Mr. C. E. Low.—Q. Have there not been cases of difference between the Bihar and Orissa Government and companies, in connection with the administration of the Electricity Act which could not be settled locally, and required more or less unofficial intervention by the Government of India?—*A.* Yes.

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