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Education (1905) Department.

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G.O. No. 313-14P.

Dated 12. 5. 1905

1-146

[Despatch Abstract.]

Industrial Education.

Back Papers.

No.	Department.	Date.	G.O.	No.	Dep

Further Papers.

No.	Department.	Date.	G.O.	No.	

பாதுகாப்பு பிரிவு-I

செப்பனிடுபவர் பெயர் – இரா.சுரேஷ்குமார்

செப்பனிடுவதற்காக எடுத்துக்கொள்ளப்பட்ட நாள் 8/06.முதல்

செப்பனிட்டு முடித்த நாள் 9/06.வரை

சரிபார்க்கும் முதல் மு.நி.பா.எ. கையொப்பம்	சரிபார்க்கும் 2ம். நி.பா.எ. கையொப்பம்	ஆராய்ச்சி உதவியாளர் கையொப்பம்
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Government of Madras.

EDUCATIONAL DEPARTMENT.

Recd. } 1905. *Enclosures*

Regd. } *Spare copies*

ORIGINAL

G.O., No. 313, 12th May 1905.

N. P.

Industrial Education.

Submitting to the Government of India the views of this Government on the report of the Committee on —.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

Read—the following papers :—

I

Letter—from H. H. Risley, Esq., C.I.E., Officiating Secretary to the Govern of India, Home Department (Education).
To—the Secretary to the Government of Madras, Educational Department.
Dated—Simla, the 30th September 1903.
No.—593.

In continuation of Mr. Hewett's letter Nos. 570—576, dated 4th December 19(I am directed to forward, for the information of the Governor in Council, the Rep of the Committee which assembled to consider the subject of industrial education 1901-1902. The resolutions which were passed upon the subject of industri education at the Simla Conference were communicated to the Government of Madr with Mr. Hewett's letter Nos. 501—507 of the 20th November 1901. The Commit mentioned in paragraph 5 of that letter were instructed to visit the differ provinces and to consult with the local Educational and other officers as to the b means of carrying out those resolutions, which had been accepted in their entir by the Government of India. The recommendations of the Committee will be summarised at the beginning of the first volume of their report. Many of recommendations travel far beyond the terms of their instructions and matters bearing upon general industrial development and research, the factories, and other miscellaneous questions into the discussion of whic the Gove ment of India do not now propose to enter. Upon the subject of industrial educatio the Committee have not submitted definite proposals for carrying out the principle accepted at the Simla Conference, and applying them to particular schools. They state in the last paragraph of the report, part I, that in the absence of a complete survey of industries they have found it impossible to make detailed recommendations as to particular industries and the methods of instruction that may with advantage be applied to each. But they have put forward a series of proposals which, instead of applying the principles contained in the Simla Resolutions, suggest the creation of a new system resting upon an entirely different basis.

2. The central recommendation of the Committee is that industrial instruction in India shall be organized upon the model of the Casanova Boy-Artizan School at Naples. This institution which is described incompletely in this report and more fully in Appendix III to Sir E. C. Buck's report on Practical and Technical Education, 1901, "aims at giving the boys belonging to the poorer classes of a notoriously vicious population such mental, moral and manual training as will turn them into good citizens, honest men and skilful artisans." It is a day school at which attendance is enforced for long hours, throughout the year, including Sundays and holidays, in order to withdraw the boys as much as possible from evil home influences. The course is one of 7 or 8 years from the age of 8 to 15; the hours of weekly attendance ranging from $31\frac{3}{4}$ to 67. For the first three years the boys receive elementary instruction, including drawing and modelling; and at the age of eleven they enter one of the workshops attached to the school. From that time forward they spend their time partly in the workshops—for from $34\frac{1}{2}$ to 39 hours a week—and partly in school. The workshops are attached to the school, and are occupied by master artisans who are permitted to occupy them rent free upon undertaking to conduct their trade there, to employ none but boys of the school

ntices, and to be in all matters obedient to the Principal of the school. The r artisans work upon their own account for the market, and the school is not cially interested in their transactions. Fourteen master artisans are thus con- ated within the school building, who follow fourteen trades varying from ze-founding to watch-making. The workshops are patrolled by the school ers, whose duty it is said to be to see that the boys are taught in the best ble way and that strict discipline is maintained. Besides working in the work- , the boys learn drawing and modelling in the school, and also receive other uction compendiously described as desk-work, of which no particulars are given. oon as their work begins to be of value in the workshops, the boys receive wages, upon leaving school they have no difficulty in obtaining well-paid work as artisans. ost of the teaching of each boy is stated to be Rs. 80 per annum.

3. The views of the Committee as to the adaptation of this system to India are ined in recommendations, Nos. 5, 16 to 31 and 41 to 47, which precede the t. It is proposed that in the first instance selected factories, workshops and smen's shops should be registered for the training of apprentices under Govern- supervision, and that eventually the craftsmen should be induced to gather her under one roof or in one group of adjoining workshops. The inducements d to them to do so would be monetary rewards, loans, expert advice free of e and the other advantages detailed in paragraph 26 of the report. The tary rewards to the master craftsmen for the progress of the apprentices would the shape of a system of payment by the result of examinations. The apprentices l be housed in hostels and would receive rewards and certificates on the results test examinations and would be given facilities for being indentured to large ies. So far the proposals do not provide for giving the apprentices any school uction. The Committee (paragraph 11) regard the "class system" as generally cient, costly, and unsuited to instruction supported out of public funds, but propose (paragraph 44) that opportunities should be given for the apprentices, ll as for working artisans, to attend voluntarily at classes held at night schools f working hours. Existing industrial schools should, the Committee think, either nverted into supervised workshops working for a profit, and supplemented by classes for other instruction, or else classified not as industrial schools, but as ls of general instruction in which manual training forms part of the curriculum.

4. The scheme thus sketched by the Committee is one which has for its end the ion of the industrial schools and the substitution for them of a system of vision of workshops. The arguments drawn from the existing defects of Indian trial schools (stated in Chapter I) which have led the Committee to the usion that the class system is inefficient and unsuitable, appear to the Govern- of India to be unconvincing. In support of the proposition that industrial tion should not be imparted in industrial schools an appeal is made (paragraph the practice of other countries. The educational conditions of India are so ent from those of European countries that the argument from foreign precedents in any case be received with caution. But the Government of India believe n fact foreign educational methods show no tendency to substitute teaching by nticeship for teaching in schools; but that on the contrary industrial schools been, and are being, called into existence in order to supply the defects of the ntice system, which not only fails to give proper technical instruction but also ny cases cannot even provide economically for the complete training of the ntices in manual dexterity. Paragraph 11 of the report claims that the proposal stitute the apprentice system for industrial schools in India is supported by the l opinion of the authorities consulted. The Government of India regret that annot agree in this conclusion: it appears to them that the proposal is contrary weight of the evidence recorded in Part II of the report. Reference to the report of Mr. Giles, Dr. Thomson and Mr. Burns (page 113), and to the ns expressed by Mr. Giles (page 118), Dr. Thomson (pages 121 and 123), urns (pages 126 and 127), Mr. Chatterton (pages 166, 167), Mr. Bell (page 47), ewis (page 26) and Mr. Sly (page 83), and also to the scheme put forward by Pedler (pages 21, 23), shows that none of these authorities can be quoted as ing the substitution of the apprentice system for the system of industrial s. Mention is made (paragraph 7) of an attempt to conduct the Lucknow

Industrial School, in accordance with the scheme recommended by the Committee. That experiment has now been tried and has proved a complete failure; and it has been found necessary to abandon the experiment and to reconstruct the school. The Government of India are, therefore, unable to find in the arguments advanced by the Committee, in the example of other countries, in the opinions of the expert witnesses, or in practical experience in India, any reasons which would justify them in sweeping away the present industrial schools and substituting the system described in this report.

5. The proposals of the Committee appear, moreover, to the Government of India to be open to certain serious objections—

(i) It was laid down in Resolution Nos. 2—4 passed at the Simla Conference that all technical education should rest upon the basis of some preliminary education of a simple but practical nature, that this preliminary education is better communicated as a part of ordinary primary education than in industrial schools, and that the instruction given in industrial schools should be technical rather than general. But in the school recommended by the Committee for imitation, there is no such separation. Both general and technical education are given in the same institution and under the same supervision.

(ii) It appears to the Government of India that the value of instruction in the principles underlying the processes upon which industries depend is insufficiently appreciated by the Committee. In their report, all teaching, other than actual workshop practice, is relegated to a subordinate place, and is to be given voluntarily in night schools. And so little importance do the Committee attach to the matter that they have indicated only in the merest outline the manner in which such schools should be conducted or the courses of study which they should offer. Judging from previous experience, however, the Governor-General in Council has little expectation that youths who spend the entire working-day in workshops will voluntarily attend night school with any regularity, and he has no doubt whatever that systematic instruction in principles is essential to the success of any system of industrial training.

(iii) When they come to discuss the practical instruction to be imparted to pupils, the Committee dwell with emphasis upon the marketable value of the work to be done. In the judgment of the Government of India, this position is based upon a failure to distinguish sufficiently between a school and a commercial undertaking. In their Resolution No. 25, the Simla Conference expressed their conviction that industrial schools should be primarily educational, and not commercial enterprises. The Committee, on the other hand (Recommendation No. 43), maintain that such institutions should aim at financial profit. The Government of India agree with the Committee in thinking that industrial schools as at present conducted frequently fail to train their pupils to the standard of manual skill required for the market, and pursue unpractical methods. It is most wholesome, therefore, that they should be brought to the test of producing saleable articles. But this is a very different thing from requiring progressive and methodical industrial training to be sacrificed to the necessity of showing a profit on the work done by the boys, and in so far as the two objects are incompatible with one another the Government of India desire to give precedence to the former.

(iv) Finally, it appears to the Government of India, as also to several of the witnesses, extremely improbable that in India artisans could be concentrated round a school in the manner proposed, and subjected to control of the kind contemplated by the Committee. Here and there under very special conditions such an experiment might succeed; but it cannot be regarded as offering a solution of the general problem of industrial education.

6. While they have felt bound to point out the defects in the report, the Government of India desire at the same time to acknowledge the useful work that the Committee have done. They have collected information, which was nowhere else available, as to the number of the existing industrial schools, with particulars of the trades taught, the qualifications of the teachers, the numbers of the pupils and the cost of the undertakings. Their report gives a valuable account of the conditions of certain trades, and of the prospects of their development, with suggestions as to the points to which inquiry should be directed. The native system of apprenticeship,

and the working of trade guilds are explained and illustrated in an interesting and suggestive manner. They have emphasised the important principle that the object and justification of the schools must be to impart skill in a specialised manner, and to aim at improving a trade, and not merely at perpetuating existing routine methods. And they rightly point out that these objects can be attained only by the employment of skilled teachers, and of well qualified inspectors having a practical acquaintance with the processes that are taught.

7. As matters now stand, two entirely different sets of principles have been put forward by the Simla Conference and by this Committee and nothing has been done to bring either of them to the test of practice. The time for action has arrived, but in commending the question to the attention of local Governments the Government of India have no desire to restrict them unduly in their choice of methods. They endorse the opinions expressed by several witnesses that it is impracticable to build up rapidly a great fabric of technical education in India at the present time. The matter has not yet passed the stage at which many experiments must be tried, and a proportion of failures must be expected.

8. For practical purposes it is most necessary to distinguish between the kind of institutions which will be suitable in great industrial centres, such as Bombay, Howrah or Cawnpore where capital is employed in the organization of industries on a large scale; and those suitable for towns in which the local industries are practised as handicrafts in small private establishments. In the former case action may proceed on bolder and more advanced lines than in the latter; for where there are organisation and capital there must also be intelligence sufficient to appreciate the value of properly trained workers. In such places the employers are already convinced, a demand exists which it is the object of Government to supply, and the bonds of caste and trade guilds are, generally speaking, more relaxed than elsewhere. But even in these cases it will still be necessary to convince the employés of the value of the training which industrial schools offer. It is of the first importance therefore to enlist the active co-operation of employers of labour in the scheme, for if the employés see that employers attach importance to the training which it offers, they will be far more ready to believe in its value. Moreover, there are signs that an era is approaching of a considerable expansion of the industrial employment of native capital; and this prospect may justly be taken into account as offering a probable opening for more highly trained men. In such centres of industry as those which have been named, it seems to the Government of India that it should be possible to set up whole-time schools to which pupils will be admitted after reaching as high a standard of general education as can be exacted. The school can be fitted with the plant appropriate to some one trade, and the pupils can receive a course of instruction fairly divided between actual workshop practice and the study of the principles and scientific processes on which the trade depends. An instance of such a school is provided by the Victoria Jubilee Technical Institute in Bombay. Numerous examples are to be found in other countries; and where the Indian manufactures come into competition with foreign, the object should be, as far as possible, to produce an Indian workman as well trained as his foreign competitor. The technical scholarships, the Secretary of State's sanction to which was announced in the Home Department letter Nos. 565—572, dated the 21st September 1903, to your address, will be of great importance in developing such schools and in enabling the Indian student to study foreign examples of technical training and to adapt them to Indian conditions. In the first instance, however, it will probably be necessary to offer scholarships to the pupils in such schools until the commercial value of the training has been established.

9. When we turn, however, to the case of local handicrafts, the problem is at once more important and more difficult. It is more important, because it is only through the small industries that any real impression can be made upon the industrial classes of India. It is more difficult, because in this case the employers no less than the employés require to be convinced of the value of systematic training as the basis for manual skill. The trades are ordinarily in the hands of guilds constituted on a caste basis; and, in order to succeed, the system of instruction must secure their co-operation. The age at which children begin to work in India is very young, and it is

not to be expected that parents of the artisan class will agree to keep their children unremuneratively occupied until they have first secured a good grounding in general education and have then passed through a course of industrial instruction. These considerations were doubtless present to the minds of Colonel Clibborn's Committee and may have led them to their conclusion in favour of supervised workshops. But it is not possible for the State to undertake anything approaching to universal industrial education administered by artisans in private workshops under State inspection. Effort must be confined to producing artisans who will rise to a distinctly higher standard both of general intelligence and of manual skill than can be obtained by the ordinary traditional routine. The supply of pupils for such instruction implies some self-sacrifice on the part of parents, but this must be met by scholarships which will suffice for the maintenance of the pupils while they are being trained.

10. It remains to examine the lines on which a practical beginning should be made. It appears to the Government of India that the two important objects—(1) of keeping up and developing a boy's inherited manual skill, (2) of giving him a general education which will enlarge his prospects as a craftsman while preventing him from falling into the clerical groove—might be attained by starting in selected places half-time industrial primary and higher primary schools the course of studies in which should be designed with special reference to teaching that accuracy of workmanship in which Indian artisans are conspicuously deficient, and to familiarising the pupils with the best designs and processes as applied to their hereditary trade. Geometrical drawing and designing would therefore form a large part of the course, and the general education given would be determined with reference to the trade. The boys would spend half the day at the primary school, and the other half in working as registered and supervised apprentices under approved artisans who would receive a monetary reward for each apprentice on the conditions, (1) that they taught them the trade thoroughly and not merely the elementary processes, (2) that they accepted supervision and control by a Government expert.

11. If such a scheme be attempted, there are certain conditions which should be strictly enforced. In the first place, admission should be strictly limited to pupils whose caste occupation is the industry which the school is intended to develop. The obligation to work in the workshop would probably effect this automatically. Secondly, the education given in the primary school should be so ordered as not to fit the pupil for clerical employment. No English should be taught and the reading should be limited to the vernacular. Thirdly, as mentioned above, scholarships for all the pupils should be provided, at any rate for some time to come, and this condition alone will greatly limit the scope of possible effort. Further, if any progress is to be made with such a scheme, an inspector will be required who knows more than the teachers whose work he is to inspect, including the teachers in the workshop.

12. The appointment of such an inspector presents great difficulty. The statement of his qualifications implies that he could only efficiently supervise one industry. A single province will not at first find sufficient employment for such an officer, and the diversity of languages will be a great obstacle to his employment in more than one. The Government of India would be glad to receive the advice of the Governor in Council as to how this difficulty may best be overcome. It may be that the experiment should at first be confined to a single industry; and, if so, it would probably be well to give the preference to weaving. The Government of India are inclined to think that, if one or more expert inspectors of this industry can be found qualified to promote such a system of teaching, they should be Provincial officers attached to one or more provinces rather than Imperial officers.

13. Such a scheme as has been sketched above both for the larger industrial enterprises and for smaller handicrafts must, the Governor-General in Council thinks, in the main depend upon Government and not upon private management. It is essential that the trade and the subjects of instruction should be properly selected, and this cannot safely be left to the chance of private enterprise, in the same way as the establishment of ordinary schools where the curriculum is of a defined type. The function of a teacher of an industrial school is far more specialised than that of an ordinary school teacher, and the Government is better able than private individuals to offer secure employment to such a man.

14. Meanwhile, grants-in-aid should still be made for efficient industrial instruction in schools under private management. The organization of the existing schools should, however, be carefully reviewed in the light of the criticisms which have been passed upon them. Their object being to produce intelligent artisans, the extent to which they attain that object should be scrutinized; inappropriate trades should be discarded, and specialised instruction should be given in one or a few industries; the course of instruction in the school workshops should be supplemented by appropriate lessons in class, which would be differentiated according to the particular industry for which the pupil is intended. Where it is found that the passed pupils do not follow the trades that they have been taught, the remedy will be to take all necessary measures to restrict admission to the pupils who are likely to follow the industry, to direct the instruction specially and closely to a preparation for it, and to study all means of providing an easy passage from the school to the workshop.

15. The solution of the problem must rest mainly with local Governments, and must be approached by them with reference to the general considerations presented in this letter. I am now to ask that the Governor in Council will be good enough, after consideration of the Committee's report and the foregoing suggestions, to inform the Government of India of the action which His Excellency in Council would propose to adopt in the Madras Presidency and state the industry or industries with which experiment should be commenced. On receiving the recommendation of the Government of Madras together with a statement of the probable cost, the Government of India will be prepared to make a special assignment of grants for the purpose.

II

Endorsement, No. 592, Educational, dated 22nd October 1905.

Referred to the Director of Public Instruction for remarks.

A. G. Cardew,
Ag. Secretary to Government.

III

Letter—from the Hon'ble Mr. A. G. Bourne, D.Sc., F.R.S., Director of Public Instruction, Madras.
To—the Secretary to Government, Educational Department.
Dated—26th June 1904.
No.—Ref. on C. 8070 of 1903.

I have the honour to submit the following remarks upon the letter from the Government of India, No. 593, dated 30th September 1903, referred to the Director of Public Instruction under endorsement No. 592, dated 22nd October 1903.

The letter and the report of the Committee on Industrial Education were referred by the late Director to the Inspector of Technical Schools for remarks. A copy of Mr. Chatterton's reply is submitted herewith.

2. I also submit a copy of a letter No. 709, dated 13th February 1904, from the same officer advocating the employment of coolies in industrial schools. As this has only an indirect bearing upon the question at issue, I propose to dispose of it first. This letter had its origin in a reference wherein I asked Mr. Chatterton to justify the employment of coolies which I found he was advocating in the existing schools. There is much force in Mr. Chatterton's contentions. I raised the question because it appears to me that there is considerable risk of the training being lost sight of in the development of the commercial aspect. For instance, I used in years gone by to visit the Engineering College workshops and on several occasions pointed out to Mr. Chatterton that little attention was being paid to the theoretically correct cutting angles of tools used on different materials and such like matters. He admitted that this was so, but explained that in order to teach the students business he had taken contracts for work which required to be completed within a given period and that

there was no time to attend to such details which he evidently regarded as the refinements of an amateur, but knowledge of, and attention to, such details is, I submit, exactly what differentiates the trained workman from the workman who has picked up his knowledge for himself in the "shops."

As another instance of the danger of the development of the commercial aspect I may mention that I have recently had to point out to the Manager of an Industrial school that in order to secure a contract for which he had tendered, the price of material was quoted below the market rate; now this, as it is an aided school, meant that provincial funds were being utilized to allow the lessees of the contract to obtain work below cost price. This was brought to my notice by the inspector and if the inspector and the managers adhere to a suitable policy the danger to which I have alluded will be averted.

I may mention here that I observed, while on special duty, that the best engineering laboratories in England, Germany and Switzerland were regarded as places for the investigation of scientific principles and not for the teaching of working methods which is regarded as the function of a technical school; while in the technical schools the idea of turning out work for the market was scouted. In such schools the theoretically best with the underlying principles is taught while it is left to the pupil to discover in actual practice how far commercial considerations necessitate a departure therefrom.

It does not, however, follow that what is most suitable in Europe is best fitted to this country and generally speaking I am strongly in favour of letting the best expert available have his own way.

3. I now turn to the letter of the Government of India and Mr. Chatterton's remarks thereon.

His letter covers a very wide field but does not perhaps bring us much nearer the practical beginning which the Government of India have in view.

The key-note to Mr Chatterton's position is, I think, to be found in the words "in the south of India, at any rate, industrial enterprises is almost non-existent and it is therefore useless to provide for technical and industrial education, unless, at the same time, efforts are made in some way or other to improve the status of existing industries and provide for the introduction of new ones."

4. The Government of India say (paragraph 15) that "the solution of the problem must rest mainly with local Governments." I must confess that I am not quite clear as to what, exactly, the problem referred to is. As Madras is not a great industrial centre (paragraph 8) it appears that the intention of the Government of India is that the general considerations with reference to which the "problem" must be approached are those contained in paragraphs 10 and 11. This coupled with the request for specific advice with reference to an inspector in paragraph 12 seem to define the "problem." The main question then is—Does the Government of Madras desire to narrow the issue to this extent.

5. Assuming this to be the case and accepting the Government of India's suggestion that the industry to which the experiment should at first be confined, be weaving, the proposals of the Government of India may be thus formulated :—

(i) Industrial primary and higher primary schools should be started for the children of weavers.

(ii) Half the day is to be spent by the pupils in a course of studies designed with special reference to teaching accuracy of workmanship and to familiarising the pupils with the best designs and processes applicable to weaving.

(iii) The other half is to be spent in weaving as registered and supervised apprentices under approved weavers.

(iv) There are to be teachers in the workshops to control and supervise the artisan weavers.

(v) There is to be an inspector "who knows more than the teachers" and who might possibly take the Presidencies of Madras and Bombay and make periodical visits to inspect the work and promote the system.

Mr. Chatterton remarks that he does not consider the scheme practicable. I have since referred the scheme to Mr. James, the present Acting Inspector of Technical Schools and in his letter, of which a copy is attached, he doubts whether the scheme of half-time schools would work well in practice.

6. I proceed to consider how far it is likely to attain its objects. The objects mentioned by the Government of India would, in this case, be to make these boys more skilful weavers, to improve their prospects as weavers and to prevent them from leaving their hereditary occupation of weaving in order to seek for clerical employment. We are to deal with the children of weavers presumably somewhere between the ages of 5 and 12 (5 or 6 to 9 or 10 would be the ordinary ages in the classes of a primary and upper primary school). In the school the pupils will necessarily on account of their age be largely occupied in learning to read and write and make simple calculations. As for teaching accuracy of workmanship a beginning might be made with paper-folding and such like occupations, and with learning to weigh and measure and draw. Such training must be good, but I think the common complaints of want of accuracy on the part of Indian artisans is exaggerated. So far as I know there are already plenty of weavers who will weave a cloth with the most perfect accuracy and of the utmost fineness if the purchaser will pay a long price. It must be borne in mind that great accuracy in hand work is only to be obtained by very greatly increased labour. It is perhaps rash to generalize with regard to all the arts, but my experience has been that, if the requisite price is forthcoming, any attainable accuracy may be secured.

With regard to the teaching of drawing and design, the main object, at any rate at that age, should be to widen the general mental horizon. Any attempt to make these studies particularly applicable to weaving seems to me to be a mistake and likely to have a narrowing influence. What is wanted is to make these boys think, to lead them to observe and to ask why? and how? In actual trade the principle of division of labour must be fully carried out if the concern is to be a commercial success. The actual weaver on a large scale does not make, or even select, the design. It needs one expert to design and another to advise as to what is likely to "catch on" in a particular market.

I cannot think that specialised schools are necessary or even desirable. After all they are primary schools for little boys and are likely to have teachers of very ordinary qualifications, whereas to give any special trend to instruction imparted at that age needs, to be of any value, a teacher of quite extraordinary capabilities.

I do think that half-time schools may be necessary to induce parents to spare their children from work, but this might be made to apply to all rural schools. We need much greater elasticity in respect of the mass of our "elementary" schools not only as to hours of work but as to the curriculum.

The whole scheme for primary schools as now designed or at any rate interpreted seems to take for granted that, as a minute proportion of the pupils may continue and enter a university class, it is necessary to learn this or that particular subject at a particular stage as there will be no time to learn it later on. It is all based upon the assumption that the aim of education is to learn a particular set of facts (which, in nine cases out of ten, are soon forgotten), training of the mind and memory and powers of observation being left out of account. This has of course been the natural outcome of the examination system. I think that if we can dislocate the mass of our Primary schools from this system special schools for particular classes at that early stage will be unnecessary. Everything depends in the end upon the individual teacher and when he has sufficient originality to give any particular bias to the instruction he imparts he should be allowed, with the sanction of the inspecting officer, to do so.

The greatest freedom is now being given to teachers in England to allow them to adapt the instruction to local requirements. The inspecting officers there endeavour merely to see that what is done, is well done.

7. When we turn to the workshop the subject is one for an expert, but I understand that what is most needed is machinery and that much further progress will not be made without better sizing and the use of warping and other machines. The

artisans to teach the use of these are not forthcoming (*cf.* however paragraph 12) teachers would have in the first instance to be procured from Europe and so would the Inspector who must be a specialist.

8. Now supposing Government consider it desirable to experiment upon these lines. A few schools only could be attempted and these in large weaving centres. The main mass of the weaving population which lives in scattered colonies would be untouched. Indeed except the few who secured permanent employment in the schools I cannot think that the scheme would for a long time do much either for the weavers or their industry. Unless the prospects of the pupils as weavers were improved, and this depends upon the development of the industry and of the market for the products, they would inevitably try to continue their general education hoping to find some more profitable employment in other spheres.

After most careful thought I am very doubtful as to whether the scheme would do much to improve matters in this Presidency. If anything can be done to make the weaving industry once again a profitable one there will be no danger of those whose hereditary occupation it is forsaking it and there will be a demand for any instruction we can afford in the best methods and processes, but to attempt this without doing anything to improve the industry seems to me to be courting failure. I have so far endeavoured to investigate the scheme suggested by the Government of India for this Presidency, but if Government agree with Mr. Chatterton that this is impracticable the whole subject assumes once more the vaguest dimensions. If, on the other hand, they propose to try the experiment, I think a beginning might be made at Madura and Salem.

9. I have once more considered what is being now done. Some interesting facts may be gathered from appendix F to the Public Instruction Report. The chief local industries in each district are therein shown. A list of all the schools which, by any stretching of the term, can be classified as industrial or technical schools is given, also the subjects taught in these schools and the numbers of the different classes of the community attending them.

With regard to the classes of the community we need in order to narrow the limits of the present investigation consider the non-Brahmin caste Hindus only.

Europeans and Eurasians constitute a separate problem; so do Native Christians who, we may assume, are being more or less looked after by missionary bodies: so also do respectively Muhammadans, Brahmins and Panchamas.

Those whose hereditary caste occupation is an industry are, I presume, to be found under non-Brahmin caste Hindus. The total number of this class of the community reported to be now studying in these schools in 983. From this number I take away those studying commercial subjects, subjects like telegraphy and music and drawing, those in carpentry classes in schools (which are manual occupation classes) also for obvious reasons the Reformatory school and then analyze the remainder by means of appendix E, and I think it is quite clear that there are not 100 pupils in the whole Presidency who are at present receiving instruction in the methods and processes of their hereditary caste occupations or in the principles underlying the same. So that I think we may say that the existing schools while doing useful work in other ways, for instance, teaching Native Christians and others a trade and affording instruction to all classes of the community in certain technical subjects are doing nothing towards what I call the real problem of industrial education. I am not condemning the existing schools, they fulfil, to a greater or less extent, a useful purpose. The particular field which the Government of India have in view is however at present almost a blank.

10. The example of other countries does not help us very much in Madras. My information is I fear somewhat vague. I can, however, understand the value of industrial education in a country with plenty of well established and profitable industries. Some of the workmen are sure to be sufficiently ambitious to wish to rise and will seize any opportunity of studying the principles underlying the processes upon which their industry depends, but to begin teaching the principles to the children when their industry is almost on its last legs, and there is no sign that capital will be forthcoming to put into practice the new processes they may learn or to develop any ideas they may acquire seems to be much like offering them a stone when they ask for bread.

11. The above remarks are not, I fear, any preparation for action, and they have been delayed in the hope that I should see my way to recommending some definite plan. The position appears to me to be this. Sir Edward Buck, the Simla Conference, the Committee on Industrial Education and the Government of India have all enunciated general principles and even as to these there is a considerable difference of opinion.

The most definite proposals have been those of the Committee: these are condemned by the Government of India, while the suggestions for a practical beginning made in the letter under reference are considered impracticable by Mr. Chatterton, the man who has been for the past three years employed in furthering the progress of technical and industrial education in this Presidency.

12. Even Mr. Chatterton is however but an amateur so far as the weaving industry is concerned and as everything points to an experiment of some sort with that industry, I wish to draw the attention of Government to the proposals of Mr. L. K. Tulasiram of Madura. When I visited Madura and discussed the matter with him he promised to let me have his proposals. He now sends a rough scheme which I submit in original.

He is sanguine of obtaining suitable teachers from Baroda and of finding a demand for the course of instruction among the pupils of the Sourashtra school.

There is I think no doubt but that he has underestimated the cost, but I think that an initial expenditure of Rs. 10,000 for plant, etc., and Rs. 30,000 for land and building and a recurring expenditure of Rs. 10,000 would go a long way. Some of the members of his community are undoubtedly doing their best to help the community as a whole. The school which they have founded for general education is a good one, and I understand that the Managers are willing (at my suggestion) to make the "High school" course a special one not leading up to matriculation but giving special instruction in Mechanics, Physics, Chemistry and such subjects so that the pupils might then be drafted into the weaving and dyeing school. I cannot help thinking that this, as an indigenous effort, merits support and that the technical school might be started at any rate as a Government school. A similar school might also be started at Salem.

These experiments could be put in hand at once apart from any other action and would not commit Government to any very large expenditure. It seems to me that they might do something towards the development of the industry. The most promising of the scholars might be awarded technical scholarships to England while some of them if it was known that they had really studied the subject, might inspire sufficient confidence to raise some capital and start business on a large scale.

13. The only other practical suggestion which I can make is that Government should secure the services for some limited period of some real expert with commercial experience who, after a patient investigation of the whole state of affairs with regard to weaving in this Presidency, could advise on a line of action. This is what I imagine Japan would have done, has done, I believe, in respect of some of her industries.

14. The great objection in my opinion to any technical department or "Expert Advisor" is one that now applies in smaller measure to the present post of Inspector of Technical schools, viz., that each industry requires its own expert. A man may occasionally come forward able to offer more or less valuable advice with regard to several industries but his opinion must always partake to some extent of the nature of that of an amateur.

15. I submit in conclusion that, as suggested by Mr. Chatterton, the real problem is not an educational one and is outside the functions of my department. Our technical schools should teach drawing and designing and impart manual training, and it may be teach a trade to many who might otherwise seek clerical employment such as Native Christians and Panchamas, but they are not likely to touch the hereditarily industrial classes.

P.S.—I intend to make further proposals for the reorganization of the School of Arts the subject of a separate communication, but as some proposals to that end are already with Government and as it is possible that Government may wish to consider the subject in connection with the letter of the Government of India now under reference I attach to this letter certain * proposals of Mr. Chatterton for perusal and favour of return when done with.

* See G.O., No. 524, Educational, dated 3rd August 1905.

Enclosures.

Letter—from A. Chatterton, Esq., Officer in Charge, School of Arts, Madras.
To—the Director of Public Instruction, Madras.
Dated—13th November 1903.
No.—587.

In reply to your reference on Current No. 8070, dated 29th October 1903, forwarding No. 593 of the Officiating Secretary to the Government of India, Home Department, with the report of the Commission on Industrial Education, I have the honour to offer the following remarks thereon.

2. The first step taken by the Government of India in the matter of Industrial Education was in December 1900 when they deputed Sir Edward Buck, K.C.S.I., the late Secretary in the Revenue and Agricultural Department, to enquire into the subject all over India during the cold weather of 1900–1901. His report was placed before the Educational Conference which assembled at Simla at the end of August 1901 and a number of resolutions drafted by the Viceroy himself were, with but little modification, unanimously accepted by the Conference. These resolutions form the basis of the instructions to the Commission on Industrial Education, which was subsequently appointed to report on the whole subject. This Commission made a tour round India and Burma in the cold weather of 1901–1902, in the course of which they held conferences with the local authorities in each Province and made enquiries regarding the state of industries, visiting a large number of workshops and industrial schools. Their report and recommendations are dealt with in the letter of the Government of India now referred to me. The Government of India consider that the recommendations of the Commission travel far beyond the terms of their instructions and deal with many questions into the discussion of which they do not now propose to enter. In paragraph 7, after criticising the report of the Commission, the Government of India state: "As matters now stand, two entirely different sets of principles have been put forward by the Simla Conference and by this Committee, and nothing has been done to bring either of them to the test of practice. The time for action has arrived, but in commending the question to the attention of local Governments, the Government of India have no desire to restrict them unduly in their choice of methods."

3. In the reports submitted by Sir Edward Buck and by the Industrial Education Commission, the recommendation is made that an officer should be specially attached to the Imperial Government, exercising functions in regard to industrial education and industrial development, somewhat analogous to those of the Director-General of Agriculture. No recommendation of this nature was made by the Simla Conference, but in resolution No. 128 it was agreed "that in Provinces where the suggested developments admit of a wide or rapid growth, it should be for the consideration of the local Governments whether a separate technological department of the Government may in time be instituted for their special supervision and control". Nearly all the authorities who have made a careful study of the question and specially those who have been practically engaged in fostering industrial education and occupied in improving and developing indigenous industries are of opinion that but little progress will be made unless Government are prepared to embark upon a series of industrial experiments which to be successful must, in most cases, be worked on a comparatively large scale. The Government of India fully accept the fact that experiments are necessary but evidently wish to avoid, if possible, carrying on manufacturing operations on what may be termed a commercial scale. These objections are founded upon a desire to interfere with private enterprise as little as possible, and upon a realisation of the difficulty which Government must inevitably experience in effectively controlling any commercial undertaking which may be carried on in their name. With the experience I have gained in connection with the development of the aluminium industry, I fully realise the force of the objections to any scheme for exploiting Indian Industries with Government funds and under Government control. The machinery of Government is ill-adapted to such work and Government would, I consider, be ill-advised to create any department to carry on such a work. Yet in the south of India, at any rate, industrial enterprise is almost non-existent and it is therefore useless to provide for technical and industrial education unless, at the same time, efforts are made in some way or other to improve the status of existing industries and provide for the introduction of new ones. Probably the greatest difficulty which Government would experience if they created a department for the development of industries would be to find

officers with the necessary qualifications for the work; and without such officers it is absolutely certain that no good but much harm, would result. So far, therefore, as the actual working of "Experimental" industries is concerned, it seems to me that it is not the duty of Government to initiate such enterprises but the conditions in the south of India are such that I think the Madras Government would be fully justified in considering propositions either from their own officers or from private individuals for the improvement of existing industries or for the development of new ones. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which Government would incur if they accepted them can then be considered and the prospects of success and the nature of the advantages resulting therefrom can then be carefully weighed and adequate measures taken to prevent a misapplication of public funds. It is obvious that the financing of such undertakings will prove a serious difficulty and I am hardly in a position to suggest any satisfactory solution. The creation of a special fund, either by the assignment of a lump-sum to begin with, or by the provision of an annual grant, the unexpended portion of which in any one year shall be allowed to accumulate for the benefit of future years may possibly prove practicable. The only precedent we have to go upon is that of the aluminium industry during the first two years of the working of which the receipts and expenditure balanced one another and the financing of the industry was done by a private firm. In subsequent years the expenditure exceeded the receipts and a certain amount of capital was in this way locked up in the industry which was recovered when the industry was handed over to private enterprise. The circumstances in this case were exceptionally favourable, and in the end Government was able to recover not only all the capital invested in the industry but also the whole of the indirect expenditure incurred. This can only be expected to happen in a very few cases and, as a general rule, I think it will be found that, even when Government embark directly or indirectly in an experimental industry, it will be difficult, even when success is ultimately obtained, for them to recover the whole of their expenditure.

Whilst I therefore consider that it will be necessary in the immediate future for Government to undertake the working of industrial experiments on a commercial scale, I think they should be regarded as exceptional and they should not be included in any scheme for the reorganization of technical and industrial education. Probably it would be found expedient to deal with them apart from the general question, and as they have nothing whatever to do with educational work, it suggests itself to me that the control of such experiments might be conveniently vested in the Board of Revenue.

4. The Government of India desire to have submitted to them, proposals for industrial education based upon a consideration of the resolutions of the Simla Conference, of the report of the Industrial Education Commission, and upon certain general considerations set forth in their letter under reference. After considering these papers carefully, I have come to the conclusion that the resolutions of the Simla Conference should form the basis of these proposals and that they should only be neglected when clearly in opposition to the more recent statement of the views of the Government of India.

5. The first point which I think should be dealt with is the question of removing technical and industrial education from the control of the Education Department, and the institution of a separate department. Such a course is contemplated in resolution No. 128 of the Simla Conference, and the advantages which it affords are fairly obvious; and probably the only objections to it are of a financial character. If such a department were created in Madras it would, I presume control the work of the Engineering College, the Agricultural College, the School of Arts and all the mufassal technical and industrial schools. It would also be advisable to take over the control and management of the Government Technical Examinations. It would afford considerable relief to the Director of Public Instruction and enable him to devote more time to the control of the general education of the Presidency, whilst the Director of Technical Education, being presumably a specialist in such matters, would be able to initiate fresh work and provide for a more complete co-ordination of the work of the different technically qualified officers under him.

The Government of Madras already devote a good deal of money to the promotion of technical and industrial education and the Government of India are now prepared to make a special assignment of grants for the purpose so that in the immediate future it is likely that there will be material advances made and possibly a large expenditure incurred. At present there is no technically qualified officer in the Education Department who is in a position which enables him to make a comprehensive survey of the entire situation and when called upon to express opinions, their value is often discounted, because he can only deal with questions with imperfect knowledge of all the factors to be considered. The controlling officer, the Director of Public Instruction, not being an expert is in a similar situation and it is doubtful if in the past the various measures which have been taken to develop industrial education, being generally in the nature of compromise between conflicting opinions, have been the best the could be devised. The very many discussions of the past two years have led to much clearer ideas on the subject and it is now possible for Government to declare its general policy and the best results are likely to be obtained if the working out of the same is placed in the hands of an expert who is able to devote the whole of his time to it. Under these circumstances I would suggest for the consideration of Government that the most convenient time to separate the control of technical from general education is before any important changes or developments are made.

6. If technical and industrial education is still to remain under the control of the Director of Public Instruction, then I think it will be necessary to appoint a special officer under the Director of Public Instruction, who will combine the work of Inspector of Technical schools with that of expert adviser to the Director of Public Instruction. His work will necessarily be of a very miscellaneous character as he will have to combine the offices of an Inspector of schools with those of expert assistant to the Director of Public Instruction in technical matters, and those of an executive officer in so far as it will be necessary for him to initiate new developments in industrial training and provide for a supply of capable instructors. It would be practically making a permanent appointment of the position in which I have been placed whilst on special duty for the last three years, exchanging the duties of Superintendent of the School of Arts for those connected with that of an expert assistant to the Director of Public Instruction in matters connected with higher technical education. A very important part of the work would be to take up, one by one, the more important industries of the Presidency and to make a detailed study of them, with a view to discovering whether it is possible to effect improvements and, if so, to point out the lines upon which they can be made, and to assist private enterprise with expert advice as far as is possible. Native enterprise is undoubtedly very much hampered through the difficulty in getting in this country disinterested technical advice; and it is possible that, if it was made known that Government had made it part of the duty of a special officer to render assistance in this way, it might lead to a considerable number of really useful developments. Even as it is, I received a considerable number of applications for advice or information on almost every conceivable industrial subject and these are disposed of to the best of my ability but I have no time to make detailed enquiries and as a rule the information I am able to supply is simply to indicate where the required assistance can be obtained. If a fee were levied which might easily be collected by requiring all such applications to be made on stamped paper it is not improbable that the number of such enquiries would increase and that they would be of a more important character than at present. In cases where no help could be rendered it would be easy to return the value of the stamp, whilst in other cases where rendering the assistance required would involve much work of a consulting nature, further fees could be charged.

7. The Government of India distinguish between the kind of institutions which will be suitable in great industrial centres and those suitable for towns in which the local industries are practised as handicrafts in small private establishments. But, beyond suggesting that the appointment of an inspector for each industry presents great difficulties they entirely omit to consider the question of how teachers are to be provided for either class of institutions. It may be assumed, however, as practically self-evident that the larger and more ambitious institutions will be officered by Europeans or Natives of India who have received a western training. But for industrial schools dealing with indigenous industries it would be impracticable, on account of the cost, to supply them with any but teachers trained in this country. At the Simla Conference the question was dealt with in resolutions Nos. 111 and 127, the first of which states "that teaching in the Schools of Art should be in the hands of experts trained, as a rule, in Indian colleges or in Art schools," whilst the latter is to the effect that "for the present the best available teachers, overseers and foremen for these schools should be procured either in India or from abroad; but however in time it is hoped that they may be produced in larger numbers by institutions at suitable centres in India, where investigations of the products of industries can be carried on."

Whether the School of Arts or the College of Engineering should be made the centre of technical and industrial education in this Presidency, or whether it would be possible to establish an entirely new institution is the first question which arises, and in dealing with it the following considerations suggest themselves to me. If unlimited funds were available and if a wide and comprehensive scheme of industrial education were going to be introduced in the immediate future, there is no doubt whatever that a new institution would be the most satisfactory solution we could adopt. The cost, however, places it outside the reach of practical politics and we have only to consider whether the School of Arts should be converted into a Central Technical and Industrial institution, or whether the sphere of operations of the Engineering College should be enlarged so as to enable it to satisfy the industrial requirements of the country. From the very outset the School of Arts was started as an institution for the training of artisans and through the fifty odd years of its existence the pupils have been entirely drawn from the poorer and uneducated classes. Beyond the Superintendent and latterly the industrial assistants, the staff of the school has been composed of men practically drawn from the bazaar and with no qualifications or attainments that will be of any assistance in a scheme for improving industries in this country. Till quite recently, the industrial side of the school was of comparatively minor importance and the School of *Arts* was really a School of *Art* with a certain number of apprentices who were taught art work in wood and metal. A lot of good work was done in this way and not a few of the art industrial workers of this Presidency at the present time owe much of their skill to the training they received here. I am inclined to think that it is not desirable to materially change the character of the school. In many respects it can be greatly improved and the training given can be made much more thorough, but I should limit its scope of action to the functions specified in resolutions Nos. 105 to 109 of the Simla Conference.

These resolutions run as follows:—

(105) That the true function of the Indian Schools of Art is the encouragement of Indian arts and art industries and that, in so far as they fail to promote these arts or industries, or provide a training that is dissociated with their future practice, or are utilised as commercial ventures, they are conducted on erroneous principles.

(106) That the first duty of the Indian Schools of Art should be to teach such arts or trades as the pupil intends to practise when he has left the school.

(107) That these fall naturally into two classes—

(*a*) such arts as designing in special reference to Indian arts and industries, drawing, painting, illumination, modelling, photography, engraving, which may be taught either to those who intend to practise them professionally in the future, or to drawing masters in schools;

(*b*) such art industries as are capable of being practised in the locality and in which any improvement is capable of being introduced by instruction to the pupils or workmen by means of superior appliances, methods or designs.

(108) That the practice of these arts or art industries should be directed to the improvement of the skill and capacity of the pupil or workman and thereby to their expansion; and should not be pushed to the point of competing with local industries organized upon a caste or trade basis, or of doing within the school what can be equally well done outside or of usurping the sphere of private enterprises.

(109) That samples of the wares produced in Schools of Art may legitimately be kept for sale or for orders, and may profitably be exhibited in public museums, but it is undesirable to convert the schools into the shops, or for Government Educational officers to be responsible for extensive commercial transactions.

8. It is perfectly obvious that if we adhere to the principles laid down in these resolutions the School of Arts can never under any circumstances provide the kind of training which is required for the leaders of industrial enterprises. On the other hand, the College of Engineering receives quite a different class of students and gives them a thoroughly sound scientific education so far as it goes. Nominally, the college provides for the training of both civil and mechanical engineers, but in practice, it does not differentiate between them. All the civil engineering students get a good deal of mechanical training and those who wish to more particularly qualify themselves as mechanical engineers have hitherto only been able to do so during the fourth year of the course which is spent in outside workshops. In the case of the mechanical engineering students the Madras Railway locomotive shops are usually selected. The students in the engineering classes are well educated. Many of them are graduates of the University and at the end of their course not a few obtain the B.E. degree. It may be taken as almost axiomatic that the industrial development of a country can only be carried on by men who have received a thoroughly sound engineering training and it is upon this foundation that specialisation satisfactorily proceeds. The College of Engineering training produces men mainly suited to the requirements of the Public Works Department and up to the present time the College has had practically no influence on the manufactures of the Presidency. The time has now come, I think, when without in the least degree altering the training which is given to the students whose subsequent career will be in the Public Works Department, it is necessary to provide the courses of instruction for mechanical and electrical engineers so that in the future there may be a competent body of trained men from whom we may obtain instructors for our technical schools and managers for factories, workshops and other industrials concerns.

The sanctioned scale of professors in the College of Engineering already provides for a Principal, a Professor of Mechanical Engineering, a Professor of Civil Engineering and a Professor of Mathematics but hitherto only one Engineering Professor has been appointed, and it would be a move in the right direction if the other appointment was also filled. Ultimately it will be necessary to have a Professor of Electrical Engineering and Assistant Professors of Chemistry and Physics. The Professor of Electrical Engineering should be a man who has received his training in England but the Assistant Professors might well be selected in this country and attached to the Provincial Educational Service. I have already stated that the civil engineering students in the College of Engineering receive a considerable amount of instruction in mechanical engineering and the main distinction which I would make between the civil engineering students and the mechanical engineers would be in the matter of surveying and workshop training. A very short course of surveying lasting probably about a month is sufficient for mechanical engineers, and the time which civil engineering students devote to surveying might, in the case of mechanical engineers, be spent in the workshops. The College of Engineering at the present time possesses a testing laboratory and a small workshop, but the equipment is totally insufficient for the training of mechanical engineers and it will be necessary, if these proposals are sanctioned, to provide the college with suitable workshops. These need not be on a very large scale but as far as possible they should be complete and should include (1) a small foundry, (2) a smith's shop, (3) a machine shop, (4) a fitter's shop, (5) a shop for pattern-making and wood-working generally and (6) a brass foundry. At the head of each of these departments it will be necessary to have a thoroughly competent and experienced foreman and under him a few workmen to ensure continuity in the operations, and to provide for the proper

training of the students. The outturn from such workshops should be entirely regulated from an educational point of view, but even then it will amount to a considerable quantity and it will be necessary to make arrangements so that these workshops do not appreciably interfere with private enterprise in Madras. With such a workshop Government might possibly find it practicable to abolish the Public Works Workshops or to transfer from these workshops such work as will be suitable for the college workshops on the scale now contemplated. A very important part of the work of these shops ought to be the manufacture of machines and tools for the use of industrial schools and if these are developed, as they doubtless will be, it is not at all improbable that in supplying their requirements the college workshops will eventually find a sufficient outlet for all their productions. There are no buildings in Chepáuk suitable for these workshops but it would be quite possible to find a site for them, to which few objections could be raised. But it must be admitted that Chepauk is by no means an ideal site for workshops or for the matter of that, for an Engineering college either. With such workshop it will be possible to entirely dispense with the so-called courses of practical training which the Engineering college students now receive in the Public Works Workshops, and the college course for students might be completed in the college itself. In the case of mechanical engineering students, however, I strongly recommend that an additional year be added to the length of the course so as to give the students a more thorough and practical workshop course.

If these proposals are accepted, the College of Engineering will become a technical institution of the highest character and capable of satisfactorily providing for the industrial requirements of this Presidency and it will, I think, attract a very large number of students I have not the least doubt that well-trained mechanical engineers will find plenty of employment in India and will to a large extent displace men who are now imported from home and who, as a rule, do not prove very satisfactory. In this connection I might draw attention to a statement made by Mr. Chambers of Messrs. Binny & Co., at the Industrial Educational Conference held in the Senate House, Madras, on the 29th January 1902, and recorded on page 153 of Part II of the Report on Industrial Education, in which he sad. "The securing of experts was a lottery. Sometimes a man on Rs. 250 a month turned out to be better than one on Rs. 500. They (Messrs. Binny & Co.) sent home seven engineers last year as being incompetent." From the students on the mechanical engineering side of the College of Engineering I should look for the majority of the experts that will be required and it will be desirable to provide, as far as possible, facilities to enable them to specialise after they have completed the college course. In this connection the State scholarships offered by the Government of India will prove of great value. But it should also not be difficult to arrange for the employment of a certain number of these men in the large Government factories which are maintained in various parts of the country, where their services should be of value from the outset and should command a sufficient salary to enable them to live with moderate comfort. In these factories they should be able to gain a large amount of expert knowledge regarding processes of manufacture and management of workshops and men. From all points of view I am therefore strongly of opinion that the College of Engineering should be developed and should be made the centre of all educational effort in the Presidency which does not come under the term general education. The prominence of the School of Arts in these matters has been entirely due to accidental circumstances and I think that it is undesirable to perpetuate them. Industrial education and subsequently the industries themselves can only receive the much-needed impetus if arrangements are made to provide a thoroughly good and practical training for those who are to be engaged in this work, and it seems to me that there is no question but that the staff who are to impart this training should be attached to the only scientific and practical institution that we at present possess. My proposals in this respect are provided for in resolution No. 104 of the Simla Conference, which states "that the institutions which have been established for these purposes (the higher forms of technical education) such as the Engineering Colleges at Roorke, Seebpore and Madras, the College of Science at Poona, the Technical Institute at Bombay the Engineering School at Jubbulpore, etc., the majority of which are affiliated to Universities and trained up to Universities courses, have done, and are doing, valuable work and that their maintenance and further development are matters of first importance but that the first call upon a fresh technical effort should preferably lie in other directions." It is only with the last sentence of this resolution that I do not quite agree as more extended experience leads me to think that the provision of a small number of highly-trained men is absolutely necessary as a preliminary to any considerable effort in other directions.

9. Assuming then that the College of Engineering is to become the centre of technical education in this Presidency, it becomes necessary to suggest in what direction the School of Arts should work in the future. The resolutions of the Simla Conference already quoted lay down the general principles which I recommend for acceptance in finally setting the lines upon which this institution is to work. The school should consist of an art school and an industrial school, and the superintendent of the industrial side should be made the principal of the school, but I would suggest that the superintendent of the art side should be solely responsible for the art teaching and that the principal should only exercise such general supervision over the work as is necessary to maintain order and discipline. The art side of the school should remain as it is at present under the superintendence of a native of India and he should be provided with a competent staff of teachers. Instruction should be given in drawing, painting, engraving

modelling and in the principles of design applied to what are called Indian art industries. The students would be composed of two classes: first, those who come for instruction leading up to the fine arts, pure and simple, and the majority of whom will subsequently become drawing masters in schools; and secondly of apprentices from the industrial school, who will receive a thorough training in drawing of the kind that is necessary for the proper prosecution of their trade. But special care should be taken to prevent such apprentices from spending their time at work which properly belongs to the students of the first class. The industries carried on in the school may be changed from time to time as it may be expedient, but at the outset they may be those which are at present taught, namely, wood working, metal-working, cotton-weaving and carpet-weaving. Resolution No. 122 of the Simla Conference indicates the lines upon which they should be run, namely, "that such schools, whether country or urban, should be primarily educational and not commercial institutions and that they should be as far as possible self-supporting but should not compete with established private trades." This I take to mean that the school should practically maintain its present character in this respect. Most of the work done here cannot be obtained elsewhere in Madras except the products of the weaving shed and the great bulk of these are not manufactured for sale in Madras but for export to London where they are sold by auction for re-export to the West Coast of Africa, the West Indies and the Southern States of America. The abolition of the pottery department and the sale of the aluminium department leaves the School of Arts at the present moment entirely devoid of machinery and it will undoubtedly be necessary to re-equip the workshops wirh suitable tools. In this matter I am strongly of opinion that industrial schools should. as far as means allow, be equipped with machine tools and that efforts should be made to induce the local artisans to bring work to be executed by them when such a course is practicable. Although labour is cheap in this country, it is impossible to disregard the fact that it is not cheap enough to compete with good machinery in many directions and it will be wise to avail ourselves, to the greatest extent possible, of the assistance which machinery can give, as it will enable us to employ a very much larger percentage of the total labour engaged on work requiring a high degree of manipulative skill. The introduction of machinery into the aluminium department displaced a large amount of inferior hand labour but very largely increased the number of skilled workmen we were obliged to employ, and the extension of the business which followed instead of reducing the total amount of wages paid considerably increased them.

10. Apart from its educational work, whether on the art or industrial side, one of the functions which should be assigned to the School of Arts is the carrying out of industrial experiments. It is not necessary now to specify the directions these will take or to indicate the nature of the experiments. But it should be assumed that the principal of the school will be a competent person to entrust with the details of the work under the general direction of the individual whose ideas or proposals Government have approved of. Before these experiments can be undertaken as already indicated, they will have to be sanctioned by Government and whatever staff, machinery or buildings are required for them will then be specified and the cost of such work should be provided from special grants outside the annual budget of the school. It should be clearly understood, however, that minor experimental work such as is necessary to improve the state of the existing crafts carried on in the school should be provided for in the educational budget and should be undertaken under the superintendence of the principal. If worked on the lines suggested, the training given in the School of Arts should supply a large number of first-class artisans and a smaller number of men capable of occupying such positions as maistries or foremen in workshops where industrial operations are carried on. The training of artisans in the engineering trades is already well provided for in the large engineering works which exist in this Presidency, such as the Perambúr and Negapatam Railway Workshops, the iron works of Messrs. Massey & Co., and the workshops attached to big industrial concerns like the sugar works at Nellikuppam managed by Messrs. Parry & Co.

11. Dealing now with the industrial institution scattered all over the Presidency, the conditions in Madras are such that the specific recommendations made by the Government of India cannot be easily applied. In paragraph 10 it is suggested that half-time primary and lower secondary schools should be established for the education of artisans and that the boys who attend them should spend the other half of their time as registered apprentices under approved artisans. I regret to say that I do not consider the scheme practicable and that the end which the Government of India have in view can be better obtained in other ways. In paragraph 11 certain conditions are laid down which the Government of India desire should be strictly enforced:—

(1) Admission to the schools should be strictly limited to pupils whose caste occupation is the industry which the school is intended to develop;

(2) education in the primary or lower secondary schools should be so ordered as not to fit the pupil for clerical employment;

(3) no English should be taught;

(4) scholarships should be given.

If we offer scholarships on a sufficently liberal scale it will no doubt be practicable to carry out these conditions, but the cost will be considerable and the result not very satisfactory. If industries are to be improved—and that I take to be the object which the Government of India have in view when they ask us to start special industrial schools it will, in my opinion, be far better to deal with the adult workmen in the industries than to spend a large amount of time at the outset in the education and training of boys.

It is perfectly clear from subsequent paragraphs in the Government of India's letter that the existing industrial schools are not to be interfered with and of these we have already in this Presidency an almost sufficient number, and it is, I consider, of far greater importance that whatever funds are available should be spent in improving these schools than in the creation of new ones. Approaching the subject with a desire to carry out, to the utmost extent possible, the spirit of the instructions of the Government of India, I would suggest that the following principles be formally approved of by Government for the guidance of those who have the management and control of industrial schools:—

(1) That there should be no literary education given in industrial schools but that every effort should be made to exclude from the schools boys who have not passed the Primary examination.

(2) That the lower limit of age for admission to industrial schools should be 13 years and that the value of scholarships given to boys should be materially increased when they have passed the Primary examination.

(3) That there should be no restriction placed on the employment of workmen in industrial schools when it is clearly evident that the object of their employment is the improvement of the industry and, concurrently, the improvement of the men themselves as artisans.

(4) That in industrial schools adequate provision should be made for instruction in drawing and designing suited to the requirements of the trade and that demonstrations and lectures should be given by competent instructors in the principles underlying the processes and practices of the trade.

(5) That the Superintendents or Headmasters of industrial schools should in all cases be thoroughly competent men with a practical knowledge of the working of the industries in their schools. That such men should, as a rule, have received their training in the higher technical institutions of this or other Presidencies and that they should have had subsequent experience in the management of industrial operations either in private or Government factories.

(6) That the management of the schools should be such as will conduce to educational efficiency and economy in expenditure.

That the workshop should approximate as closely as possible, in their methods of working and their ways of doing business, to commercial undertakings but that in no instance should educational efficiency be sacrificed for the sake of making a profit.

It appears to me to be unnecessary at the present moment to examine each of the principles in detail. To carry them out thoroughly will necessitate a considerable increase in the annual expenditure and a considerable increase in the scale on which operations are conducted. In this Presidency with the exception of the School of Arts there are no other Government industrial schools and it will not be necessary to create any permanently. The recommendations made by the Government of India in paragraph 14 have been the key-note of our policy in this Presidency for some time past and all that is necessary is that larger funds should be placed at the disposal of the Educational department so that more liberal assistance may be given in the form of grant-in-aid. Private enterprise is so weak that for the successful introduction of new industries or important improvements in existing industries, it will be necessary for Government to set up temporary special industrial schools analogous to the late aluminium department of the School of Arts. Such schools however will be of a very special character and their main object will be to develop new industries or new processes in an old industry as rapidly as possible with the object of inducing private enterprise to take them over at the earliest possible date. The management of such pioneer enterprises hardly comes within the scope of the Education department and should in every instance be the object of the special orders of Government. Probably their control can best be vested in the Board of Revenue.

There remains for consideration the question of the improvement of agricultural education, and the interests involved are so large that it is possible they will be better dealt with independently of the general industrial question. The Simla Conference in resolution No. 114 agreed "that the existing Agricultural Colleges, Madras and Poona, have been organized upon a theoretical rather than a utilitarian basis," and it is generally agreed that the College of Agriculture does not materially influence agriculture in this Presidency. Quite recently, I submitted to you a scheme for the institution of agricultural and industrial schools and to the proposals which I then made I have now nothing further to add. The full development of the scheme will require years and a very large amount of detailed investigation and labour and it will be absolutely necessary to put a special officer in charge of the work. If technical education is to be definitely separated from general education, then, I think it will be practicable to place such a scheme under the head of the former department but it would probably be unwise to place it under the Director of Public Instruction.

In concluding this note I should like to be allowed to point out that I have received no definite indication as to the policy which the Government of Madras intend to pursue and in the absence of definite instructions as to the proposals they intend to submit to the Government of India, I have thought that it is unnecessary to enter into details or to furnish estimates of the cost of any or all the proposals embodied in the note.

During the last two or three years I have written a number of papers for the "Indian Review" on subjects connected with industrial and agricultural education and quite recently the editor of that paper has with my consent republished them; and I therefore forward a copy of these collected papers for the information of Government. Three of these papers, viz, those on weaving, tanning and agricultural education, suggest lines of experimental investigation which may be considered apart from the general question of a scheme for industrial education.

Letter—from A. Chatterton, Esq., officer in charge, School of Arts Madras.
To—the Director of Public Instruction.
Dated—13th February 1904.
No.—709.

In reply to your Ref. on Cur. No. 1151, dated 12th February 1904, I have the honour to submit the following remarks for your consideration.

The object of industrial schools is, I take it, to introduce new industries into a district, to introduce new and improved methods of working into existing industries and to train boys as artisans in those industries. In addition to these, it is, I consider, important that businesslike methods of carrying on an industry should be enforced and the industrial school should set an example as to how modern industrial enterprises should be carried on and every effort should be made to avoid the dilatory and unsatisfactory ways of doing business which are generally prevalent among artisans. Assuming that the manufacture of articles for sale is an essential part of the working of an industrial school, it is desirable that the work turned out should not only be of good quality but should be executed promptly. The most common cause of complaint on the part of the outside public who patronize industrial schools is the dilatory and unbusinesslike way in which orders are attended to. If an industrial school consists simply of maistries as teachers and boys as apprentices, it will be impossible to carry on manufacturing work with any degree of regularity and despatch. The output of the school from time to time will vary with the capacity and experience of the apprentices and it will be practically impossible for the Superintendent to undertake orders with any prospect of being able to execute them in a reasonable time. Boys working in an industrial school, pure and simple, spend a very large amount of their time in merely exercise work and as they have not to work against time there is nothing to stimulate them to acquire dexterity and quickness in working, whereas if they are put on to work which has to be completed on a certain date, they are bound to do the best they can, and if they do not, the delay in executing the work will bring prominently to notice defects in this direction. The employment of coolies converts the school into a practical workshop and not the least important part of the work of the school is the training of the coolies themselves. It is much more economical to spend money in improving the education of a young man who is already, according to native standards, a fairly skilled artisan than it is to take a young boy and begin with him *ab initio*. Where coolies are employed it is possible for the Superintendent to take orders for all kinds of work and to distribute the same in the workshops according to the capacity of the people in them. Boys will learn much faster when associated with skilled workmen than when working in a class together under a maistry. Probably the best artisans in the world have been turned out under the old English apprenticeship system where the boys worked in a workshop with skilled artisans, and my experience in this country points distinctly in the same direction. In the aluminium department we certainly did a great deal to improve the quality of the work turned out by the Madras metal workers, and this would never have been possible unless we had employed them in large numbers. The best training school for carpenters in this Presidency is at Karur where not only is a certain amount of modern machinery employed but also a fair number of coolies. Without the latter it would be impracticable to use the former and without either the school would be unable to give any better training than is done at Nazareth or Bezwada. Similarly at Madura from time to time, coolies have been largely employed with the result that the general standard of industrial excellence in the town has undoubtedly been raised. Lastly, it is of importance to remember that industrial schools are often able to secure many valuable orders that would not be given to individual artisans. Skilled artisans can be employed on the work which serves as a valuable object lesson to the boys who are learning their trade. My experience in the School of Arts, and as Inspector of Technical schools during the last few years, is completely in favour of the employment of coolies. I have adduced certain reasons for the same and I am unable to state any valid argument against the proposition.

Letter—from W. H. James, Esq., Professor of Engineering, College of Engineering, Madras.
To—the Director of Public Instruction, Madras.
Dated—20th June 1904.

In reply to your reference forwarding No. 593 of the Officiating Secretary to Government of India, I have the honour to offer the following remarks.

2. With regard to the suggested establishment of half-time schools (paragraph 10), I am inclined to doubt whether they will work well in practice.

3. It would seem preferable to keep general distinct from technical education, and to carry the former on the lines indicated as far as the means of the parents will allow, or up to a certain standard.

4. The boys who have reached this standard might then be registered as apprentices under approved artisans conditional on their attending technical classes, which should be established to give instruction in the particular subjects suited to the industries in the district, for, say, two days in the week.

5. Under these circumstances the boys would better appreciate the bearing of the special instruction on their work, and the services of instructors of higher qualifications might be obtained as they would not be tied to one school, and in fact they might be specialists in their particular subjects.

6. The monetary reward to the artisan should depend on the report of the inspecting officer, who would take into account the interest shown by the man in the progress of his apprentice and the standard of skill attained by the latter, so far as it depends on the artisans.

Letter—from M.R.Ry. L. K. Tulasiram Avargal, B.A., B.L., Madura.
To—the Director of Public Instruction.
Dated—18th June 1904.

I am in due receipt of your esteemed note of the 16th instant. I enclose for your kind perusal a rough scheme for a Weaving and Dyeing school as desired by you. I am very anxious to meet you in person and explain in detail the general outlines on which I wish to work the school. If it would be convenient for you I wish to hear from you on the subject. I had no time to prepare a detailed scheme as promised to you while you were in Madura, for which I beg to be excused.

2. Thanking you for your deep interest in the revival of the Weaving and Dyeing Industries of the Presidency, etc.

Sub-Enclosure.

A scheme for a Weaving and Dyeing School.

The following extracts from the address presented by the Madura Sourashtra community to His Excellency Sir Arthur Enbank Havelock, G.C.M.G., C.G.I.E., Ex-Governor of Madras, during His Excellency's visit to Madura in 1897, point out to the necessity of opening a school for teaching weaving and dyeing industries in Madura :—

(1) The indigenous industries of weaving and dyeing which were once in a flourishing condition have received a severe shock owing to the importation of alizarine and aniline dyes from Germany, of gold and silver threads from France and of yarns of fine counts from Manchester.

(2) It may be interesting to Your Excellency to hear that the water of the Vaigai River, especially after the success of the Periyár Project, has been pronounced by able German chemists, as best suited for the purposes of Turkey-red dyeing.

(3) The masses who eke out their livelihood by weaving and dyeing have not a scientific knowledge of the industries which they practise. We therefore deem it necessary to suggest that the establishment of textile schools and technical dye-houses for imparting instruction in the said industries will be an effective mode of encouraging them and the means of ameliorating the condition of the industrial classes.

His Excellency, in his reply, said :—

You inform me that you form 42 per cent. of the population of this large city. It must, therefore, be fully admitted that you are an important section of the community and one whose wants are deserving of the best attention. I may tell you that Her Majesty's Government look upon the development of industries and pursuits other than agricultural pursuits of this country which take up the time and the life of about four-fifths of the population as things which should be fostered and encouraged in every possible way. It is therefore with interest and sympathy that I have listened to the remarks you have made with regard to your special industry in Madura. I have had an opportunity of seeing some of the works done in your manufactories and though there is much to admire in it. I am obliged to admit the truth of the remark that you have made in one of your paragraphs that you have received a severe shock owing to the importation of the alizarine and aniline dyes from Germany. I wish you had strength to resist the temptation to use these objectionable dyes. Your own ancient forms of dyeing are far superior and it would in my opinion be for the benefit of your industry if you would continue to use those and endeavour to perfect them instead of expecting importation of dyes from foreign countries.

You make a very practical suggestion as to the establishment of a school for improving your textile manufacture and teaching you something in a technical dye-house. The only difficulty is to frame a really workable scheme for any undertaking of this kind. If your body can suggest some scheme, details of which you should carefully think out and then submit it to Government, you will take my word for it that it will receive the very kind attention from the Government.

You mention that the water of the Vaigai is particularly suited for the dye known as Turkey-red. I am aware that the special colour needs the use of water possessing certain chemical qualities that exist somewhere in Dumbartonshire in Scotland. I have been told that the success of that dye is due in part probably to the quality of the water used and it is a fortunate circumstance for you that the same valuable qualities are found in the water which you use in Madura. I shall really be glad and you will greatly help me if you try and advise me as to some practical and workable scheme for the school for encouraging and assisting the dyeing and weaving operations here.

The industrial schools committee on the 3rd February 1902 inspected the fly-shuttle loom and winding machine for winding yarns. I observed that the industries of weaving and dyeing had reached such a stage of development that they needed expert advice on well sizing yarn bleaching and chrome dyeing. Dyeing industry has received a new impetus in Madura through the exertions of one Jaswant Rao Dhagut, a student of Professor T. K. Gajjer, M.A., B.Sc., Ex-Principal of Kalabavan or the Baroda Technical College. Dye-houses on improved scientific lines have been established by nearly a dozen firms and are producing the far-famed Madura-red in competition with Glasgow and Vale of Leven. The sulphate of alumina leaves, *alias* Kaya leaves, being procurable cheaply from the hills north of Madura and in the plains east of Sivaganga the soda ashes are to the Khar (Potassium Carbonate) being procurable abundantly from islands near Tuticorin and in the saline tracts of Ramnad.

Weaving School.

Equipment.—The equipment of the school comprises a complete range of spinning and preparing machinery, appliances for yarn testing, and upwards of twenty model hand and power looms of the best type for the manufacture of all classes of fabrics in cotton, silk and wool, together with every convenience and appliance for the complete illustration of the courses of lectures. A museum of fabrics, of samples, and of appliances and materials relating to the textile trades and also a small library of English and foreign technological books and periodicals relating to the weaving and dyeing industries is also necessary. The scheme of study extends over two years and is designed for satisfactory training in the principles and processes of elementary spinning, plain and fancy weaving, bleaching, dyeing and finishing of cotton fabrics and in addition will include free-hand and machine drawing, elementary mechanics, and industrial chemistry with special reference to dyeing, soap and candle making, varnishing, enamelling and manufacture of oils, paints and varnishes.

First Year's Course.

First term—Elementary spinning.

Cotton.—Geographical position of the various cotton fields; time of planting; treatment of cotton; causes of injury to cotton during the growing and fitting seasons.

Nature and properties of raw material.—American, Egyptian and Indian varieties, a comparative study; structure and chemistry of the cotton fibre; composition of the cotton fibre; chemical and microscopical investigation, impurities of the cotton fibre, viz., cotton wax, sand, leaf, seeds, motes, and excess moisture.

Preparing raw material.—Ginning; the construction and function of gins; baling presses.

Cleaning and opening.—Description of different openers; principles of each.

Scutchers and lap machines.—Number and make of machines in use for different cotton.

Carding.—Combing; drawing; slubing, intermediate, and roving frames.

Spinning.—Principles of different systems of spinning as throstle, mule and ring; special uses of each; description of the various parts of each.

Drafts.—Drafts and speeds of rollers and spindles; production of machinery and spinning calculations.

Second term—Elementary weaving—Fabrics.

Plain fabrics.—Influence of twist on fabrics; effects produced by using threads of different thickness, or by combining two or more colours.

Twills.—Division, construction and combination.

Stains.—Methods and rules for constructing stain designs.

Drafting.—Method of making drafts; rules for ascertaining the number of healds required for any harness.

Derivative patterns.—Ribs, plain and fancy; twills, steep and reclining; twills, reversed and pointed; double satins; coloured effects.

Fancy single cloths.—Diapers; honeycombs; imitation gauze, plain and figured; spot fabrics.

Combination patterns.—With two warps and one weft; two wefts and one warp; figuring with extra material, as extra warp, and lappets; extra weft and swivels; fabrics backed with warp or weft; reversibles.

Double cloths.—Alternate threads of face and back; two threads of face to one of back; three threads of face to one of back; two separate cloths; where two cloths are stitched together —methods of stitching; fabrics in which stitching forms the figure; fabrics in which the stitching is not visible on the face.

Analysis of fabrics.—Rules for ascertaining weight per yard of finished fabric; ends and picks per inch; counts of material; design, draft, tie-up and shrinkage.

Calculations.

Yarn calculations.—Methods of naming yarns; methods of ascertaining counts; systems of reed naming and miscellaneous calculations.

Machinery.

Preliminary Machinery and Processes.—Winding: winding from cop, hank. Throstle, or ring bobbin. Warping: as mill, beam, section, and Yorkshire dressing. Sizing: using of sizing, composition of size; effects produced on fabric sizing, ball sizing, hank sizing, dressing, slashing. Hot-air machines; winding yarn on beam; drawing in; twisting.

The Hand Loom.—Analysed and explained. The uses of the treadle and witch loom; position of the hand loom as a commercial machine.

The Power Loom.—Explanation of parts; tappets and barrel shedding; single and double acting dobby shedding; over and under picking motions; method of beating up; methods of taking up and letting off; automatic stop motions; temples; miscellaneous calculations relating to the loom.

Second year's course.

First term—Fancy design weaving, pile fabrics, gauze fabrics, tapestry fabrics, designs on borders.

Jacquard machine.—General arrangement and application; illustration of different parts; method of operation; principles of construction; modifications; double lift single cylinder; double lift double cylinder.

The Jacquard hardness.—Its parts; method of tying up; setting out of comber board; straight over tye; straight over tye repeated; centred tye up; straight over and centred tyes combines; compound hardness.

Squared design paper.—Method of transferring sketch to squared paper.

Finished designs.—For single cloths; damask fabrics with compound hardness, dress goods figured with extra material; figured pile fabrics.

Analysis and Calculations.

For fabrics.—Proportioning fabrics; testing fabrics for impurities; methods of distinguishing fabrics; calculating cost of fabrics; calculating cloths structure.

Machinery.

Power looms.—Arrangement of machinery, construction, erection, action and management of various makes of power looms; machine calculations.

Second term—Bleaching, dyeing and finishing of cotton fabrics.

(1) Structure and chemistry of the cotton fibre; (2) impurities of the cotton fibre; (3) composition of the cotton fibre; (4) action of alkalies and acids on celleulose—theory of dyeing.

Bleaching of cotton.—Marked bleach; Turkey-red bleach; Madder bleach; yarn bleaching; warp bleaching; stains and damages in bleached goods.

Principles and practice of cotton dyeing.—(1) Direct dyeing. (2) Direct dyeing followed by fixation with metallic salts. (3) Direct dyeing followed by fixation with developers. (4) Direct dyeing followed by fixation with cuplers. (5) Dyeing on tannic mordant. (6) Dyeing on metallic mordants. (7) Turkey-red dyeing, chrome dyeing, chaki dyeing as specially practised in India.

Dyeing with vegetable barks, roots and pods.—Indigo dyeing, artificial and natural. Aniline, black and sulphur blacks.

Dyeing machinery.—Makers of dyeing machinery; hydro-extractors; squezing rollers; mardenting machines; washing and drying machines, drying chamber, steaming cottage, bundking machines and baling presses.

Finishing and mercerising cotton yarns.—Mercerising machinery.

Testing of the colour on dyed fabrics.—Fastness to light and air; fastness to washing; detection on colours and fibre.

Experimental dyeing and comparative dye testing.—Colour matching; raw materials used in dyeing, barks, roots, pods, leaves, seaweed ashes, soaps, oils, etc.

Design of dye-houses.—Dyeing room, bleaching room, dye-mixing room, finishing room, bundling room, steaming room and baling room.

Weaving Department.

Machinery.—(1) Preparing machinery; winding machines; warping machinery and warping creel, Rs. 400.

(2) *Model looms.*—European hand loom; improved native hand loom; Amptle patent loom; Sweedish loom; Japanese loom; Yorkshire electric loom; ribbon loom; dobby loom; etc., Rs. 500.

(3) *Shuttles.*—Temples; spindles; bobbins and other miscellaneous looming accessories, Rs. 120.

(4) Model power looms, Rs. 900.

Yarn and stock in trade for the weaving department, Rs. 1,000.

Dyeing Department.

Apparatus required for the dyeing department—
- Three Thermometers 0 to 150° C.
- Four graduated burettes.
- One revolving burette support for 8 burettes.
- Twelve pipettes 10 cc. graduated.
- Six do. 5 cc. do.
- Six do. 1 cc. do.
- Six full pipettes 1 cc.
- Three full pipettes 25 cc.
- Three do 50 cc.
- Two measuring 100 cc.
- Four do. 500 cc.
- Four do. 250 cc.
- Six do. 100 cc.
- Six do. 50 cc.
- Three do. 25 cc.
- Three do. 10 cc.
- Three glass funnels, big size.
- Six do. medium size.
- Three do. small size.
- Two hundred test tubes in two boxes.
- Two evaporating pans, big size, 20 cm.
- Six evaporating pans, medium size, 10 cm.
- Two dozen do. 5 cm.
- Two dozen do. 3 cm.
- Six primus stoves.
- One oil bath with six holes and 12 pots of porcelain fitting it.

Distilling apparatus—
- One small steam chest to steam printed goods.
- One squeezing machine with India rubber rollers.
- Six porcelain pots, 1,000 cc.
- Twenty-four porcelain pots, 500 cc.
- Twenty-four do. 100 cc.
- Fifty glass rods, long, 20 cm.
- Fifty do. short, 10 cm.
- Twelve big suqeezing taps.
- Six small suqeezing taps.
- Baume's Aerometers—
  - 0·500 — 0·766
  - 0·766 — 1·000
  - 1·00 — 10·0

  } one of each sort.
- One brass tongue for holding evaporating pans.
- Glass flasks, 2 of 1,000 cc.
  - Do. 6 of 500 cc.
  - Do. 3 of 250 cc.
  - Do. 3 of 100 cc.

One water bath with copper rings.
Enamelled pots 1 round, holding 10 L.
Do. 1 do. 5 L.
Do. 1 do. 3 L.
Do. 1 long, flat, square, holding 5 L.
Filtered paper chemically pure 200 sheets.
For funnels 200 sheets.
One pair of laboratory scales.
One set of nickle-plated weights.
One pair of ordinary scales, with brass pans and set of brass weights.
One big white glass bottle with wide mouth.
One set of cork borers.
One cork bore grinder.
Two iron retort stands with clamps.
One mortar and pestle.
Two big diameter, 20 cm.
Two medium diameter, 10 cm.
Two spirit lamps
Two stands for evaporating pans.

Chemicals—Litmus paper—
Hundred grains Litmus.
Fifty do. Phenol phtalein.
Fifty do. Methyl orange.
Fifty do. Lack moid.
Five hundred do. Oxalic acid.
Fifty do. Permanganate of Potash.
Fifty do. Silver Nitrate.
Five hundred do. Caustic Soda in sticks.
Five hundred do. Caustic Potash in sticks.
Thousand do. Ammonia Liquor.
One Kilogramme Carbonate of Soda pure.
Thousand grains Hydrochloric Acid.
Thousand do. Sulphuric Acid.
Five hundred do. Nitric Acid.
One Kilogramme common salt pure.
Hundred grains Potassium Iodide.
Five hundred do. Thio Sulphate.
One Kilogramme Marseilles soap.
Soda, Carbonate.
Do. Caustic.
Do. Nitrite.
Do. Sulphide.
Acid Sulphuric.
Do. Hydrochloric.
Do. Nitric.
Do. Tartaric 200 grains.
Do. Citric do.
Alcohol absolutis 500 grms.
Potassium Caustic.
Do. Carbonate.
Do. Ferrocyanide.
Do. Ferri Cyanide.
Do. Ammonium Oxalate.
Sodium Phosphate.
Barium Chloride.
Potassium Bichromate.
Sodium Bichromate.
Glycerine.
Ether.
Bleaching powder.
Lime.
Resin.
Acitate of lead.
Sodium acetate.
Tannin.
Tartar Emetic.
Resorcin.
Betanaphtol.
Amidonaphtol Ether.

Nerogene D.
Phenol.
Paranitra Aniline B.B.
Aniline oil.
Aniline salt.
Alum.
Acetic acid.
Blue stone.
Copperas.

	Rs.
Cost of apparatus and chemicals for the dyeing department	450
Cost of dyeing machinery	1,500
Cost of dyeing vats, dyeing rods, sticks and bars, and lancewood sticks.	250
Cost of reversible desks, black-boards, tables and chairs	600

Staff.

Lecturer in weaving, Rs. 100 to Rs. 150 per mensem.
Two weaving maistries, each on Rs. 25 to Rs. 30 per mensem.
Lecturer in dyeing, Rs. 150 to Rs. 200 per mensem.
Science Assistant, Rs. 60 per mensem.
Two dyeing maistries, each on Rs. 25 to Rs. 30 per mensem.
Four laboratory peons, each on Rs. 8 per mensem.
Four weaving shed peons, each on Rs. 8 per mensem.
One Engineer in charge of the Engine room, Rs. 100 per mensem.
Two attendants for the Engine room, each on Rs. 8 per mensem.
Contingencies for the weaving and dyeing department, Rs. 60 per mensem.
Library of Technological books, Rs. 500.
Museum of Textile Fabrics and dye materials, Rs. 800.
Machines, pipe fittings, laboratory benches, Rs. 400.
Buildings, land extra.

Order—No. 313, Educational, dated 12th May 1905.

The Government of India will be addressed.

[Here enter letter, No. 314, Educational, dated 12th May 1905.]

(True Extract.)

H. D. Taylor,
Ag. Secretary to Government.

No. 314.

From

H. D. TAYLOR, Esq., I.C.S.,
Acting Secretary to the Government of Madras,
Educational Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
HOME DEPARTMENT.

Dated Ootacamund, 12th May 1905.

SIR,

I am directed to reply to your letter No. 593, dated 30th September 1903, on the subject of industrial education.

2. The subject has been under the consideration of His Excellency in Council for a considerable period; the steps which should be taken for the solution of the problem have provoked much discussion and given rise to differences of opinion both as to the means to be adopted and the method of their application and their adaptation to local conditions and to the various stages of industrial progress in the Madras Presidency, which necessarily vary considerably from those of other provinces. It has therefore been no easy task to decide on a line of action which commends itself to the Government, as, on the whole, most likely to prove successful in this Presidency without running counter to the general principles laid down by the Government of India.

3. In this province organized industry practically does not exist. A list of the industries in Madras is given in Mr. Chatterton's note printed in the report of the Committee and reproduced for convenient reference in the margin of this letter. There are no great industrial centres in this Presidency where capital is employed in the organization of industry on a large scale and the small industries or local handicrafts appear to be decaying rather than advancing. The Government regard this condition of things with great concern. But as only 11 *per cent.* of the population live in towns, they cannot look upon the establishment of industrial schools in a few centres as an adequate means for the general advancement of industrial education among the masses.

"There are no important industries in this Presidency such as "exist in Bombay, Cawnpore and Calcutta. There are a few "cotton mills, weaving sheds, cotton presses and ginning factories, "several large railway workshops, two or three small iron works, "one Portland cement works, one or two oil presses and a number "of important tanneries, all of which are carried on by joint stock "companies with European or Native capital. The other indus-"tries of this Presidency are practically unorganized and in the "hands of artizans. They may be sub-divided as follows:—

"(*a*) Building trades, including brick-making, carpentry, "stone-mason's work.

"(*b*) Metal-work trades, including goldsmiths, silversmiths, "coppersmiths, brass and bell-metal workers, tinsmiths and a great "variety of minor sub-divisions.

"(*c*) Textile trades, including cotton weaving and printing by "hand blocks, silk weaving and the manufacture of carpets.

"(*d*) Wood-working, such as cabinet-making, coach and "carriage building, boat-building and ornamental woodwork of "various kinds.

"(*e*) Tanning and the preparation of hides and skins for "export trade.

"(*f*) A variety of miscellaneous industries, such as glass manufacture, fireworks and pepper-mat making."

4. While admitting the difficulty of the subject, this Government have not been blind in the past to the necessity for aiding the industries which from the figures noted in the margin appear to be the most important in this Presidency.

Census figures of 1901.

Landowners and agricultural labourers	26,500,000
Weavers and dyers	1,245,000
Graziers	509,000
Leather workers	476,000
Fishermen	394,000
Carpenters	385,000
Workers in precious stones	315,000
Masons and builders	281,000
Potters	225,000
Basket and mat manufacturers	210,000
Oil pressers and sellers	163,000
Ironsmiths	157,000
Tailors and embroiderers, etc.	78,000
Silk weavers and dyers	62,000
Brass and copper workers	58,000
All the other various kinds of industries employ less than workers.	50,000

Special endeavours are being made for agriculture and agricultural training and a scheme is under consideration for the reorganization of the Agricultural College, which has in the past proved a failure so far as its capability to provide trained agriculturists engaged in agricultural pursuits or in agricultural teaching. Experimental farms have been established under more than one District Board, and the Government have noticed with pleasure a tendency to the formation of District Agricultural societies and to the holding of agricultural exhibitions which they do all in their power to foster and encourage.

The Veterinary Department is to be largely extended and is looking after the interests of graziers in a special degree and the more well-to-do and enlightened of the District Boards are also responding to the call to establish Veterinary Institutes of their own.

An officer has been placed on special duty to devise means for the improvement of the weaving and tanning industries, and as a preliminary to this duty, he was specially deputed while on leave last year to inquire into the possibility of introducing improved teaching and processes and was allowed to visit the chief works relating to these industries in England and America.

Proposals are now before the Government of India for deputing another officer on special duty in regard to Fisheries and for formulating plans for their development as a means of increasing both the food-supply and the manurial resources of the country.

Carpentry is taught in most of the existing Industrial schools.

5. His Excellency the Governor in Council is inclined to doubt the practicability of assisting to any considerable extent any industry in this Presidency by adding new schools of the class described in paragraphs 10 and 11 of your letter to those which already exist. The existing schools, it is feared, are attended mainly with the object of securing the general education imparted in them at a less expense than it can be obtained elsewhere. Nor are they attended chiefly by those whose hereditary caste occupation is the particular industry taught. It is calculated that there are not 100 pupils in the whole Presidency receiving instruction in the methods and processes or underlying principles of their hereditary caste industry. The multiplication of industrial schools even tentatively and experimentally and in one particular industry to begin with, does not commend itself to the Government as a measure which can be carried out immediately or as a first step in the solution of the industrial problem. The state of most of the industries in this Presidency is such that endeavours must first be made to develop and foster the industries and the workers must be taught rather than their children. It would be useless or worse than useless to afford facilities for technical education pre-supposing openings for employment which do not at present exist, but must, if possible, be created. The handloom weaving industry is suggested by the Government of India as an industry in regard to which a beginning might be made. But His Excellency the Governor in Council fears that money spent on teaching the principles underlying the various processes of weaving to the youth of the weaving caste while the industry is becoming more and more unremunerative and before capitalists are ready to assist in the introduction of improvements or to develop ideas, would in all likelihood be money wasted. Similar considerations apply to such other industries as exist in this Presidency. His Excellency in Council has therefore no advice to offer at present as to establishment of

technical schools to promote any particular industry or as to the appointment of a specialist to inspect them. Captains of industry, industrial enterprise, willingness and power to introduce innovations, can scarcely be said to exist at the present time in South India.

6. His Excellency in Council, however, does not consider it impossible to devise means of furthering industrial development in this Presidency, such as the appointment of special officers to investigate and formulate plans for developing or introducing particular industries, a course which has already been adopted in the appointment to special duty of Mr. Chatterton. The Government propose to continue to advance cautiously on the lines on which a commencement has already been made. They agree with the Committee in their conclusion that "in the absence of a complete survey of industries it is impossible to make detailed recommendations as to particular "industries and methods of instruction that may with advantage be applied to each; "the making of such a survey must necessarily precede the development of any scheme "of industrial instruction." But, in their opinion, the survey should be followed by such attempts to develop or introduce industries as may, after full consideration, be found advisable; for they believe that the demand for industrial schools cannot precede but must rather follow such development or introduction. The Government do not propose to work industries experimentally on a commercial scale. It is true that the experiment of introducing the aluminium industry met with a fair measure of success, that manufacturing operations on a considerable scale were conducted at a profit and that the business was eventually sold at a price that covered all expenses, direct and indirect. But it is not the function of a Government to initiate such enterprises except in very exceptional circumstances. The Government, however, consider that, in view of the decadence of the industries of Southern India, they would be fully justified in initiating experiments and in considering proposals emanating either from their own officers or from private individuals for the improvement of existing industries or for the development of new industries. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which would be incurred by acceptance, would be considered, the prospects of success would be carefully weighed and adequate measures taken to prevent the misapplication of public funds. Of the proposals which have been considered, those which suggest simple improvements in common processes seem to the Government most suitable for adoption. For instance, M.R.Ry. L. K. Tulasiraman of Madura, a weaver and dyer in a large way of business, has made suggestions in regard to the establishment of a textile school and experimental dye-house, which he would start and manage himself if he were promised a grant-in-aid; and the officer on special duty in connection with the development of industries is examining the possibility of using chrome tanned leather to be manufactured in this country for the leather buckets in which water is raised for purposes of irrigation; as also the possibility of improving the present method of preparing the warp with a view to inducing weavers to adopt the fly-shuttle. The Government would particularly welcome proposals for introducing or making known agricultural improvements. Such experiments may be expensive and abortive in many instances; but it must be remembered that one even partial success will more than cover in value many hundreds of failures.

7. The Government accordingly propose to take up the more important industries of the Presidency and to arrange for a detailed study of them with a view to discovering whether it is possible to effect improvements and if so to point out the lines upon which improvements can be made and to assist private enterprise with expert advice as far as possible. Native enterprise cannot afford to experiment for itself or to risk failure and is undoubtedly very much hampered through difficulty in obtaining disinterested technical advice; and it is possible that if it was made known that Government were prepared to place expert advice at the disposal of pioneers of industry, a considerable number of really useful developments might result. I am directed to observe that this solution of the industrial problem appears to be regarded by the Government of India as admissible. I am to refer to paragraph 3 of the Home Department letter communicating the views of the Government of India on the recommendations of the Simla Conference.

8. At the same time His Excellency in Council agrees with the Government of India in considering that the separation of general from industrial education lies at the root of the problem and should be no longer deferred. It is therefore proposed to

place under an officer entirely separate from and not subordinate to the Director of Public Instruction the development of industries both by assistance, advice and demonstration, the control of existing industrial and technical education, and the extension of such education when the time is ripe. The establishment of separate executive departments to deal with "the whole range of operations which are concerned "with technical education as applied to industries and with the encouragement of "country trades and manufactures" is advocated in Sir Edward Buck's report of 1901. The proposal was recommended for consideration in the 31st resolution of the Simla Conference on Technical Education. I am directed to say that the Government are of opinion that the establishment of the new department is essential and that without it no satisfactory progress is likely to be made in the improvement of industries and furtherance of industrial education. The Director of Public Instruction is overburdened with other work and even if he had time to deal adequately with the matter, the problem, in the aspect it assumes in this Presidency, is not primarily an educational problem and so is not within his competence. Even though it were considered that the control of technical education could properly be left to the Director of Public Instruction, he would not ordinarily be the best adviser of Government in regard to proposals for the introduction of agricultural or industrial innovations.

9. The Government consider that it would be sufficient in the beginning to appoint a Director of Technical Education with a small office staff. This officer would occupy, in relation to the Engineering College, the Agricultural College, the School of Arts, Commercial Schools, the Chingleput Reformatory School and all mufassal technical and industrial schools, the position now occupied by the Director of Public Instruction. He would also take over the duties of the Inspector of Technical Schools and the control and management of the Government Technical Examinations. But his main duties would for the present be those of initiating new developments of industrial methods and training, of procuring and imparting information and of providing for a supply of capable instructors. He would be directly subordinate to the Government, but would work in connection with the Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, and so on. An example is likely to be found in the department lately established in Ireland. The Government consider Rs. 1,250—50—1,500 would be a suitable salary for the Director. I am directed to request that the sanction of the Secretary of State may be obtained to the creation of the appointment. A proposition statement is enclosed.

10. It is also considered that one of the objects which the Government of India wish to attain by means of industrial schools—diffusion of ideals of scientific precision in workmanship—should be sought by means of general, not of technical education. It is, in the opinion of His Excellency in Council, no part, and cannot usefully be made a part, of technical education to teach fundamental scientific notions or the elements of science. Some knowledge of elementary scientific laws is, however, a part of general education in its elementary stage. The Government consider the present primary and lower secondary school curricula far too literary and they will, partly with a view to providing a basis for the technical education of the future, revise them and introduce or quicken instruction in science. The present curriculum for primary schools in this Presidency embraces as optional subjects elementary science, drawing and mensuration. The Government would be prepared to consider the question of making drawing and mensuration compulsory subjects in both the primary and lower secondary stages of education and of making elementary geometry and geometrical drawing compulsory subjects in lower secondary schools. They would also be prepared to consider proposals for the complete differentiation of the ordinary and technical curricula in high schools.

11. A suggestion which the Government are inclined to accept, if means can be found to carry it into effect, is that persons should be trained in the principles and technique of a particular industry and appointed itinerant teachers. It is understood that itinerant instructors have been found most useful in Ireland and that information penetrates through them to classes which it is otherwise impossible to reach. In view of the general illiteracy of the industrial classes of this Presidency it is considered that itinerant teachers are likely to be required in order that information collected or results obtained by the technical department may be communicated to those interested. The proposal can hardly be applied in the near future to any very large extent though when the experiments in connection with chrome tanned leather are matured it will be

necessary to employ this agency to bring the leather to the notice and knowledge of the ryots as well as to teach them how to apply the process so far as is necessary for their own purposes. It will also be necessary to employ itinerant teachers in connection with weaving problems. The establishment of schools for imparting technical knowledge to boys is not likely to have any genuine success or to touch the real problem of industrial education until the value of technical knowledge has been impressed on the minds of parents.

12. In conclusion, with regard to the special considerations attaching to great industrial centres advanced in your letter, I am directed to say that the Government doubt whether the time is yet ripe for the establishment of technical schools of the sort described by you even in the Presidency town. It has, however, been suggested that special departments sufficient to meet the demand for the finished product should be added to the Madras College of Engineering and School of Arts, specialists engaged and laboratories and workshops built. The Government have as yet come to no conclusion in regard to this suggestion and have now under consideration the report of a Committee which has been sitting to make proposals concerning the curriculum of the College of Engineering and the improvement of its workshops and laboratories. A proposal that technical schools should be opened in conjunction with the railway workshops at Perambur and Negapatam is also under consideration. Finally the reorganization of the Madras School of Arts and of the Agricultural College, Saidapet, is being considered, and the principles enunciated by the Government of India will be applied, as far as they are applicable, to these institutions.

13. It is not possible to make any accurate estimate of the cost involved in the above proposals; but it would probably not be inconsiderable.

To recapitulate those proposals—

(1) The Government propose to provide a foundation for the technical education of the future by revising the curriculum of elementary schools for general education. Before this can be done, it will be necessary to train more schoolmasters in normal schools and more thoroughly than they have been trained in the past and to improve the prospects of the class. It will probably be possible to defray some part of the expenditure out of the special grant of six lakhs for the improvement of primary education recently made by the Government of India to this Government.

(2) The Government propose to sever technical education completely from general education and to create a separate department which will deal practically with the promotion of industries by experiment and advice, as well as with the imparting of theoretical instruction in technical schools and colleges. The cost of the department at present is estimated at Rs. 1,781-1/12 *per mensem* for salaries. Travelling allowance and contingent expenditure may be expected to raise the cost to some Rs. 2,000 *per mensem*, while some initial expenditure will probably be incurred in providing office buildings. The cost of schemes which the Department would be expected to formulate or of the experiments which the Department would conduct the Government cannot of course now estimate with any particularity. They would, however, propose to make a budget provision of a lakh of rupees in the estimates for 1906–1907 and they would suggest that a grant of that amount be sanctioned by the Government of India.

(3) The Government propose the appointment of itinerant instructors; but have not worked out the proposal in detail.

14. The above are the proposals which His Excellency in Council has approved. It will, however, be observed that other proposals involving expenditure have been referred to in the preceding paragraph and are still under consideration.

I have the honour to be,

Sir,

Your most obedient servant,

H. D. TAYLOR,

Ag. Secretary to Government.

Exd. A.F.E.

[Annexure.

ANNEXURE.

STATEMENT of Proposition for revision of establishment.

Order sanctioning present establishment, Government of Madras, Educational Department.		Office to which the proposition refers.	Present scale.	Nature of charge. Proposed scale.						Proposition. Permanent.	
						Pay.					
Number.	Date.			Number.	Designation.	Minimum.	Increment.	Maximum.	Average cost.	Increase per month. Amount.	Decrease per month. Amount.
1	2	3	4	5	6	7	8	9	10	11	12
						Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
		Office of Director of Technical Education.	Nil.	1	Director of Technical Education.	1,250	50	1,500	1,416 2/3	1,416 2/3	..
				1	Manager	125	5	150	143 1/3	143 1/3	..
				1	Clerk	75	5	100	93 1/3	93 1/3	..
				1	.. .. ..	50	4	70	66	66	..
				1	Type-writing clerk ..	20	1	35	28 1/3	28 1/3	..
				1	Attender	12	..	12	12	12	..
				1	Peon	8	..	8	8	8	..
				2	Peons	14	..	14	14	14	..
				9	Total ..	1,554	..	1,889	1,781 11/12	1,781 11/12	

* Within the powers of sanction of the Local Government.

EDUCATIONAL DEPARTMENT.

NOTES CONNECTED WITH G.O., Nos. 313, 314, EDUCATION, 12TH MAY 1905.

[SUBJECT.—*Industrial Education.*]

From the Government of India, No. 593, *dated* 30*th September* 1903.

Submitted that the letter from the Government of India may be circulated to the Honourable Members for perusal only with reference to memorandum No. 671, Public, dated 29th April 1901. It may be submitted to His Excellency in Madras after his return from tour.

N.L.R.—13-10-03.

[The report mentioned in paragraph 1 was received in the Madras office and has not been sent up.]

P. T. THARYAN—13-10-03.

A. G. CARDEW—14-10-03.

Seen. Very interesting all of it, but rather a fizzle out!

Perhaps the Local Government may be able to gather some ideas from the report.

H. W[INTERBOTHAM]—16-10-03.

Seen.

G. S. F[ORBES]—16-10-03.

All that this amounts to is that we have got to solve the problem. The Government of India give it up.

A[MPTHILL]—27-10-03.

[Reference No. 592, Educational, dated 22nd October 1903.]

From the Director of Public Instruction, No. 8070, *dated* 26*th June* 1904.

The recommendations of the Committee on Industrial Education will be found summarized on pages (iii) and (iv) prefixed to Part I of their report. There are 47 of them. The leading points in them are briefly described in paragraphs 2 and 3 of the letter from the Government of India, No. 593, dated 30th September 1903. To express the whole thing in one sentence as has been done by the Government of India in paragraph 4 of their letter, the scheme of industrial education sketched by the Committee "is one which has for its end the abolition of the industrial schools and the substitution for them of a system of supervision of workshops."

2. This scheme has been rejected by the Government of India whose suggestion is, that half-time industrial primary and higher primary schools should be started in selected places, the course of studies in such schools being "designed with special reference to teaching that accuracy of workmanship in which Indian artizans are conspicuously deficient and to familiarizing the pupils with the best designs and processes as applied to their hereditary trade"—*vide* paragraph 10 of their letter. The intention is that the boys should "spend half the day at the primary school and "the other half in working as registered and supervised apprentices under approved "artizans who would receive a monetary reward for each apprentice on the conditions—

"(1) that they taught them the trade thoroughly and not merely the "elementary processes, and

[illegible] they accepted supervision and control by a Government expert"—[illegible] of the letter from the Government of India.

[illegible] scheme involves, India points out, the appointment of a competent Inspector for whom however there will not be enough work in a single province; if he is employed for more provinces than one there will be the language difficulty. The Government of India accordingly ask for the advice of this Government how these difficulties may be overcome—paragraph 12 of their letter.

4. It is also suggested by the Government of India that schools may be started as an experiment in connection with a single industry, weaving by preference —paragraph 12.

5. Mr. Chatterton to whom the suggestions of the Government of India were referred by the late Director considers that the establishment of half-time schools will not be practicable in this Presidency—*vide* paragraph 11 of his letter No. 587, dated 13th November 1903. He is of opinion "that the industrial development of a country "can only be carried by men who have received a thoroughly sound engineering "training", paragraph 8, and that the College of Engineering should be made a technical institution of the highest character capable of satisfactorily providing for the industrial requirements of the Presidency—paragraph 8. He considers also that it is of far greater importance to improve the existing industrial schools than to establish new ones and that the existing schools should be improved by requiring that no literary education shall be given in them, by limiting admission as far as possible to boys who have passed the primary examination, by fixing the lowest limit of age for admission at 13 years, by employing workmen freely, by making adequate provision for instruction in drawing and designing suited to the requirements of the trade and by employing thoroughly qualified men as Superintendents or Headmasters—paragraph 11. He admits however that it will be necessary for Government to set up temporary special industrial schools *analogous* to the late Aluminium Department of the School of Arts—paragraph 11.

6. Mr. James, Professor of Engineering, College of Engineering, doubts whether the suggested half-time schools will work well in practice—letter dated 20th June 1904.

7. The Director of Public Instruction in his letter of 26th June 1904, No. 8070, says that Mr. Chatterton's letter "does not perhaps bring us much nearer the "practical beginning which the Government of India have in view"—paragraph 3 of the letter. The Director's final proposal is that two schools for the children of weavers may be started, one at Madura and the other at Salem, each at an initial expenditure of Rs. 10,000 for plant, apparatus, chemicals, furniture and such things and Rs. 30,000 for land and building and a recurring expenditure of Rs. 10,000 per annum. In this connection the Director invites attention to a scheme for a weaving school drawn up by L. K. Tulasiram of Madura This scheme will be found in a letter from Tulasiram, dated 18th June 1904, appended to the Director of Public Instruction's current letter.

But I should not limit the instruction to children only.

H. D. Taylor—7-7-04.

8. The Director thinks that half-time schools may be necessary to induce parents to spare their children from work, but that specialized schools with a course of studies designed with special reference to teaching accuracy of workmanship and to familiarizing the pupils with the best designs and processes applicable to weaving are not necessary or even desirable.

Why "weaving"—except that Government of India suggest it?

G. S. F[orbes].

9. If the proposal to start two schools for weavers is not approved, the only other practical suggestion which the Director can make is that Government should secure the services, for some limited period, of some real expert with commercial experience who after a patient investigation of the whole state of affairs with regard to weaving could advise on a line of action, paragraph 13.

But "technical education" is not *apprenticeship* to a trade.

G. S. F[orbes].

10. In conclusion the Director submits that the real problem is not an educational one but one outside that department. The technical schools should, he thinks, teach drawing and designing and impart manual training and perhaps teach a trade to many who might otherwise seek clerical employment, but they are not likely to touch the hereditarily industrial classes, paragraph 15.

11. It is submitted that copies of the Director's letter and its enclosures marked A, B, C and D may be forwarded to the Government of India with the remark that his proposal to establish two weaving schools is accepted and that steps will be taken to start them as soon as possible. The Director may then be asked to submit detailed proposals. The Government of India admit "that it is impracticable to build up rapidly a great fabric of technical education in India at the present time", paragraph 7 of their letter. All that they want now is that experiments must be tried.

H. D. Taylor.

I think such a proposal is rubbish in that crude form.

G. S. F[orbes].

G. S[tokes].

12. As regards an Inspector it is submitted that the Government should *find one exclusively* for this Presidency. It will not be convenient to have an Inspector in common with any other Presidency or Presidencies. If this suggestion is approved, the most suitable person for the post is apparently Mr. Chatterton. He will have enough of work in other directions also. His leave will be up next February and it is not likely that a beginning in regard to weaving schools can be made before then. One of the subjects which he proposed to investigate during his special duty while on furlough is weaving, and he is sure to come out with better knowledge on the subject than he possessed during the past.

Yes. Divided authority would spell failure. If there are only two schools Mr. Chatterton could attend to them as well as other duties.

H. D. Taylor—7-7-04.

G.O., R. No. 592, dated 24th February 1903.

13. Failing Mr. Chatterton the only other person who can be thought of is Mr. J. W. Coombes who is now Deputy Superintendent of the Reformatory School, Chingleput. He has paid some attention to a scientific study of the subject at home. If he is selected he can be in charge of one of the schools with supervision over the other.

G.O., Nos. 65, 66, Educational, dated 27th January 1904.

Please see also G.O., No. 239, Educational, dated 13th April 1904.

G.O., No. 18, Educational, dated 10th January 1902.

14. We have promised to let the Government of India have our rep'y by the end of this month—*vide* letter R. No. 301, Educational, dated 11th June 1904.

P. T. Tharyan—1-7-04.

Quite so: they want a free ventilation and expression of opinion; while the Director of Public Instruction thinks he is hidebound by their suggestions?

G. S. F[orbes].

The Government of India are very diffident? Is it clear that they want any new departure to be made?

Yes. The object is, I take it, to educate the craftsmen in improvement of their craft by means of revised methods and processes. The practice and observation is everything. I have seen wild jungle hillmen become quite expert saw mill hands after a little practice.

That is not technical education.

G. S. F[orbes].

H. D. Taylor.

Yes, "*practice*", not the Educational Department.

G. S. F[orbes].

Yes. Weaving schools of that type would be not educational but for trade improvement.

G. S. F[orbes].

The weaving experiment, if it is to be made, may be made on *industrial* rather than educational lines by the Board of Revenue rather than by the Educational Department? Perhaps the Government of India would be willing to pay for a weaving expert in place of the Inspector of their paragraph 12?

2. Submitted that technical schools for small boys have been tried and found wanting all over the world.

3. When we hear of what technical education has done for Germany (*e.g.*, that it has created a chemical industry with an annual outturn of 50 million sterling), what sort of technical education is it? Surely a highly specialized scientific education of young men in the University (or post-University) stage in a very few * elaborately-equipped and splendidly staffed † institutions. The men turned out are of use to manufacturers only because they have had the highest theoretical training and are capable of original research and discovery in their own special branch.

But Germany has the machinery. India has not—at least not in rural areas.

H. D. Taylor.

* 9 to be exact.

A. Galletti.

† There are nearly 400 professors, lecturers and assistants at the Berlin Technical High school—one to every 8 or 9 students—Berlin is, of course, far and away the biggest of these institutions.

A. Galletti.

4. Submitted that Mr. Chatterton's suggestion ‡—improvement of the Madras College of Engineering by widening the curriculum to include such subjects as electricity, by adding experts in the new subjects to the staff, by lengthening the course, by improving and adding laboratories and workshops — might be recommended to the Government of India on the ground that money spent on higher technical education might perhaps be money well-spent while elementary technical schools almost always fail in their object.

‡ Paragraph 8 of his letter, dated 13th November 1903.

But the highly-paid staff would only turn out a few expert engineers and specialists who would not confer any material or lasting benefit on the masses.

H. D. Taylor.

5. If I have read the Government of India's letter right, it was composed chiefly in order to damn their Committee's report. The alternative scheme which they suggest in paragraphs 9—12 is an alternative in which they have very little faith, and if the Madras Government said they did not want to start new schools, but would try to develop the existing schools on the principles (or such of them as the Government accept) stated in paragraphs 10 and 11, that would satisfy them.

G. S. F[orbes].

A. Galletti—2-7-04.

G. S. F[orbes].

(Mr. Risley—because he wanted information about the Casanova school at Naples—spoke to me about the Committee's report last year. He was very strong on the uselessness of the Committee's recommendations (for which I understood Mr. Radice, C.S., who ought to have known better than to crack up Italian Elementary Industrial Schools—admitted failures—was chiefly responsible); and seemed to think that very little could be done to improve elementary technical education in this country).

A. Galletti.

The Government of India do not definitely lay down any scheme for adoption or criticism, but leave it to Local Governments to formulate and work out proposals for industrial schools in one or more industries.

2. In paragraph 5 of their letter they controvert the proposals of the Committee and lay down four principles—

(*a*) that there should be a separation of general and technical education;

(*b*) that technical instruction should include the principles underlying the processes, as well as the actual practical development of those processes;

Precisely: technical education is teaching the *reason* of an operation, or teaching scientific methods which help an artizan to do better work, *e.g.*, drawing, geometry, the use of exact instruments, etc.

G. S. F[orbes].

(*c*) that the instruction imparted should be of an educational nature, and not restricted to mere commercial enterprises for sake of profit;

(*d*) that there must be schools at more than one centre of each industry and that the instruction cannot be concentrated at a single centre

3. In paragraph 10 the Government of India develop their proposals still further. They start with the industrial element and propose—

(*a*) to keep up and develop a boy's inherited manual skill,

(*b*) to give him a general education which will enlarge his prospects as a craftsman while preventing him from falling into the clerical groove. Paragraph 11 lays down three conditions which the Government of India consider essential for the carrying out of these principles. The Government of India are however very diffident and do not appear desirous of imposing their own views upon local administrations.

General education is in itself "technical education" in a wide sense.

G. S. F[orbes].

G. S. F[orbes].

4. The proposals as I take it are for the development of industries as apart from fine arts, and the education is to take the form of imparting to young artizans a scientific knowledge of the principles of their craft, and possible improvements in methods which will ensure for themselves, the producers, a better market for their wares, and for the public, an article superior in quality at the same cost as they paid before. The schools are not to be mere workshops in themselves on a commercial basis, but they should so educate the artizan or craftsman that he will be able to produce a superior article for the * public good. The persons so educated cannot be expected to compete with countries outside, but they may at least replace amongst their own people home-manufactured goods in place of those made in Germany.

The development of industries is for the Revenue department.

Yes—scientific, but apprenticeship instruction in a craft is not scientific education.

G. S. F[orbes]—8-7-04.

* And his own.

G. S. F[orbes].

Hence, I consider that the industries which it is proposed to improve should be limited to those which provide for the people of this country an article of daily demand.

There is no intention to develop or encourage new trades or new arts and in fact the present proposals do not relate to "Art" as such at all.

5. It cannot be expected that craftsmen who speak different languages can for this purpose be concentrated at a single centre, such as Madras. The instruction must be taken to the people and hence the school must be started at centres of existing trades, and if there is only to be a single instructor and not a specialist to preside over each branch, it is essential that the instruction to be effectively and intelligently supervised should be strictly limited to one or two industries alone, and the officer who supervises those industries should be under the entire control of one administration and not distributed over two or three provinces. Though an Imperial grant may be made to foster such industries and carry out the scheme, the supervision should be strictly provincial.

6. The proposals made by the Director of Public Instruction are practically on these lines and he proposes to limit the scope of these schools, tentatively, to weaving and to start two schools for weavers at Madura and Salem, respectively, and to provide these schools with improved machinery and plant and the best raw materials on the most approved processes which are capable of being grafted as an improvement upon the industries as they exist amongst the native craftsmen. The Director of Public Instruction is certainly not sanguine in the matter, but an experiment may be made. The Director of Public Instruction's proposals are based largely on the proposals of Mr. L. K. Tulasiram of Madura and partly upon the fact that Mr. Chatterton is making special inquiries into weaving at home and suitable methods in machinery for introduction into this country. Given important heads of industries such as Mr. Tulasiram, interested in the proposals and willing to assist them, together with an officer of special experience to guide and direct, the experiment may prove a success—but whether the new and improved processes and the use of improved materials will spread from the centres of industry at which these schools are established to outlying hamlets is much to be doubted.

The initial cost is estimated at Rs. 40,000 with Rs. 10,000 a year for maintenance, but the figures have not been worked out in detail.

H. D. Taylor—7-7-04.

7. Finally the Director of Public Instruction points out that the development of industries is a technical matter, and that it is entirely outside the province of education proper. He would therefore entirely sever the connection between industrial as apart from technical schools and the Educational Department. This may be to some extent true, but there is no other department to take up the work. Mr. Chatterton will, it is anticipated, still remain, though on special duty, nominally in the capacity of Superintendent of the School of Arts and the question of the department under which he should work is being separately considered.

H. D. TAYLOR—7-7-04.

I very much regret that I cannot dispose of this file before I give over charge: but there have arisen so many difficult subjects of more urgent importance that I have never been able to give sufficient continuous attention and have only read up bits of the subject at intervals. The whole question is one of extreme difficulty in this country where the ordinary education which must be the preliminary to technical instruction is so little advanced among the population at large and more especially among the classes and castes who are likely to adopt an industrial life.

It seems pretty clear that the Government of India themselves are in a maze as to the course to be followed, or as Lord Ampthill noted have practically "given it up". The Director of Public Instruction after several months' cogitation can come no nearer a solution; and the proposals he does make do not commend themselves to me altogether.

2. The real fact seems to be that the country is not ripe for any extensive system of technical education in its proper sense; and that the few (insignificant compared with the population) who have a fairly competent knowledge of such mathematics, science, etc., as are the essential groundwork of an intelligent understanding of practical arts and industries will not take up technical education. Nor is the genius of the people either practical or inventive. At the same time they are most extraordinarily imitative and adaptive; and the large European workshops in this country where the most complicated machinery is used find comparatively little difficulty in obtaining native workmen who become quite expert in its use. There is thus little or no difficulty in finding satisfactory native mechanics, where the demand for it is effective, as in Railway workshops.

3. The problem of extending industries and arts in this country is, taking things as they are at present, by showing the people that certain machinery is more *paying* than that in use. They are not, so far as I can judge, at all conservative in this direction. If they seem to be, it is rather because they are unable to afford the more expensive substitute recommended to them, and because it has not been shown to them that with the market they have to supply, the substitution would be worth the expenditure. But to demonstrate the advantages, in outturn and in economy, of a modern machine is not technical education nor for the Educational Department: it is for the Revenue Department. For instance if the improved types of loom are to be popularized it is by practical demonstrations and a *few* lessons in its use is all that is needed. The persons who will adopt it on that demonstration are quite incompetent to understand the scientific and technical reasons for the superiority, upon which a technical teacher would expatiate.

4. "Technical Education" is defined in England as "the special education the "object of which is to train persons in the arts and sciences *that underlie* the practice "of some trade or profession"—Encyclopædia Brittanica, Volume XXIII. It is *not* apprenticeship, as Mr. Chatterton would fain make it.

5. I once had a long conversation with Mr. George Stuart, the late Director of Public Instruction, on this subject, and we agreed that Government in extending sound ordinary education among the people was in the circumstances of the country doing nearly all that it could do for technical education, since the former is the very foundation of the latter.

6. At the same time we cannot well rest there at the present day: and we must adopt some compromise. Elementary geometry, or elementary chemistry and drawing are the technical basis of almost every art or industry. At the same time accuracy

in measurements, in drawing to scale, in setting out to scale are also fundamental and essential if any native industry or art is to be improved. Accuracy and preciseness are besides the very qualities in which ordinary native workmen are most deficient.

7. I see no use in expending funds from *Educational* grants in merely giving boys opportunities for learning blacksmithy, or carpentry or weaving, *unless* (*a*) the teacher can instruct in the technology of the tools and the scientific reason why they are used in a particular way, and (*b*) the pupils are able to understand such instruction. *Mere* manual dexterity they can learn equally well in their fathers' shops; while as to the use of higher forms of machinery native craftsmen have never, as I have already noted, shown any difficulty in acquiring the necessary facility when their services were wanted. Nor at *boys'* schools could much more than the use of the simpler and commoner tools and machinery be taught in any case.

8. Some local bodies have opened so-called technical schools which are no more than apprenticeship shops—teaching only the manual use of the tools of the carpenter, the blacksmith or the weaver, without any scientific instruction and without even having any portion of the day devoted to an ordinary school course, as the Government of India recommend. Money spent on such places from the Educational allotments is in my view misappropriated, and if they cannot be placed on any other footing I should close them.

9. The general policy—which however I have not been able to work out—should, I think, be confined so far as *primary* and *secondary* schools are concerned to developing on the *compulsory* side subjects which more directly serve the industrial and technical arts.

10. In the *primary* stage it would have to be decided at what point small boys should begin to pay attention to the subjects I refer to.

It will be observed that our present curriculum for *primary* schools embraces as *optional* subjects *elementary science*, *drawing*, *mensuration*, etc. (pages 35, 36 Calendar of Commissioner for Government Examinations). What I should be inclined to do is to make *drawing and mensuration compulsory*. To whatever line of life a boy is to turn, these are useful and educative. With *mensuration* I should require practical lessons in drawing to scale, and make such practical examination also compulsory. No advance will ever be made of any importance unless subjects are made compulsory.

11. In the *lower secondary stage*, drawing, etc., would be still further developed as compulsory subjects and I should transfer to the same head *geometry*, but instead of Euclid Book I., would prescribe some of the modern geometries of the same standard. There is no question modern geometry, taught as it is now in the elementary stages, lends itself very specially to the end in view, since the bulk of it is done by actual measurements, the application of similar figures, the noting of correspondences, etc., etc.

Vide page 38 *et seq.* of calendar.

12. It would be going too far to prescribe as compulsory either "elementary science" or "one of the subjects of the elementary technical examinations". But I can see no reasonable objection to making compulsory the subjects I have mentioned for the standards in question on general educational grounds. They are moreover fundamental for any sound understanding of or progress in industrial education.

13. The *upper secondary schools* might be revised on similar lines; while in the *high schools* (and perhaps some upper secondary schools) complete differentiation might be made between the ordinary and technical curricula—such schools having two sides.

14. If local bodies can afford it, and with a certain percentage of schools they should be required to do so, a workshop should be attached to the school in which tools or some simple machinery are available. I do not think it matters a bit what the tools or the machinery are. All they are wanted for in my view is to have material on which the boy may have object lessons in his drawing, his mensuration, his scales, and his practical geometry. The manual dexterity obtained by an hour or an hour and-a-half a day (and so restricted) in the workshop will be all the better; but that I do not regard as an end of supreme importance, which is to give a certain *class* of instruction and education, and to develop a certain turn of mind.

15. Real technical education in its strict sense is already afforded in the *Engineering College*—the *Agricultural College*—the *Medical College*—the *Veterinary College*, etc. With regard to the *Government Engineering College* which is in the first rank, proposals are now under consideration for improving and extending it. I think Government might however take into consideration the question, and it is of great importance, of opening technical schools in connection with the Railway Workshops at Perambúr, at Negapatam and other centres of the kind. These schools would have to be mainly night schools and the curricula should be formed on strictly technical lines—give instruction in mathematics and mechanics, etc. Those who are admitted should prove that they have the ordinary education requisite to render the course profitable. I should not mind much how few attended at first. It is no use in having sham technical schools.

I do not know we can do much more for the mechanical arts and Industries at present.

16. With regard to *art industries*, the School of Arts in Madras professes to be a school of technical education; but as it is at present run, it scarcely seems to fulfil that design; but seems to be degenerating, so far as the Educational Department is concerned, into a commercial venture. Its reform is a matter for serious consideration. It should occupy a corresponding position with that of the Engineering College and start suitable courses of lecture in chemistry, and its applications to dyeing, etc., lectures on design, etc., drawing, etc. To some extent instruction in these latter subjects is given, I understand: but the whole curriculum requires, I think, revision and reform.

17. I have jotted down the above remarks from the rough notes of the general conclusions I have come to in reading the subject. I only regret that I have found it impossible, with more pressing subjects, to work out the question in any detail, or to find time to discuss the matter with Dr. Bourne since he returned.

G. S. F[ORBES]—13-12-04.

Shewn to Hon'ble Sir James Thomson.

H. D. TAYLOR—18-12-04.

Circulated to the Hon'ble Mr. G. Stokes, C.S.I.

H. D. TAYLOR—18-12-04.

I have had the benefit of consulting Dr. Bourne on the subject of this file. He agrees with me, I think, in what I say below.

2. The scheme which the Government of India propounds will be impracticable in this Presidency. No instruction in connection with, or bearing on, technical education can be given in primary or upper primary schools. Such schools teach only the three R's and technical instruction in any form presupposes much more than that.

3. It is no part, and cannot usefully be made a part, of technical education to teach the elements of science. Before a pupil enters a technical school he should be familiar with the fundamental truths of science. For example, such fundamental ideas as gravity and its laws, or the laws of motion of air or water, or the axiomatic conceptions of dynamics such as velocity, and the methods of weighing, measuring and determining such phenomena which need no teaching but examination as matters of daily experience and knowledge, are presupposed in a technical school. How far a pupil should be taken in science or physics is a detail and a matter for subsequent discussion. A great point of failure in our present system of education is that it is practically altogether literary, and that there is wanting in it effective instruction in regard to the elementary notions of science even in our secondary schools. It is in such schools and as a compulsory subject that the elements of Science and Physics and such subjects as Drawing, and Geometry which teach accuracy of method and observation should be taught.

4. With a view to start technical education the first practical step which should now be taken would therefore seem to be to revise the existing course of instruction

nd to introduce or to quicken instruction in science. This is a matter of general ducation and should be developed with advantage whether technical education is ow started or not.

5. Technical education seems to me impossible unless there is a demand for those echnically trained or an opening through which they can utilise their knowledge o gain a livelihood. There is no use in affording facilities for technical education eyond the openings for employment available as a means of living to the pupils so nstructed. The case of the Agricultural College shows this very plainly. As India ecognises, the problem of technical education in arts and industries in the large entres of industry is very different to what it is in the rural tracts. It is possible hat one technical school for arts and industries in the Presidency town might find sufficient support in the whole Presidency, but what will have to be done in the country must be on a much lower plane. There I think we cannot get further than industrial schools, *i.e.*, schools in which the best methods and practice of a particular industry or industries should be taught. The state of most of our industries in this Presidency is such that we must first develop the industry. With moribund industries we must teach the workers and not the boys. It is necessary always to remember that agriculture, which is our chief industry, will need particular treatment.

6. So far as technical education in arts and industries is concerned, the School of Arts as an existiing institution should be modelled to give all the instruction which is needed. We have, however, a number of other technical schools—the College of Engineering, the Medical College and the Medical schools, the Agricultural College, Commercial schools, Carpentry schools, the Reformatory, and so on. Industrial schools will follow as above indicated the development of industries The superintendence and development of this field of work is in itself sufficient to afford ample and full employment to a special officer. The Director of Public Instruction has now more than he can do in looking after general education. I think therefore that the next practical step which should be taken in this matter is the appointment of an officer entirely separate from and not subordinate to the Director of Public Instruction for the control and development of technical education and of industries both by assistance, advice and demonstration. He could work in connection with the Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, with the Surgeon-General as to medical education, and so on. His relations in this respect are matters of detail to be settled in each case.

7. There are many points of similarity in regard to technical and commercial education between the case of this country and of Irleand. Here, as there, the initial difficulty will be to provide teachers and the necessary appliances and books. The establishment of schools for boys for instruction in connection with industries is little likely to be successful. As in Ireland the first step must be to impress on the parents the value of technical knowledge. This can only be done by itinerant teachers as there. That is, to take the case of weaving, by teachers who can show the weaver the faults in his work and can demonstrate to him the advantages of their correction and the manner in which that correction can best be made.

8. I think a reply should be sent to India on the above lines.

G. S[TOKES]—5-1-05.

Circulated to His Excellency the Governor.

H. D. TAYLOR—6-1-05.

Demi-official from L. M. WYNCH, Esq., Private Secretary to His Excellency the Governor, to the Secretary to Government, Educational Department, dated 10th January 1905.

This file connected with the Report of the Committee appointed to consider the subject of industrial education reached me three or four days ago in a very urgent red covered file.

I do not know when I am going to get time to read the report and the notes and still less when His Excellency will find time to do so.

India, I see, want recommendations with a statement of probable cost and promise a grant for the purpose.

I have glanced through the Hon'ble Mr. Stokes' note and he seems to suggest the appointment of a special officer and some itinerant teachers and the modelling of the School of Arts on certain lines. I am not quite clear whether the marginal note that Sir James Thomson saw the papers on 18th December means that he is in accord with these ideas, because if so it seems to me that much time might be saved if these were worked up as the Government of India seem to require, into definite recommendations with a statement of probable cost. Or does the Honourable Member want that the reply to India should merely ask for approval first of the general line of policy he has sketched out.

Could you kindly get this point cleared up and then return the file to me.

I have looked at this file long enough to know what should be done with it, but I don't know.

2. The idea of the Government of India to combine primary education with the thorough learning of a trade, in particular places and under efficient supervision, is not impossible of execution, but is an inversion of proper education and carries small promise of usefulness with it. The particular children might be got in a large town or place; the thoroughly competent artizans might also be got together; and the whole might be duly supervised;—resulting in a Government school and workshop or factory where goods would be produced at a cost above the market value, ordinary trade interfered with, and the canons of trading broken, and out of which the finished apprentice would proceed where and to what? All these schemes for improvement in the quality of labour imply a demand for the improved product and a willingness to pay for it, a probability of capital appearing to foster and support the improved industry and to wait for and create a market for the product, and to go on extending that market. What sign have we of that in, say, weaving? The finished apprentice will have been trained on the best and say cheapest loom procurable; in almost every case he could not afford to buy one for himself; and if he did he would require a proper sizing and warping apparatus to keep him going. The combination of capital and of labour is essential to the finished apprentice's progress, and, further, a market is required for their wares at remunerative prices on the top of that combination.

3. I asked the Diwan of Mysore the other day about the State's technical or industrial schools. He said one was doing well, applying itself to produce common country cloths. He did not seem to think there was much use in handling any other product. A State may teach and may show improved methods; it may pioneer new industries, but what is the good unless the private trader will take them up? When Mr. Chatterton says that in the South of India industrial enterprise is almost non-existent, it was incumbent on him to show that it could be made to exist and be supported before he went on to propose the improvement of the status of existing industries and the introduction of new ones. When he proposes to set up special industrial schools analogous to the late aluminium school, he omits the radical distinction between a totally new industry and old industries, but he knows and sees that he is advocating the engagement of Government in trade with all the disabilities and objections that attach thereto; and "for the financing of such undertaking—a "serious difficulty—I am hardly in a position to suggest any satisfactory solution." Nor can I. If we could foresee for weaving, etc., what was predictable for the aluminium industry we should have warrant for seeking to do something that the spinning and weaving mills of the country are not doing. But what is that? The field of the hand-loom as against that of the power loom is an unknown quantity to me.

4. Hon'ble Mr. Forbes's proposals have reference to general education for industrial ends, and the consideration of these proposals is properly for the Educational Department. Technical education proper is hardly the concern of these papers. Hon'ble Mr. Stokes follows; but considers that, for the bulk of the country, industries first

require to be developed or resuscitated by the instruction of the present workers. This would be by peripatetic teachers. There may be promise in that idea if the right sort of apostle can be found or created.

5. At the same time I do not see why the continuance and improvement of such industrial * schools as we have should not be striven after and their wider introduction favoured wherever opportunities seem to open. I cannot see any good in making commercial ventures of them. They should be places where the ordinary handicrafts and any special to the neighbourhood can be soonest and best learnt from thoroughly competent instructors, and where the implements of the calling are taught to be used and are on exhibit. They will be expensive to maintain, but that is no objection in these times. Boys might be stipended in them, but only such as are likely to stick to the trade or craft. And while there may well be a minimum limit of age for admission, it will not be possible, I think, for many years to come to insist on a minimum of general education as a preliminary to admission.

* Misnamed technical.

6. Mr. Chatterton is with us now for purposes cognate with this and it ought to be made a chief duty of his to see what can be done on these modest lines. It is not work for the Director; and Mr. Chatterton and the Board should have special charge of it.

7. As for the School of Arts, the key-note of Mr. Chatterton's letter and proposals is that there is no demand for the scholars there educated or for the work they are intended for, and therefore Government must create a market for both.

If the School of Arts fell to be treated as an ordinary technical school, like—say—the College of Engineering, one would have no difficulty in knowing what answer to make to this suggestion. If fifty years has not called into existence such a body of art followers and such a market for their wares as will enable them to live and prosecute art, what guarantee is there that more money expended on teachers and taught, and turning the place into a shop, will alter matters in the desired direction? I should say little or none. As a school for drawing and design the place serves a useful purpose: painting hardly counts: the bulk of the creatures that fill the classes at the present time do not seem fit for admittance and are, I understand, presently shroffed out. The work section in furniture, metals, carpets, etc., may be regarded as the higher form of an industrial school. I have no wish to see the place converted into a shop or factory such as Mr. Chatterton contemplates even if it is an art shop; I think that for teaching purposes it ought to carefully select its students and then educate them thoroughly, but always should have regard to the probabilities of their finding employment or making a living; I would not grudge the establishment and equipment necessary to these ends. But if the school cannot live on those lines, it will conclusively show that it is not wanted. At any rate, the first thing to do at the present time is to find what the admittance to the school should amount to and what the crafts taught should be and to what amount of outturn, and the staff regulated accordingly. With the restricted classes that I contemplate the staffing of the school should be a simple matter and the establishment of the work sections similarly easy.

J. T[HOMSON]—26-2-05.

Circulated to His Excellency the Governor.

H. D. TAYLOR—3-3-05.

This is by far the most difficult question upon which I have as yet been required to form an opinion and I am at the disadvantage of having to note while the Government of India are sending impatient reminders on account of long delays in which I have had no share.

2. The present situation is well described by the Director of Public Instruction in paragraph 11 of his letter in which he says "The position appears to be this: Sir "Edward Buck, the Simla Conference, the Committee on Industrial education and "the Government of India have all enunciated general principles and even as to "these there is a considerable difference of opinion. The most definite proposals "have been those of the Committee. These are condemned by the Government of "India while the suggestions for a practical beginning made in the letters under

"reference are considered impracticable by Mr. Chatterton, the man who has been "for the past three years employed in furthering the progress of technical and "industrial education in this Presidency".

3. We have been told that the solution of the problem rests mainly with the Local Government and thus far there has been no more unanimity of opinion among ourselves than there was among the authorities enumerated in the passage quoted above. The first question then is what is the "problem". The Government of India admit that it is impracticable to build up rapidly a great fabric of technical education in India at the present time, but think that the time for action has arrived and that experiments must be tried. The choice of methods is to be unrestricted save by the "general" considerations and the problem for Madras is where and how and on what lines to try experiments.

4. The general considerations suggested by the Government of India fall into two categories—

(*a*) those applicable to great industrial centres, and

(*b*) those applicable to local handicrafts in small towns.

As regards (*a*), the Government of India think it might be possible to set up whole-time schools to which pupils should be admitted after reaching as high a standard of education as can be exacted. The schools should be fitted with plant appropriate to some one trade and the pupils given a course of instruction fairly divided between workshop practice and the study of the principles and scientific processes on which the trade depends. The Director of Public Instruction thinks that Madras hardly comes under the head of a great industrial centre and makes no proposals under this head. Mr. Chatterton suggests the improvement of the College of Engineering, widening the curriculum, adding experts and new subjects and building laboratories and workshops. As a Committee has just been sitting to make proposals about the curriculum at the College of Engineering and the extension of workshops and laboratories, it is premature to discuss this proposal. Mr. Chatterton also suggests the re organization of the School of Arts in Madras which has an industrial side, but this matter again is, I believe under separate consideration. There remains the suggestion of the Hon'ble Mr. Forbes who proposes the opening of technical schools in conjunction with the Railway workshops at Perambur and Negapatam. My Honourable Colleagues have not commented on this proposal and there is no information on the papers about these workshops. The College of Engineering apparently furnishes technical instruction for the higher grades of employés, for I see from paragraph 8 of Mr. Chatterton's report that students in the Mechanical Engineering department attend the locomotive workshops. There is nothing in the papers on which to base an opinion as to whether technical schools (which would apparently be night schools) would be of any use to the ordinary artisans of the workshops and their children, but I am inclined to think that the Railway authorities have their own schools at all the large centres. The suggestion however might be referred to the Director of Public Instruction for consideration and the Government of India might be told that this is being done. Nothing else seems practicable at present in Madras as regards great industrial centres until the schemes for the re-organization of the College of Engineering and the School of Arts are matured.

5. As regards (*b*), considerations applicable to the case of local handicrafts, the case is much more difficult. The Government of India recognise the difficulties themselves and they suggest that a commencement might be made by starting half-time primary and higher primary schools,—pupils to spend half the day in the school and the other half as registered apprentices under approved artisans, the schools to be under the management of Government and the trade and subjects of instruction carefully selected.

The experiment should at the outset be confined to a single industry and the Government of India suggest that preference should be given to weaving.

6. The Director of Public Instruction has discussed this proposal at length in his report and comes to the conclusion that it would not work. He sums up his objections in the following sentence:—

"To teach principles underlying processes to children when the industry is on its last legs "and there are no signs of capital forthcoming, to put into practice the new processes taught or "develop ideas is like offering a stone in place of bread."

The Hon'ble Mr. Stokes concurs that the scheme is impracticable while the Hon'ble Sir James Thomson, though he does not think it impossible of execution, is of opinion that it is an inversion of proper education and carries small promise of usefulness with it.

7. So far therefore the results of the examination of the problem are entirely negative. There are however some suggestions to be gleaned from the notes though they are not exactly on the lines of the recommendations of the Government of India.

The Government of India say that only through small industries can any impression be made on the industrial classes of India and before considering the suggestions made it will be as well to collect a few observations on the industries of Madras from the Committee's report and the notes of Mr. Chatterton and of the Director of Public Instruction.

8. In a note drawn up for the Committee (page 162, part II of the Report) Mr. Chatterton writes—

"There are no important industries in this Presidency such as exist in Bombay, Cawnpore "and Calcutta. There are a few cotton mills, weaving sheds, cotton presses and ginning factories, "several large railway workshops, two or three small iron works, one Portland cement works, "one or two oil presses and a number of important tanneries, all of which are carried on by "Joint Stock Companies with European or native capital. The other industries of this Presidency are practically unorganized and in the hands of artisans. They may be sub-divided as "follows:—

(*a*) Building trades, including brick-making, carpentry, stone-masons work.

(*b*) Metal work trades, including goldsmiths, silversmiths, coppersmiths, brass and bell-metal workers, tinsmiths and a great variety of minor sub-divisions.

(*c*) Textile trades, including cotton-weaving and printing by hand blocks, silk-weaving and the manufacture of carpets.

(*d*) Wood-working, such as cabinet-making, coach and carriage building, boat building and ornamental wood-work of various kinds.

(*e*) Tanning and the preparation of hides and skins for export trade.

(*f*) A variety of miscellaneous industries, such as glass manufacture, fire-works and peppermat making."

9. A list of existing industrial schools is given at page 156 and Dr. Bourne has analysed (paragraph 9 of his letter) what is now being done in these schools. He eliminates Europeans and Eurasians, Native Christians, Brahmans, Muhammadans and Panchamas as being outside the scope of the present enquiry which concerns Non-Brahman Caste Hindus whose hereditary occupation is an industry and finds that there are not 100 pupils in the whole Presidency who are at present receiving instruction in the methods and processes of their hereditary caste occupation or in the principles underlying the same, so that although the existing schools are doing useful work in other ways they are doing nothing towards the real problem of industrial education.

10. As the Government of India have themselves remarked, both employers and employed need to be convinced of the value of systematic training as a basis for manual skill. Sir James Thomson says that the combination of capital and labour is essential to the finished apprentice's progress and further a market is required for their wares at a remunerative price on the top of that combination, and the Hon'ble Mr. Stokes remarks that "the state of most of our industries in this Presidency is such "that we must first develop the industry" and again "industrial schools will follow "the development of industries". Mr. Chatterton is not at all in favour of starting a number of industrial schools, but on the other hand he advocates Government aid in developing industries.

11. Now in a previous letter communicating their views on the results of the Simla Conference, the Government of India seem to have recognised the possibility of this conclusion. They say (paragraph 3, page 3, of G.O., No. 695, Educational, dated 28th November 1901) that if any local Government feels especial efforts are required to organise or help any particular industry from the mercantile point of view, they should either invoke the assistance of private enterprise or they should arrange for its development by means of special officers not connected with the Educational Department.

It is on these lines that Madras appears to be advancing at present, and the following figures taken from the census table of 1901 (Part I, page 212) are instructive in this connection :—

Landowners and agricultural labourers	26,500,000
Weavers and dyers	1,245,000
Graziers	509,000
Leather-workers	476,000
Fishermen	394,000
Carpenters	385,000
Workers in precious stones	315,000
Masons and builders	281,000
Potters	225,000
Basket and mat manufacturers	210,000
Oil pressers and sellers	163,000
Ironsmiths	157,000
Tailors and embroiderers, etc.	78,000
Silk-weavers and dyers	62,000
Brass and copper workers	58,000

All the other various kinds of industries employ less than 50,000 workers.

12. Now when it is remembered that only 11 per cent. of the population live in towns, the difficulty of getting at the industrial classes by means of industrial schools for small handicraftsmen seems to be almost outside the scope of practicability at present.

But meanwhile let us see what we are doing for the industries which appear from the above figures to be the most important in this Presidency.

Special endeavours are being made for agriculture and agricultural training, and the whole scheme of the Agricultural College is once more in the melting pot.

The Veterinary Department is looking after the interests of graziers in a special degree.

Mr. Chatterton has been put on special duty to devise means for improving the weaving and the tanning industries and placed under the orders of the Board of Revenue.

Proposals are now before the Government of India for deputing Sir Frederick Nicholson on special duty in regard to fisheries.

Carpentry is taught in most of the existing industrial schools.

13. Now I think it is generally agreed that what are wanted are capital and "captains of industry". Industrial schools on the lines of the Government of India letter are not likely to furnish either, but special officers may be able to indicate the means of attracting the one and discovering the other. In paragraph 6 of his letter Mr. Chatterton has some very pertinent remarks as to the necessity of taking up one by one the important industries of the Presidency and making a detailed survey of them in order to discover whether it is possible to effect improvements, and if so to point out the lines on which they could be made and to assist private enterprise with expert advice. This leads up to what seems to me the most practical suggestion on these papers, viz., the appointment of an officer entirely separate from and not subordinate to the Director of Public Instruction for the control and development of technical education and of industries both by assistance, advice and demonstration (the Hon'ble Mr. Stokes' note, paragraph 6). Mr. Chatterton advocates this measure which he says was contemplated in Resolution No. 128 of the Simla Conference. He says that such an officer would control the work of the Engineering College, the Agricultural College, the School of Arts and all mufassal technical and industrial schools. He would also take over the control and management of the Government Technical examinations and would afford considerable relief to the Director of Public Instruction. The Director of Public Instruction apparently concurs, for he says in the concluding paragraph of his letter that the real problem is not an educational one and is outside the functions of his department.

14. Another practical suggestion is the revision of the present curriculum in our primary schools. The ideas of the Director of Public Instruction (paragraph 6 of his letter) have been elaborated in some detail by the Hon'ble Mr. Forbes and the Hon'ble

Mr. Stokes concurs. The Hon'ble Sir James Thomson points out that technical education proper (as opposed to industrial schools) is hardly the concern of these papers and that it is a matter for the Educational Department. This is true, but it seems advisable to refer to it briefly in the reply to India in order to complete the enunciation of the views of Madras Government. A third suggestion is made by the Hon'ble Mr. Stokes at the end of his note to the effect that itinerant teachers should be appointed as in Ireland, and the Hon'ble Sir James Thomson thinks this is a promising idea if the right sort of apostle can be found or created.

15. With these remarks I think that the reply to the Government of India should be to the following effect :—

(1) that their proposals to starting industrial schools do not commend themselves to the Madras Government who have therefore no advice to offer as to the appointment of an Inspector for such schools ;

(2) that as industrial enterprise is almost non-existent in Southern India, the Madras Government would prefer to continue to advance cautiously on the lines on which a commencement has already been made, viz., by appointing special officers to investigate and devise means for developing particular industries ;

(3) that a demand for industrial schools is more likely to follow than to precede such development ;

(4) that a separate department for technical and industrial education should be started with a Director, independent of the Director of Public Instruction, at its head ;

(5) that the revision of the curriculum of primary schools will be undertaken in order to remove its present defect of being too literary ;

(6) that for particular industries, *e.g.*, weaving, something might be done by the appointment of itinerant teachers ;

(7) that the organization and improvement of our existing technical and industrial schools will be attended to (Government of India letter, paragraph 14, and the Hon'ble Sir James Thomson's note, paragraph 5);

(8) that the reorganization of the School of Arts will be separately dealt with and ;

(9) that proposals are being made by the Director of Public Instruction to start schools for weaving at Madura and Salem on the lines suggested by Mr. Tulasiram of Madura, but that these are at present in too crude a shape for any estimate of cost to be submitted (these proposals may be referred to Mr. Chatterton for further examination and elaboration).

A[MPCHILL]—20-4-05.

Please draft. Reference may also be made to the recent orders in regard to Mr. Chatterton, whose sphere of duties will include agricultural experiment in the direction of irrigation by means of pumping, which will affect the agricultural community which forms by far the largest class of the rural population of the Presidency.

H. D. TAYLOR—21-4-05.

Draft submitted. The references ordered by His Excellency should be to Mr. Chatterton and from the Revenue Department? The Director is not to have anything to do with the proposed weaving schools at Salem and Madura or technical schools at Perambur and Negapatam, if they are ever started ?

I think this is the intention.
H. D. TAYLOR.

2. Should not India be told that industrial schools have been permanently transferred to the Board of Revenue (if this is intended by the recent decision)? I have briefly mentioned this in the draft. I understand the decision applies only to technical colleges and schools whose techné is an industry and not those whose techné is a profession, *i.e*, not to colleges

The orders are still under consideration. The exact sphere of Mr. Chatterton's duties remains to be more clearly defined.
H. D. TAYLOR.

and schools which turn out Engineers, Doctors, drawingmasters, shorthand-writers and typists. This would exclude the Medical College, the Medical Schools at Vizagapatam, Tanjore, and Royapuram, the Engineering College, the Commercial School, Calicut, the School of Arts on the Art side, etc. I have slurred over the point in the draft as notes and orders seem to be conflicting; but perhaps it had better be made clear. The Agricultural College, I presume, will be classified as industrial; agriculture is an industry and not a profession. Submitted that there seems to be no reason why the Director should not be relieved of the Medical and Engineering Colleges and schools as he is really only a wheel in the machine and the Surgeon-General and Chief Engineer are really responsible and might just as well write direct to Government; but that there is also no reason why communication should be through Mr. Chatterton and the Board. The control of Commercial schools and the School of Arts on the Art side [it would perhaps be as well to make separate institutions of the Art and the Industrial sides?] might, it is submitted, continue to rest with the Director.

This is, I take it, the intention *for the present*.

H. D. TAYLOR.

I think the draft may stand, until more definite orders issue on the point.

H. D. TAYLOR.

3. I have assumed that it is not the intention of Government to ask for a grant at present.

A. GALLETTI—22-4-05.

With reference to the note above I think that the draft may stand as it is: the precise position that Mr. Chatterton is to occupy in relation to the Revenue and Educational Departments (in respect of Technical schools), has not as yet been very clearly defined. This seems to be a separate question connected with the appointment of a separate Director of Technical and Industrial Education.

2. The future of the Agricultural College, the School of Arts and the Engineering College, and the lines on which they should be conducted are still "in the air."

3. The draft is circulated for approval.

H. D. TAYLOR—25-4-05.

I hope the draft will do.

J. T[HOMSON]—29-4-05.

I attended at the Hon'ble Mr. Stokes' yesterday and to-day to receive instructions for the preparation of a new draft. This is submitted—marked No. II. No. I draft passed by the Hon'ble Sir James Thomson is also resubmitted. Both drafts follow His Excellency's note closely, but they are very different in tone.

A. GALLETTI—2-5-05.

The revised draft is recirculated. It has been considerably amplified and is more specific in its recommendations, especially as to the appointment of a special officer as Director of Technical Education.

2. The referencee in paragraph 10 to technical education in Ireland is somewhat vague and indefinite, but no definite information on the subject is locally obtainable, unless the Director of Public Instruction knows about it.

H. D. TAYLOR—2-5-05.

As I did not like the draft No. I, I sent for Mr. Galletti and gave him instructions as to the preparation of the draft as I would wish it drafted which is marked No. II. There seemed to me to be no use in giving way to the despair which characterised the first draft. I hope draft No. II will meet with the approval of my Honourable Colleagues

G. S[TOKES]—3-5-05.

I will not refuse assent to draft No. II if His Excellency prefers it. But my opinion is that the time and the country are not ripe for a full blown Director of Technical Instruction, and we ourselves show that the proposal is premature when we

show so small a field of labour for him. It is one thing to keep Mr. Chatterton on special duty experimenting and prospecting: it is a heavy responsibility to create a department on such crude grounds as we are able to offer: indeed it seems to me the probable fiasco of the College of Agriculture all over again.

2. And while I can imagine a Director of Technical Instruction fit to give orders to the Engineering College authorities I cannot easily picture one able to take command of the Medical College. No doubt both are technical schools, but not the schools we are now agitating. At any rate, any Director of Technical Schools in Madras had better employ himself with dead matter and the manipulation thereof and let the human body and the professors of the art of healing and prevention of disease alone.

J. T[HOMSON]—4-5-05.

Bring to Council.

A[MPTHILL]—4-5-05.

Order in Council.

Draft No. II approved subject to the alteration of first five paragraphs in accordance with instructions given to Secretary, viz.; Paragraphs 1 to 4 to be put into plain simple English; Paragraph 5 to be rounded off and expanded; Reference to Ireland—wording as suggested by Sir James Thomson.

Other alterations are noted on the draft. Draft to be submitted again to His Excellency before issue.

H. D. TAYLOR—5-5-05.

A revised draft is submitted for approval. Paragraphs 2 and 3 and the first portion of paragraph 4 have been thrown together as paragraph 2. The remaining portion of paragraph 4 becomes paragraph 3, while paragraph 5 (new paragraph 4) has been slightly rounded off and expanded. The remaining paragraphs have been renumbered and the whole draft as revised has been retyped.

H. D. TAYLOR—7-5-05.

The revised draft will do very well and may issue at once. Honourable Members did not wish to see it again.

A[MPTHILL]—9-5-05.

Now issue sharp.

H. D. TAYLOR—10-5-05.

[G.O., Nos. 313, 314, Educational, dated 12th May 1905.]

2,050—12-2-03.

Educational (1904) Department.

CURRENT No. 1121

From

[Name] The Hon'ble Mr. A.G. Bourne D.Sc. F.R.S

[Designation] Director of Public Instruction

[Station] Madras

DESPATCHED
26 JUN. 1904

No. 8070 of 03 Received 26-6- 1904

Dated 26th June 1904

Enclosures 5- (Two in original) Registered 27-6- 1904

SUBJECT.

Industrial Education

Submitting remarks on letter from the Govt of India forwarding Report of the Committee on Industrial Education.

BACK PAPERS.

FURTHER PAPERS.

To

The Secretary to Government,

Educational Department.

Sir,

I have the honour to submit the following remarks upon the letter from the Government of India No. 593 dated 30th September 1903 referred to the Director of Public Instruction under Endorsement No. 592 dated 22nd October 1903.

The letter and the report of the Committee on Industrial Education were referred by the late Director to the Inspector of Technical Schools for remarks. A copy of Mr. Chatterton's reply is submitted herewith. A

2. I also submit a copy of a letter No. 709 dated 13th February 1904 from the same officer advocating the employment of coolies in Industrial Schools. B As this has only an indirect bearing upon the question at issue, I propose to dispose of it first. This letter had its origin in a reference wherein I asked Mr. Chatterton to justify the employment of coolies which I found he was advocating in the existing schools. There is much force in Mr. Chatterton's contentions. I raised the question because it appears to me that there is considerable risk of the training being lost sight of in the development of the commercial aspect. For instance I used in years gone by to visit the Engineering College workshops and on several occasions pointed out to Mr. Chatterton that little attention was being paid to theoretically correct cutting angles of tools, to [illegible] materials and such like matters. He admitted the [illegible] so but explained that in order to teach the students [illegible] he had taken

contracts for work which required to be completed within a given period and that there was no time to attend to such details which he evidently regarded as the refinements of an amateur but knowledge of and attention to such details is I submit exactly what differentiates the trained workman from the workman who has picked up his knowledge for himself in the "shops."

As another instance of the danger of the development of the commercial aspect I may mention that I have recently had to point out to the Manager of an Industrial School that in order to secure a contract for which he had tendered, the price of material was quoted below the market rate; now this as it is an aided school meant that provincial funds were being utilized to allow the lessees of the contract to obtain work below cost price. This was brought to my notice by the Inspector and if the Inspector and the Managers adhere to a suitable policy the danger to which I have alluded will be averted.

I may mention here that I observed while on special duty that the best engineering laboratories in England, Germany and Switzerland were regarded as places for the investigation of scientific principles and not for the teaching of working methods which is regarded as the function of a technical School; while in the technical schools the idea of turning out work for the market was scouted. In such schools the theoretically with the underlying principles is taught while it is left to the pupil to discover in actual practice how far commercial considerations necessitate a departure therefrom.

It does not however follow that what is most [illegible] in Europe is best fitted to this country and generally speaking I [illegible] strongly in favour of letting the best expert available [illegible] own way.

3. I now turn to the letter of the

Government of India and Mr. Chatterton's remarks thereon.

His letter covers a very wide field but does not perhaps bring us much nearer the practical beginning which the Government of India have in view.

The key-note to Mr. Chatterton's position is I think to be found in the words " in the south of India at any rate, industrial enterprise is almost non-existent and it is therefore useless to provide for technical and industrial education, unless, at the same time, efforts are made in some way or other to improve the status of existing industries and provide for the introduction of new ones."

4. The Government of India say (para 15) that "the solution of the problem must rest mainly with Local Governments." I must confess that I am not quite clear as to what, exactly, the problem referred to is. As Madras is not a great industrial centre (para 8) it appears that the intention of the Government of India is that the general considerations with reference to which the "problem" must be approached are those contained in paras 10 and 11. This coupled with the request for specific advice with reference to an Inspector in para 12 seem to define the "problem." The main question then is does the Government of Madras desire to narrow the issue to this extent.

5. Assuming this to be the case and accepting the Government of India's suggestion that the industry to which the experiment should at first be confined, be weaving, the proposals of the Government of India may be thus formulated:-

I. Industrial primary and higher primary schools should be started for the children of weavers .

II. Half the day is to be spent by the pupils in a course of studies designed with special reference to teaching accuracy of workmanship and to familiarising the pupils with the best designs and processes applicable to weaving.

III. The other half is to be spent in weaving as registered and supervised apprentices under approved weavers.

IV. There are to be teachers in the workshops to control and supervise the artisan weavers.

V. There is to be an Inspector "who knows more than the teachers and who might possibly take the Presidencies of Madras and Bombay and make periodical visits to inspect the work and promote the system.

Mr. Chatterton remarks that he does not consider the scheme practicable. I have since referred the scheme to Mr. James, Ag: Inspector of Technical Schools and in his letter of which a copy is attached he doubts whether the scheme of half time schools would work well in practice.

6. I proceed to consider how far it is likely to attain its objects. The objects mentioned by the Government of India would in this case be to make these boys more skilful weavers, to improve their prospects as weavers and to prevent them from leaving their hereditary occupation of weaving in order to seek for clerical employment. We are to deal with the children of weavers presumably somewhere between the ages of 5 and 12 (5 or 6 to 9 or 10 would be the ordinary ages in the classes of a primary and Upper primary school). In the School the pupils will necessarily on account of their age be largely occupied in learning to read and write and make simple calculations. As for teaching accuracy of workmanship a beginning might be made with paper-folding and such like occupations, and with learning to weigh and measure and draw. Such training must be good but I think the common complaint of want of accuracy on the part of Indian artisans is exaggerated. So far as I know there are already plenty of weavers who will weave a cloth with the most perfect accuracy and of the utmost fineness if the purchaser will pay a long price. It must be borne in mind that great accuracy in hand work is only to be obtained by very greatly increased labour. It is perhaps rash to generalize with regard to all the arts but my

experience has been that if the requisite price is forthcoming any attainable accuracy may be secured.

With regard to the teaching of drawing and design, the main object, at any rate at that age, should be to widen the general mental horizon. Any attempt to make these studies particularly applicable to weaving seems to me to be a mistake and likely to have a narrowing influence . What is wanted is to make these boys think, to lead them to observe and to ask why? and how? In actual trade the principle of division of labour must be fully carried out if the concern is to be a commercial success. The actual weaver on a large scale does not make, or even select, the design. It needs one expert to design and another to advise as to what is likely to "catch on" in a particular market.

I cannot think that specialised schools are necessary or even desirable. After all they are primary schools for little boys and are likely to have teachers of very ordinary qualifications whereas to give any special trend to instruction imparted at that age needs, to be of any value, a teacher of quite extraordinary capabilities.

I do think that half time schools may be necessary to induce parents to spare their children from work but this might be made to apply to all rural schools . We need much greater elasticity in respect of the mass of our "elementary"schools not only as to hours of work but as to the curriculum.

The whole scheme as now designed for Primary Schools or at any rate interpreted seems to take for granted that as a minute proportion of the pupils may continue and enter a university class it is necessary to learn this or that particular subject at a particular stage as there will be no time to learn it later on. It is all based upon the assumption that the aim of education is to learn a particular set of facts (which in nine cases out of ten are soon forgotten) training of the mind and memory and powers of observation being left out of account. This has of course been the natural outcome of the examination system.

I think that if we can dislocate the mass of our Primary Schools from this system special schools for particular classes at that early stage will be ~~necessary~~ unnecessary. Everything depends in the end upon the individual teacher and when he has sufficient originality to give any particular bias to the instruction he imparts he should be allowed, with the sanction of the Inspecting Officer, to do so.

The greatest freedom is now being given to teachers in England to allow them to adapt the instruction to local requirements. The Inspecting Officers ~~here~~ endeavour ~~merely~~ to see that what is done is well done.

7. When we turn to the workshop the subject is one for an expert but I understand that what is most needed is machinery and that much further progress will not be made without better sizing and the use of warping and other machines. The artisans to teach the use of these are not forthcoming, teachers would have in the first instance to be procured from Europe and so would the Inspector who must be a specialist.

8. Now supposing Government consider it desirable to experiment upon these lines. A few schools only could be attempted and these in large weaving centres. The main mass of the weaving population which lives in scattered colonies would be untouched. Indeed except the few who secured permanent employment in the schools I cannot think that the scheme would for a long time do much either for the weavers or their industry. Unless the prospects of the pupils as weavers were improved, and this depends upon the development of the industry and of the market for the products, they would inevitably try to continue their general education hoping to find some more profitable employment in other spheres. After most careful thought I am very doubtful as to whether the scheme would do much to improve matters in this Presidency. If anything can be done to make the weaving industry once again a profitable one there will be no danger of those whose

hereditary occupation it is forsaking it and there will be a demand for any instruction we can afford in the best methods and processes but to attempt this without doing anything to improve the industry seems to me to be courting failure. I have so far endeavoured to investigate the scheme suggested by the Government of India for this Presidency but if Government agree with Mr. Chatterton that this is impracticable the whole subject assumes once more the vaguest dimensions. If on the other hand they propose to try the experiment I think a beginning might be made at Madura and Salem.

I have once more considered what is being now done. Some interesting facts may be gathered from Appendix F to the Public Instruction Report. The chief local industries in each district are therein shown. A list of all the schools which by any stretching of the term can be classified as Industrial or Technical Schools is given, also the subjects taught in these schools and the numbers of the different classes of the community attending them.

With regard to the classes of the community we need in order to narrow the limits of the present investigation consider the non-brahmin caste Hindus only. Europeans and Eurasians constitute a separate problem; so do native christians who we may assume are being more or less looked after by missionary bodies: so also do respectively Muhammadans, Brahmins, and Panchamas.

Those whose hereditary caste occupation is an industry and I presume to be found under non-brahmin caste Hindus. The total number of this class of the community reported to be now studying in these schools is 983. From this number I take away those studying commercial subjects, subjects like Telegraphy and music and drawing, those in carpentry classes in schools (which are manual occupation classes) also for obvious reasons the Reformatory School and then analyze the remainder by means of Appendix E. and I think it is quite clear that there are not 100 pupils in the whole Presidency who are at present receiving

instruction in the methods and processes of their hereditary caste occupations or in the principles underlying the same. So that I think we may say that the existing schools while doing useful work in other ways for instance teaching native christians and others a trade and affording instruction to all classes of the community in certain technical subjects are doing nothing towards what I call the real problem of industrial education. I am not condemning the existing schools, they fulfil, to a greater or less extent, a useful purpose. The particular field which the Government of India have in view is however at present almost a blank-

10. The example of other countries does not help us very much in Madras. My information is I fear somewhat vague. I can however understand the value of Industrial Education in a country with plenty of well established and profitable industries. Some of the workmen are sure to be sufficiently ambitious to wish to rise and will seize any opportunity of studying the principles underlying the processes upon which their industry depends, but to begin teaching the principles to the children when their industry is almost on its last legs and there is no sign that capital will be forthcoming to put into practice the new processes they may learn or to develop any ideas they may aquire seems to be much like offering them a stone when they ask for bread.

11. The above remarks are not, I fear, any preparation for action, and they have been delayed in the hope that I should see my way to recommending some definite plan. The position appears to me to be this. Sir Edward Buck, the Simla Conference, the committee on Industrial education and the Government of India have all enunciated general principles and as even to these there is a considerable difference of opinion.

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The most definite proposals have been those of the committee: these are condemned by the Government Of India while the suggestions for a practical beginning made in the letter under reference are considered impracticable by Mr. Chatterton, the man who has been for the past three years employed in furthering the progress of technical and industrial education in this Presidency.

12. Even Mr. Chatterton is however but an amateur so far as the weaving industry is concerned and as everything points to an experiment of some sort with that industry, I wish to draw the attention of Government to the proposals of Mr. L.K.Tulasiram of Madura. When I visited Madura and discussed the matter with him he promised to let me have his proposals. He now sends a rough scheme which I submit in original.

D Pages 41 to 50 P Current file.

He is sanguine of obtaining suitable teachers from ~~Bombay~~ Baroda and of finding a demand for the course of instruction among the pupils of the Sourashtra School.

There is I think no doubt but that he has underestimated the cost but I think that an initial expenditure of ₹10,000 for plant etc, and ₹30,000 for land and building and a recurring expenditure of ₹10,000 would go a long way. Some of the members of his community are undoubtedly doing their best to help the community as a whole. The school which they have founded for general education is a good one and I understand that the Managers are willing (at my suggestion) to make the "High School" course a special one & not leading up to matriculation but giving special instruction in Mechanics, Physics, Chemistry and such subjects so that the pupils might then be drifted into the weaving and dying school. I cannot help thinking that this, as an indigenous effort, merits support and that the technical school might be started at any rate as a Government School. A similar school might also be started at Salem.

These experiments could be put in hand at once apart from any other action and would not commit Government to any very large expenditure.

It seems to me that they might do something towards the development

of the industry . The most promising of the scholars might be awarded ~~the~~ Technical Scholarships to England while some of them if it was known that they had really studied the subject might inspire sufficient confidence to raise some capital and start business on a large scale.

13. The only other practical suggestion which I can make is that Government should secure the services for some limited period of some real expert with commercial experience who after a patient investigation of the whole state of affairs with regard to weaving in this Presidency could advise on a line of action . This is what I imagine Japan would have done, has done, I believe, in respect of some of her industries.

14. The great objection in my opinion to any Technical Department or "Expert Advisor" is one that now applies in smaller measure to the present post of Inspector of Technical Schools Viz:- that each industry requires its own expert. A man may occasionally come forward, able to offer more or less valuable advice with regard to several industries but his opinion must always partake to some extent of the nature of that of an amateur.

15. I submit in conclusion that, as suggested by Mr. Chatterton, the real problem is not an educational one and is outside the functions of my department. Our Technical Schools should teach drawing and designing and impart manual training and it may be ~~am~~ teach a trade to many who might otherwise seek clerical employment such as Native christians and panchamas but they are not likely to touch the hereditarily industrial classes.

I have the honour to be,

Sir,

Your most obedient servant,

A. G. [illegible]

Director of Public Instruction.

E.I. 24-6-02.

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16 37 17 E P.

Postcript.

I intend to make further proposals for the reorganization of the School of Arts the subject of a separate communication, but as some proposals in that case are already with Government, and as it is possible that Government may wish to consider the subject in connection with the letter of the Government of India now under reference I attach to this letter certain proposals of Mr. Chatterton for perusal and return when done with. E

from

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-38-

Copy of the letter from the Officer in charge, School of Arts, Madras, No. 587, dated 13th November 1903.

In reply to your Ref. on Current No. 8070 of 1903, dated 29th October 1903, forwarding No. 593 of the Officiating Secretary to the Government of India, Home Department, with the Report of the Commission on Industrial Education, I have the honour to offer the following remarks thereon.

2. The first step taken by the Government of India in the matter of Industrial Education was in December 1900 when they deputed Sir Edward Buck, K.C.S.I., the late Secretary in the Revenue and Agricultural Department, to enquire into the subject all over India during the cold weather of 1900-1901. His report was placed before the Educational Conference which assembled at Simla at the end of August 1901 and a number of resolutions drafted by the Viceroy himself were, with but little modification, unanimously accepted by the Conference. These resolutions form the basis of the instructions to the Commission on Industrial Education, which was subsequently appointed to report on the whole subject. This commission made a tour round India and Burmah in the cold weather of 1901-1902, in the course of which they held conferences with the local authorities in each province and made enquiries regarding the state of Industries, visiting a large number of Workshops and Industrial Schools. Their report and recommendations are dealt with in the letter of the Government of India now referred to me. The Government of India consider that the recommendations of the Commission travel far beyond the terms of their instructions and deal with many questions into the discussion of which they do not now propose to enter. In paragraph 7, after criticising the report of the Commission, the Government of India state, "As matters now stand, two entirely different sets of principles have been put forward by the Simla Conference and by this Committee; and nothing has been done to bring either of them to the test of practice. The time for action has arrived, but in commending the question to the attention of Local Governments, the Government of India have no desire to restrict them unduly in their choice of methods

5. In the reports, submitted by Sir Edward Buck and by the Industrial Education Commission, the recommendation is made that an Officer should be specially attached to the Imperial Government, exercising functions in regard to industrial education and industrial development, some what analogous to those of the Director-General of Agriculture. No recommendation of this nature was made by the Simla Conference, but in resolution No. 128 it was agreed "that in provinces where the suggested developments admit of a wide or rapid growth, it should be for the consideration of the Local Governments whether a separate Technological department of the Government may in time be instituted for their special supervision and control". Nearly all the authorities who have made a careful study of the question and specially those who have been practically engaged in fostering industrial education and occupied in improving and developing indegenous industries, are of opinion that but little progress will be made unless Government are prepared to embark upon a series of industrial experiments which to be successful must in most cases be worked on a comparatively large scale. The Government of India fully accept the fact that experiments are necessary but evidently wish to avoid, if possible, carrying on manufacturing operations on what may be termed a commercial scale. These objections are founded upon a desire to interfere with private enterprise as little as possible, and upon a realisation of the difficulty which Government must inevitably experience in effectively controlling any commercial undertaking which may be carried on their name. With the experience I have gained in connection with the development of the Aluminium industry, I fully realise the force of the objections to any scheme for exploiting Indian industries with Government funds and under Governments control. The machinery of Government is ill adapted to such work and Government would, I consider, be ill-advised to create any department to carry on such a work. Yet in the South of India at any rate, industrial enterprise is almost non-existent and it is therefore useless to provide for tecnical

and

and industrial education unless, at the same time, efforts are made in some way or other to improve the status of existing industries and provide for the introduction of new ones. Probably the greatest difficulty which Government would experience if they created a department for the development of industries, would be to find officers with the necessary qualifications for the work; and without such officers it is absolutely certain that no good, but much harm, would result. So far, therefore, as the actual working of "Experimental" industries is concerned, it seems to me that it is not the duty of Government to initiate such enterprises but the conditions in the South of India are such that I think the Madras Government would be fully justified in considering propositions either from their own officers or from private individuals for the improvement of existing industries or for the development of new ones. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which Government would incur if they accepted them can then be considered and the prospects of success and the nature of the advantages resulting therefrom can then be carefully weighed and adequate measures taken to prvent a misapplication of public funds. It is obvious that the financing of such undertakings will prove a serious difficulty and I am hardly in a position to suggest any satisfactory solution. The creation of a special fund, either by the assignment of a lump-sum to begin with, or by the provision of an annual grant, the unexpended portion of which in any one year shall be allowed to accumulate for the benefit of future years, may possibly prove practicable. The only precedent we have to go upon is that of the Aluminium industry, during the first two years of the working of which the receipts and expenditure balanced one another, and a certain amount of capital was in this way locked up in the industry which was recovered when the industry was handed over to private enterprise. The circumstances in this case were exceptionally favourable, and in the end Government was able to recover not

not only all the capital invested in the industry but also the whole of the indirect expenditure incurred. This can only be expected to happen in a very few cases and, as a general rule, I think it will be found that, even when Government embark directly or indirectly in an experimental industry, it will be difficult, even when success is ultimately obtained, for them to recover the whole of their expenditure.

Whilst I therefore consider that it will be necessary in the immediate future for Government to undertake the working of industrial experiments on a commercial scale, I think they should be regarded as exceptional and they should not be included in any scheme for the re-organization of technical and industrial education. Probably it would be found expedient to deal with them apart from the general question, and as they have nothing whatever to do with educational work, it suggests itself to me that the control of such experiments might be conveniently vested in the Board of Revenue.

4. The Government of India desire to have submitted to them, proposals for industrial education based upon a consideration of the resolutions of the Simla Conference, of the Report of the Industrial Education Commission, and upon certain general considerations set forth in their letter under reference. After considering these papers carefully, I have come to the conclusion that the Resolutions of the Simla Conference should form the basis of these proposals and that they should only be neglected when clearly in opposition to the more recent statement of the views of the Government of India.

5. The first point which I think should be dealt with is the question of removing ~~the~~ technical and industrial education from the control of the Education Department, and the institution of a separate department. Such a course is contemplated in Resolution No.128 of the Simla Conference, and the advantages which it offers are fairly obvious; and probably the only objections to it or of a financial character. If such a department were created in Madras it would

would , I presume, control the work of the Engineering - College, the Agricultural College, the School of Arts, and all the Mofussil technical and industrial schools. It would also be advisable to take over the control and management of the Government Technical Examinations. It would afford considerable relief to the Director of Public - Instruction and enable him to devote more time to the control of the general education of the Presidency, whilst the — Director of Technical [illegible] Education, being presumbly a specialist in such matters, would be able to initiate fresh work and provide for a more complete co-ordination of the work of the different technically qualified officers under him.

The Government of Madras already devote a good deal of money to the Promotion of Technical and Industrial Education and the Government of India are now prepared to make a special assignment of grants for the purpose so that in the immediate future it is likely that there will be material advance made and possibly a large expenditure incurred. At present there is no technically qualified officer in the Education Department who is in a position which enables him to make a comprehensive survey of the entire situation and when called upon to express opinions their value is often discounted because he can only deal with questions with imperfect knowledge of all the factors to be considered. The controlling officer, the Director of Public Instruction, not being an expert is in a similar situation and it is doubtful if in the past the various measures which have been taken to develope industrial education, being generally in the nature of compromises between conflicting opinions, have been the best that could be devised. The very lengthy discussions of the past two years have led to much clear ideas on the subject and it is now possible for Government to declare its general policy and the best results are likely to be obtained if the working out of the same is placed in the ~~hands~~ hands of an expert who is able to devote the whole of his time to it.

Under these circumstances I would suggest for the consideration

consideration of Government that the most convenient time to separate the control of tecnical from General Education is before any important changes or developments are made.

6. If technical and industrial education is still to remain under the control of the Director of Public Instruction, then I think it will be necessary to appoint a Special Officer under the Director of Public Instruction, who will combine the work of Inspector of Technical Schools with that of expert advisor to the Director of Public Instruction. His work will necessarily be of a very miscellaneous character as he will have to combine the Offices of an Inspector of Schools with those of expert Assistant to the Director of Public Instruction in technical matters, and those of an Executive Officer in so ~~for~~ far as it will be necessary for him to initiate new developments in industrial training and provide for a supply of capable instructors. It would be practically making a permanent appointment of the position in which I have been placed whilst on special duty for the last three years, exchanging the duties of Superintendent of the School of Arts for those connected with that of an Expert Assistant to the Director of Public Instruction in matters connected with higher tecnical education. A very important part of the work would be to take up, one by one, the more important industries of the Presidency and to make a detailed study of them, with a view to discovering whether it is impossible to effect improvements and, if so, to point out the lines upon which they can be made, and to assist private enterprise with expert advice as far as is possible. Native enterprise is undoubtedly very much hampered through the difficulty in getting this country disinterested technical advice; and it is possible that, if it was made known that Government had made it part of the duty of a special officer to render assistance in this way, it might lead to a considerable number of really useful developments. Even as it is, I received a considerable number of applications for advice or information on almost every conceivable industrial subject and these are disposed of to the best of my ability

but I have no time to make detailed enquiries and as a rule the information I am able to supply is simply to indicate where the required assitance can be obtained. If a fee were levied which might easily be collected by requiring all such applications to be made on stamped paper, it is not improbable that the number of such enquiries would increase and that they would be of a more important character than at present. In cases where no help could be rendered it would be easy to return the value of the stamp, whilst in other cases where rendering the assistance required would invlove much work of a consulting nature, further fees could be charged.

7. The Government of India distinguish between the kind of institutions which will be suitable in great industrial centres and those suitable for towns in which the local industries are practised as handicrafts in small private establishments. But, beyond suggesting that the appointment of an Inspector for each industry presents great difficulties they entirely omit to consider the question of how teachers are to be provided for either class of institutions. It may be assumed, however, as practically self-evident that the larger and more ambitious institutions will be officered by Europeans or Natives of India who have received a Western-Training. But for industrial Schools dealing with indigenous industries it would be impracticable, on account of the cost, to supply them with any but teachers trained in this country. At the Simla Conference the question was dealt with in Resolutions Nos. 111 and 127, the first of which states "that teaching in the School of Art should be in the hands of experts trained, as a rule, in Indian Colleges or in Art Schools," whilst the latter is to the effect that "for the present the best available teachers, overseers, and foremen for these Schools should be procured either in India or from abroad; but however in time it is hoped that they may be produced in large numbers by institutions at suitable centres in India, where investigations of the products of industries can be carried on."

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Whether the School of Arts or the College of Engineering should be made the centre of technical and industrial education in this Presidency, or weather it would be possible to establish an entirely new institution; is the first question which arises, and in dealing with it the following considerations suggest themselves to me. If unlimited funds were available and if a wide and comprehensive scheme of Industrial education were going to be introduced in the immediate future, there is no doubt whatever that a new institution would be the most satisfactory solution we could adopt. The Cost, however, places it outside the reach of practical politics and we have only to consider whether the School of Arts should be converted into a Central Technical and Industrial institution, or whether the sphere of operations of the Engineering College should be enlarged so as enable it to satisfy the industrial requirements of the country. From the very out set the School of Arts was started as an institution for the training of artisans and through the 50 odd years of its exisience the pupils have been composed of men practically drawn from the bazaar and with no qualifications or attainments that will be of any assistance in a scheme for improving industries in this country. Till quite recently, the industrial side of the School was of comparatively minor importance and the School of Arts was really a school of Art with a certain number of apprentices who were taught art work in wood and metal. A lot of good work was done in this way and not a few of the best of the art industrial workers of this Presidency at the present time owe much of their skill to the training they received here. I am inclined to think that it is not desirable to materially change the character of the School. In many respects it can be greatly improved and the training given can be made much more through, but I should limit its scope of action to the functions specified in Resolutions Nos. 105 to 109 of the Simla Conference.

These Resolutions run as follows:-

entirely drawn from the poorer and uneducated classes. Beyond the Superintendent and latterly the industrial assistant, the staff of the school has been

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The Resolutions run as follows:-

(105). That the true function of the Indian Schools of Art is the encouragement of Indian Arts and Art industries and that, in so for as they fail to promote these arts ~~and~~ industries, or provide a trainig that is dissociated with their future practice, or are utilised as commercial ventures, they are conducted on erroneous principles.

(106). That the first duty of the Indian Schools of Art should be to teach such arts ~~and~~ or trades as the pupil intends to practise when he has left the school.

(107) That these fall natuarally into two classes:-

(a) Such arts, as designing in special reference to Indian arts and industries, drawing, painting, illumination modelling, photography, engraving, which may be taught either to those who intend to practise them professionally in the future, or to drawing masters in Schools;

(b) Such art industries as are capable of being practised in the locality and in which any improvement is capable of being introduced by instruction to the pupils or workmen by means of superior appliances, methods or designs.

(108). That the practise of these arts or art industries should be directed to the improvement of the skill and capacity of the pupil or workman and thereby to their expansion; and should not be pushed to the point of competing with local industries organized upon a caste or trade basis, or of doing within the school what can be equally well done outside or of usurping the sphere of private. enterprises.

(109). That samples of the ~~were~~ wares produced in Schools of Art may legitimately be kept for sale or for orders, and may profitably be exhibited in public museums, but it is undesirable to convert the schools into shops, or for Government Educational officers to be responsible for extensive commercial transactions.

8. It is perfectly obvious that if we adhere to the Principles laid down in these resolutions the School of Arts can never under any circumstances provide the kind of training which is required for the leaders of industrial enterprises. On the other hand, the College of Engineering receives quite a different class of students and gives them a thoroughly sound scientific education so far as it goes. Nominally, the College provides for the training of both Civil and Mechanical Engineers, but in practice, it does not differentiate between them. All the Civil engineering students get a good deal of mechanical training and those who wish to more particularly qualify themselves as mechanical engineers have hitherto only been able to do so during the fourth year of the course which is spent in outside workshops, In the case of the mechanical engineering students the Madras Railway locomotive shops are usually selected. The Students in the Engineering Classes are well educated. Many of them are [redacted] Graduates of the University and at the end of their course not a few obtain the B.E. Degree. It may be taken as almost axiomatic that the industrial development of a country can only be carried on by men who have received a thoroughly sound engineering training and it is upon this foundation that specialisation satisfactorily proceeds. The College of Engineering training produces men mainly suited to the requirements of the Public Works Department and upto the present time the College has had practically no influence on the manufactures of the presidency. The time has now come, I think, when without in the least degree altering the training which is given to the students whose subsequent career will be in the Public Work Department, it is necessary to provide the courses of instruction for mechanical and Electrical engineers so that [redacted] in the future there may be a competent body of trained men from whom we may obtain instructors for our Technical Schools and Managers for factories, workshops and other industrials concerns.

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The sanctioned scale of professors in the College of Engineering already provides for a ~~[illegible]~~ Principal, a Professor of Mechanical Engineering, a Professor of Civil Engineering, and a Professor of Mathematics but hitherto only one Engineering Professor has been appointed, and it would be a move in the right direction if the other appointment was also filled. Ultimately it will be necessary to have a Professor of Electrical Engineering and Assistant Professors of Chemistry and Physics. The Professor of Electrical Engineering should be a man who has received his training in England but the assistant professors might well be selected in this country and attached to the provincial Educational Service.
I have already stated that the Civil Engineering Students in the College of Engineering receivve a considerable amount of instruction in Mechanical Engineering and the main distinction which I would make between the Civil Engineering Students and the Mechanical Engineers would be in the matter of Surveying [illegible] and workshop training. A very short course of surveying lasting probably about a month is sufficient for Mechanical engineers, [illegible] and the time which Civil Engineering students devote to Surveying might, in the case of Mechanical Engineers, be spent in the workshops. but the equipment is totally insufficent for the training of mechanical engineers and it will be necessary, if these proposals are sanctioned, to provide the college with suitable workshops. These need not be on a very large scale but as far as possible they should be complete and should include (1) a small foundry, (2) a smith's shop, (3) a machine shop, (4) a fitter's shop, (5) a shop for pattern making and woodwork generally and (6) a brass foundary. At the head of each of these departments it will be necessary to have a thoroughly competent and experienced foreman and under him a few workmen to ensure continuity in the operations, and to provide for the proper training of the students. The outturn from such workshops should be entirely regulated from an educational point of view, but even then it will amount to a considerable quantity and it will be necessary to make arrangements so that these workshops do not

the college at the present time possess a fitting laboratory and a small workshop, but the equipment is totally insufficient for the

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do not appreciably interfere with private enterprise in Madras. With such a workshop Government might possibly find it practicable to abolish the Public Works workshops or to transfer from these workshops such work as will be suitable for the College workshops on the scale now contemplated. A very important part of the work of these shops ought to be the manufacture of machines and tools for the use of industrial Schools and if these are developed, as they doubtless will be, it is not at all improbable that in supplying their requirements the College workshops will eventually find a sufficient outlet for all their productions. There are no buildings in Chepauk suitable for these workshops but it would be quite possible to find a site for them, to which, few objections could be raised. But it must be admitted that Chepauk is by no means an ideal site for workshops or for the matter of that, for an engineering College either. With such workshop it will be possible to entirely dispense with the so-called courses of practical trainig which the engineering college students now receive in the Public Workshops, and the college course for students might be completed in the College itself. In the case of mechanical engineering students, however, I strongly recommend that an additional year be added to the length of the course so as to give the students a more thorough and practical workshop - course.

If these proposals are accepted, the College of Engineering will become a technical institution of the highest character and capable of satisfactorily providing for the industrial requirements of this Presidency and it will I think attract a very large number of students. I have not the least doubt that well trained mechanical engineers will find plenty of employment in India and will to a large extent displace men who are now imported from home and who, as a rule, do not prove very satisfactory. In this connection I might draw attention to a statement made by - Mr. Chambers of Messrs. Binny & Co., at the Industrial Education al conference held in the Senate House, Madras, on the

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29th January 1902, and recorded on page 155 of Part II of the Report on Industrial Education, in which he said, "The securing of experts was a lottery. Sometimes a man on Rs.250/-a month turned out to be better than one on Rs.500 /- They (Messrs. Binny & Co) sent home seven engineers last year as being incompetent." From the students on the mechanical engineering side of the College of Engineering I should look for the majority of the experts that will be required and it will be desirable to provide, as far as possible, facilities to enable them to specialise after they have completed the College course. In this connection the State scholarships offered by the Government of India will prove of great value. But it should also not be difficult to arrange for the employment of a certain number of these men in the large Government factories which are maintained in various parts of the country, where their services should be of value from the outset and should command a sufficient salary to enable them to live with moderate comfort. In these factories they should be able to gain a large amount of expert knowledge regarding processes of manufacture and management of workshops and men. From all points of view I am therefore strongly of opinion that the College of engineering should be developed and should be made the Centre of all educational effort in the Presidency which does not come under the term general education. The prominence of the School of Arts in these matters has been entirely due to accidental circumstances and I think that it is undesirable to perpetuate them. Industrial education and subsequently the industries themselves, can only receive the much-needed impetus if arrangements are made to provide a thoroughly good and practical training for those who are to be engaged in this work, and it seems to me that there is no question but that the staff who are to impart this training should be attached to the only scientific and practical institution that we at present possess. My proposals in this respect are provided for in resolution 104 of

Messrs Heatly & Grisham of Calcutta told me that they had had to send home their whole engineering staff as incompetent in 1902.

of the Simla Conference, which states " that the institutions which have been established for these purposes (the higher forms of technical education) such as the Engineering College at Roorke, Seebpore and Madras, the College of Science at Poona, The technical institute at Bombay, the Engineering School at Jubbulpore etc., the majority of which are affiliated to universities and trained up to Universities courses, have done, and are doing, valuable work and that their maintenance and further development are matters of first importance but that the first call upon a fresh technical effort should perferably lie in other directions. " It is only with the last sentence of this Resolutions that I do not quite agree as more extended experience leads me to think that the provision of a small number of highly trained men is absolutely necessary as a preliminary to any considerable effort in other directions.

9. Assuming, then, that the College of of Engineering is to become the centre of technical education in this Presidency it becomes necessary to suggest in what direction the School of Art should work in the future. The resolutions of the Simla Conference already quoted lay down the general principles which I recommend for acceptance in finally settling the lines upon which this institution is to work. The School should consist of an Art School and an Industrial School, and the Superintendent of the Industrial side should be made the Principal of the School but I would suggest that the Superintendent of the art side should be solely responsible for the Art teaching and that the Principal should only exercise such general supervision over the work as is necessary to maintain order and discipline. The Art side of the Schoil sh should remain as it is at present under the Superintendence of a Native of India and he should be provided with a competent staff of teachers. Instruction should be given in drawing, Painting, engraving, modelling and in the principles of design applied to what are called Indian Art industries.

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The students would be composed of two classes, first, those who come for instruction leading up to the fine arts, pure and simple, and the majority of whom will subsequently become drawing masters in schools; and secondly of apprentices from the industrial school, who will receive a thorough training in drawing of the kind that is necessary for the proper prosecution of their trade. But especial care should be taken to prevent such apprentices from spending their time at work which properly belongs to the students of the first class. The industries carried on in the school may be changed from time to time as it may be expedient but at the outset they may be those which are at present taught namely, wood working, metal working, cotton weaving and carpet weaving. Resolution No.122, of the Simla Conference, indicates the lines upon which they should be run namely, "that such schools, whether country or urban, should be primarily educational and not commercial institutions and that they should be as far as possible self supporting but should not compete with established private trades." This I take to mean that the school should practically maintain its present character in this respect. Most of the work done here cannot be obtained elsewhere in Madras except the products of the weaving shed and the great bulk of these are not manufactured for sale in Madras but for export to London where they are sold by auction for re-export to the West-Coast of Africa, the West Indies and the Southern States of America. The abolition of the Pottery department and the sale of the Aluminium department leaves the School of Arts at the present moment entirely devoid of machinery and it will undoubtedly be necessary to re-equip the workshops with suitable tools. In this matter I am strongly of opinion that industrial schools should as far as means allow, be equiped with machine tools and that efforts should be made to induce the local artisans to bring work to be executed by them when such a course is practicable. Although labour is cheap in this country it is impossible to disregard the fact that it is not cheap enough to compete with good machinery in many directions and it will be wise to avail ourselves,

to the greatest extent possible of the assistance which machinery can give, as it will enable us to employ a very much larger percentage, of the total labour engaged, on work requiring a high degree of manipulative skill. The introduction of machinery into the Aluminium Department displaced a large amount of inferior hand labour but very largely increased the number of skilled workmen we were obliged to employ. and the extension of the business which followed instead of reducing the total amount of wages paid, considerably increased them.

10. Apart from its educational work, whether on the Art or Industrial sides, one of the functions which should be assigned to the School of Arts is the carrying out of industrial experiments. It is not necessary now to specify the direction these will take or to indicate the nature of the experiments. But it should be assumed that the Principal of the School will be a competent person to entrust with the details of the work under the general direction of the individual whose ideas or proposals Government have approved of. Before these experiments can be undertaken as already indicated they will have to be sanctioned by Government and whatever staff, machinery or buildings are required for them will then be specified and the cost of such work should be provided from special grants outside the annual budget of the School. It should be clearly understood however that minor expiremental work such as is necessary to improve the state of the existing crafts carried on in the School should be provided for in the educational Budget and should be undertaken under the superintendence of the Principal. If worked on the lines suggested, the training given in the School of Arts should supply a large number of first class artisans and a smaller number of men capable of occupying such positions as artisries or foremen in workshops where industrials operations are carried on. The training of artisans in the Engineering trades is already well provided for in the large Engineering works which exist in this Presidency, such as the Perambur and Negapatam Railway Workshops, the

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the Iron works of Messrs. Massey & Co, and the workshops attached to big industrial concern like the Sugar works at Nellikuppam managed by Messrs. Parry & Co.

11. Dealing now with the industrial institution scattered all over the Presidency, the conditions in Madras are such that the specific recommendations made by the Government of India cnnot be easily applied. In Paragraph 10 it is suggested that half time Primary and Lowersecondary Schools should be established for the education of artisans and that the boys who attend them should spend the haher half of their time as registered apprentices under approved artisans. I regret to say that I do not consider the scheme practicable and that the end which the Government of India have in view can be better obtained in other ways. In Paragraph 11 certain conditions are laid down which the Government of India desire should be strictly enforced:-

1. Admission to the School should be strictly limited to pupils whose caste occupation is the industry which the School is intended to develope;

2. Education in the Primary or Lowersecondary Schools should be so ordered as not to fit the pupil for clerical employment;

3. No English should be taught;

4. Scholarships should be given;

If we offer Scholarships on a sufficently liberal scale it will no doubt be practicable to carry out these conditions, but the cost will be considerable and the result not very satisfactory. If industries are to be improved-and that I take to be the object which the Government of India have in view when they ask us to start special industrial Schools-it will, in my opinion, be far better to deal with the adult workmen in the industries than to spend a large amount of time at the outset in the education and training of boys.

It is perfectly clear from subsequent paragraph s in the Government of India's letter that the existing industrial Schools are not to be interfered with and of

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of these we have already in this Presidency an almost sufficient number, and it is, I consider, of far greater importance that whatever funds are available should be spent in improving these Schools than in the creation of new ones. Approaching the subject with a desire to carry out, to the utmost extent possible, the spirit of the instructions of the Government of India I would suggest that the following principles be formerly approved of by Government for the guidance of those who have the management and control of industrial Schools.

formally?

(1) That there should be no literary education given in industrial schools but that every effort should be made to exclude from the schools boys who have not passed the Primary examination.

(2) That the lower limit of age for admission to industrial schools should be 13 years and that the value of scholarships given to boys should be materially increased when they have passed the primary examination .

(3) That there should be no restriction placed on the employments of workmen in industrial schools when it is clearly evident that the object of their employment is the improvement of the industry and , concurrently , the improvement of the men themselves as artisans.

(4) That in industrial schools adequate provision should be made for instruction in drawing and designing suited to the requirements of the trade and that demonstrations and lectures should be given by competent instructors in the principles underlying the prosses and practices of the trade.

(5) That the Superintendents or Headmasters of industrial schools should in all cases be thoroughly competent men with a practical knowledge of the working of the industries in their Schools. That such men should, as a rule have received their training in the higher technical institutions of this or other Presidencies .and that they should have had subsequent experience in the management of industrial

industrial operations either in private or Government factories.

(6) That the management of the schools should be such as will conduce to educational efficency and economy in expenditure.

That the workshop should approximate as closely as possible, in their methods of working and their ways of duing business, to commercial undetakings but that in no instance should educational efficiency be sacrificed for the sake of making a profit.

It appears to me to be unnesessary at the present moment to examine each of the principles in detail. To carry them out thoroughly will necessitiate a considerable increase in the annual expenditure and a considerable increase in the scale on which operations or conducted. In this Presidency with the exceptions of the School of Art there are no other Government industrial schools and it will not be necessary to create any permanently. The recommendations made by the Government of India in Paragraph 14 have been the keynote of our policy in this presidency for some time past and all that is necessary is that larger funds should be placed at the disposal od the edugational department so that more liberal assistance may be given in the forms of grant-in-aid. Private enterprises is so weak that for the succesful introduction of new industries or important improvements in existing industries, it will be necessary for Government to set up temporary special industrial schools analogous to the late Aluminium Department of the School of Arts. Such schools however will be of a very special character and their main object will be to develope new industries or new processes in an old industry as rapidly as possible with the object of inducing private enterprise to take them over at the earliest possible date.

The management of such pioneer enterprises hardly comes with in the scope of the Education Department and should in every instance be the object of the special orders of Government. Probably their control can best be vested in the Board of Revenue.

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There remains for consideration the question of the improvement of Agricultural education, and the interests involved are so large that it is possible they will be better dealt with independently of the general industrial question. The Simla Conference in Resolution No.114, agreed "that the existing agricultural colleges, Madras and Poona, have been organized upon theoretical rather than a utilitarian basis," and it is generally agreed that the college of agriculture does not materially influence agriculture in this Presidency. Quite recently, I submitted to you a scheme for the institution of agricultural and industrial schools and to the proposals which I then made I have now nothing further to add. The full development of the scheme will require years and a very large amount of detailed investigation and labour and it will be absolutely necessary to put a special officer in charge of the work. If technical education is to be definitely separated from general Education, then, I think it will be practicable to place such a scheme under the head of the former department but it would probably be unwise to place it under the Director of Public Instruction.

In concluding this note I should like to be allowed to point out that I have received no definite indication as to the Policy which the Government of Madras intend to pursue and in the absence of definite instructions as to the proposals they intend to submit to the Government of India, I have thought that it is unnecessary to enter into details or to furnish estimates of the cost of any or all the proposals embodied in the note.

During the last two or three years I have written a number of Papers for the "Indian Review" on subjects connected with Industrial and agricultural Education and quite recently the editor of that paper has with my consent republished them; and I therefore forward a copy of these collected papers for the information of Government. Three of these papers, Viz., those on weaving, Tanning and Agricultural

Yet received vide to Director's letter.

B. Copy of Mr. Chatterton's letter No. 709 dated 13th Feb. 1904. 395

-59-

In reply to your Ref. on Cur. No. 1151 of 1904 dated 12th February 1904 I have the honour to submit the following remarks for your consideration.

The object of Industrial Schools is, I take it, to introduce new industries into a district, to introduce new and improved methods of working into existing industries and to train boys as artisans in those industries. In addition to these, it is, I consider, important that businesslike methods of carrying on an industry should be enforced and the industrial school should set an example as to how modern industrial enterprises should be carried on and every effort should be made to avoid the dilatory and unsatisfactory ways of doing business which are generally prevalent among artisans. Assuming that the manufacture of articles for sale is an essential part of the working of an industrial school, it is desirable that the work turned out should not only be of good quality but should be executed promptly. The most common cause of complaint on the part of the outside public who patronize industrial schools is the dilatory and unbusinesslike way in which orders are attended to. If an industrial school consists simply of maistries as teachers and boys as apprentices, it will be impossible to carry on manufacturing work with any degree of regularity and despatch. The output of the school from time to time will vary with the capacity and experience of the apprentices and it will be practically impossible for the Superintendent to undertake orders with any prospect of being able to execute them in a reasonable time. Boys working in an industrial school, pure and simple, spend a very large amount of their time in merely exercise work and as they have not to work against time there is nothing to stimulate them to acquire dexterity and quickness in working, whereas if they are put on to work which has to be completed on a certain date, they are bound to do the best they can, and if they do not, the delay in executing the work will bring prominently to notice defects in this direction. The employment of coolies converts the school into a practical workshop and not the least important part of the work of the school is the training of the

coolies themselves. It is much more economical to spend money in improving the education of a young man who is already, according to native standards, a fairly skilled artisan than it is to take a young boy and begin with him ab initio. Where coolies are employed it is possible for the Superintendent to take orders for all kinds of work and to distribute the same in the workshops according to the capacity of the people in them. Boys will learn much faster when associated with skilled workmen than when working in a class together under a maistry. Probably the best artisans in the world have been turned out under the old English apprenticeship system where the boys worked in a workshop with skilled artisans, and my experience in this country points distinctly in the same direction. In the Aluminium Department we certainly did a great deal to improve the qualify of the work turned out by the Madras metal workers and this would never have been possible unless we had employed them in large numbers. The best training-school for carpenters in this Presidency is at Karur where not only is a certain amount of modern machinery employed but also a fair number of coolies. Without the latter it would be impracticable to use the former and without either the school would be unable to give any better training than is done at Nazareth or Bezwada. Similarly at Madura from time to time, coolies have been largely employed with the result that the general standard of industrial excellence in the town has undoubtedly been raised. Lastly, it is of importance to remember that industrial schools are often able to secure many valuable orders that would not be given to individual artisans. Skilled artisans can be employed on the work which serves as a valuable object lesson to the boys who are learning their trade. My experience in the school of Arts , and as Inspector of Technical Schools during the last few years,, is completely in favour of the employment of coolies. I have adduced certain reasons for the same and I am unable to state any valid argument against the proposition.

I have the honour to be
(Signed) Alfred Chatterton
(True copy) A.G. Bourne
Director of Public Instruction

Copy of letter from the Professor of Engineering, College of Engineering, dated 6th June 1904.

In reply to your reference forwarding No. 593 of the officiating Secretary to Government of India, I have the honour to offer the following remarks.

2. With regard to the suggested establishment of half time schools (paragraph 10), I am inclined to doubt whether they will work well in practice.

3. It would seem preferable to keep general distinct from technical education, and to carry the former on the lines indicated as far as the means of the parents will allow, or up to a certain standard.

4. The boys who have reached this standard might then be registered as apprentices under approved artisans conditional on their attending technical classes, which should be established to give instruction in the particular subjects suited to the industries in the district, for say two days in the week.

5. Under these circumstances the boys would better appreciate the bearing of the special instruction on their work, and the services of instructors of higher qualification might be obtained as they would not be tied to one school, and in fact they might be specialists in their particular subject.

6. The monetary reward to the artisan should depend on the report of the inspecting officer, who would take into account the interest shown by the man in the progress of his apprentice and the standard of skill attained by the latter, so far as it depends on the artisans.

I have the honour to be
Sir
(Signed) W. H. James

(Fine copy)

A. G. Bourne
Director of Public In

D. 111

Madura,
18th June '04.

41 S.P.

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From

L. K. Tulasiram B. A., B.L.,

Madura.

To

A. G. BOURNE ESQUIRE.,
Director of Public Instruction.
Woodcock Hall,
Ootacamund.

Dear Sir,

I am in due receipt of your esteemed note of the 16th instant. I enclose for your kind perusal a rough scheme for a Weaving and Dyeing School as desired by you. I am very anxious to meet you in person and explain in detail the general outlines on which I wish to work the School. If it would be convenient for you I wish to hear from you on the subject. I had no time to prepare a detailed scheme as promised to you while you were in Madura, for which I beg to be excused.

Thanking you for your deep interest in the revival of the Weaving and Dyeing Industries of the Presidency.

I remain,
Dear Sir,
Yours very truly.
L K Tulasiram

A scheme for a Weaving and Dyeing School prepared by
M.R.Ry, L. K. Thulasiram Avergal.

The following extracts from the address presented by the Madura Sourashtra community to His Excellency Sir Arther Elibank Havelock, C.G.M.G., C.G.I.E., Ex- Governor of Madras during His Excellencies visit to Madura in 1897 point out to the necessity of opening a school for teaching weaving and dyeing industries in Madura:-

1. The indigenous industries of weaving and dyeing which were once in a flourishing condition have received a severe shock owing to the importation of alizarine and aliline dyes from Germany, of gold and silver threads from France and of yarns of fine counts from Manchester.

2. It may be interesting to Your Excellency to hear that the water of the Vaigai River, especially after the success of the Periyar Project, has been pronounced by able German Chemists as best suited for the purposes of Turkey-red dyeing.

3. The masses who eke out their livelihood by weaving and dyeing have not a scientific knowledge of the industries which they practise. We therefore deem it necessary to suggest that the establishment of textile schools and technical dye-houses for imparting instruction in the said industries will be an effective mode of encouraging them and the means of ameliorating the condition of the industrial classes.

His Excellency in his reply said:

You inform me that you form 42% of the population of this large city. It must, therefore, be fully admitted that you are an important section of the community and one whose wants are deserving of the best attention. I may tell you that Her Majesty's Government look upon the development of industries and pursuits other than agricultural pursuits of this country which

which take up the time and the life of about 4/5ths of the population as things which should be fostered and encouraged in every possible way. It is therefore with interest and sympathy that I have listened to the remarks you have made with regard to your special industry in Madura. I have had an opportunity of seeing some of the works done in your manufactories and there is much to admire in them. I am obliged to admit the truth of the remark that you have made in one of your paragraphs that you have received a severe shock owing to the importation of the alizarine and aniline dyes from Germany. I wish you had strength to resist the temptation to use these objectionable dyes. Your own ancient forms of dyeing are far superior and it would in my opinion be for the benefit of your industry if you would continue to perfect them instead of expecting importation of dyes from foreign countries.

You make a very practical suggestion as to the establishment of a school for improving your textile manufacture and teaching you something in a technical dye-house. The only difficulty is to frame a really workable scheme for all undertakings of this kind. If your body can suggest some scheme the details of which you are to carefully think out and then submit it to Government you will take my word for it that it will receive the very minutest attention from the Government.

You mention that the water of the Vaigai is particularly suited for the dye known as Turkey-Red. I am aware that the special colour meets the use of water possessing certain - chemical qualities that exist somewhere in Dumbarton Shire in Scotland. I have been told that the success of dutdye is due in part probably to the quality of the water used and it is a fortunate circumstance for you that the same valuable qualities are found in the water which you use in Madura. I shall really be glad and you will greatly help me if you try and advise me as to some practical and workable scheme for the school for encouraging and assisting the dyeing and weaving operations here

The industrial schools committee on the 3rd February 1902 inspected the fly-shuttle known and winding machine for winding yarns. I observed that the industries of weaving and dyeing had reached such a stage of development that they needed expert advice on well sizing yarn bleaching and chrome dyeing. Dyeing industry has received a new impetus in Madura through the exertions of one Jaswant Row Dhagut a student of pfofessor T. K. Gajjer, M.A., B.Sc., Ex Principal of Kalabavan or the Borada Technical College. Dye houses on improved scientific lines have been established by nearly a dozen firms and are producing the far famed Madura Red in competition with Glasgow and Vale of Leven. The sulphate of Alumina leaves Alias Kaya leaves being procurable cheaply from the hills North of Madura and in the plains East of Sivaganga the soda ashes are the khar (Potassium Carbonate) being procurable abundantly from Islands near Tuticorin and in the saline tracts of Ramnad.

Weaving School.

Equipment:- The equipment of the school comprises a complete range of spining and preparing machinery, appliances for yarn testing, and upwards of 20 model hand and power looms of the best type for the manufacture of all classes of fabrics in cotton, silk and wool, together with every convenience and appliance for the complete illustration of the courses of lectures. A museum of fabrics, of samples, and of appliances and materials relating to the textile trades and also a small - library of English and foreign technological Books and Periodicals relating to the weaving and dyeing industries is also necessary. The scheme of study extends over two years and is designed satisfactory training in the principles and processes of elementary spinning plain and fancy weaving bleaching dyeing and finishing of cotton fabrics and in addition will include Free-hand and Machine drawing, Elementary mechanics, and industrial chemistry with special referance to dyeing soap and candle making varnishing enamelling and manufacture of oils, paints and varnishes.

First term:- Elementary spining. 65

Cotton.- Geographical position of the various cotton f time of planting- treatment of cotton - causes of injury to cotton during the growing and fitting seasons.

Nature and properties of Raw material.- American, Egyptian and Indian varieties a comparative study-structue and chemistry of the cotton fibre - composition of the cotton fibre chemical and microscopical investigation impurities of the cotton fibre, viz., cotton wax, sand, leaf, seeds, motes, and excess moisture.

Preparing raw material.- Ginning- the construction and function of gins - baling presses.

Cleaning and opening.- Description of different openers principles of each.

Scutchers and lap machines.- Number and make of machines in use for different cotton.

Carding.- Combing - drawing - slubing, intermediate, and roving frames.

Spining.- Principles of different systems of spining as throstle, mule and ring - special uses of each - description of the various parts of each.

Drafts.-Drafts and ~~and~~ speeds of rollers and spindles - production of machinery and spining calculations.

Second term:- Elementary weaving. Fabrics.

Plain fabrics.-Influence of Twist of Fabrics-Effects produced by using Threads of different thickness, or by combining two or more colours.

Twills.- Division, Construction, and Combination.

Stains.- Methods and Rules for constructing Stain Designs.

Drafting.- Method of making Drafts-Rules for ascertaining the Number of Healds required for any Harness.

Derivative Patterns.- Ribs, Plain and Fancy-Twills, Steep and Reclining-Twills, Reversed and pointed - Double Satins-coloured effects.

Fancy Single Cloths.- Diapers-Honeycombs - imitation Gauze, Plain and figured - spot fabrics.

Combination patterns.- With two warps and one Weft - Two Wefts and one Warp - Figuring with extra material, as extra Warp, and Lappets - Extra Weft, and Swivels - Fabrics backed with Warp or Weft - Reversibles.

Double Cloths.- Alternate Threads of Face and back - two threads of face to one of back - three threads of face to one of back - two separate cloths - where two cloths are stitched together - methods of stitching - fabrics in which stitching - fabric in which stitching forms the figure - fabrics in which the stitching is not visible on the face.

Analysis of Fabrics.- Rules for ascertaining Weights per Yard of Finished Fabric - Ends and picks per inch - Counts of Material - Design, Draft, Tie-up, and Shrinkage.

Calculations.

Yarn Calculations.- Methods of naming yarns - methods of ascertaining Counts - Systems of Reed Naming, and Miscellaneous Calculations.

Machinery.

Preliminary Machinery and Processes.- Winding: Winding from Cop, Hank. Throstle, or Ring Bobbin-Warping: As Mill, Beam, Section, and Yorkshire dressing - Sizing: using of Sizing Composition of Size-effects produced on Fabric Sizing- ball Sizing, Hank Sizing, Dressing, Slashing - Hot-air Machines - Winding yarn on beam - drawing in - Twisting,

The Hand Loom.- Analysed and explained - The uses of the

Theadle and Witch Loom - Position of the Hand Loom as a commercial machine.

The Power Loom.- Explanation of Parts-Tappets and Barrel Sheding - Single and double acting Dobby Shedding - Over and Under Picking Motions - Method of Beating Up - Methods of Taking up and Letting off - Automatic Stop Motions - Temples - Mescellaneous Calculations relating to the Loom.

Second Years Course.

First Term:- Fancy Design Weaving, pile fabrics- Gauze Fabrics Tapestry Fabrics Designs on Borders.

Jacquerd Machine.- General arrangement and application - illustration of different parts- method of operation - principles of construction - Modifications - Double Lift Single Cylinder - Double Lift Double Cylinder.

The Jacquerd Hardness.- Its parts - method of tying up- setting out of Comber Board - straight over tye - straight over tye repeated - centred tye up - straight over and centred tyes combines - compound Hardness.

Squared Design Paper.- Method of transfering scetch to squared paper.

Finished Designs.- For single cloths - Damask Fabrics with compound hardness dress goods figured with extra material- figured pile fabrics.

Analysis and Calculations:-

For Fabrics.- Proportioning fabrics- testing fabrics for impurities - methods of distinguishing fabrics calculating cost of Fabrics -calculating cloths structure.

Machinery.

Power Looms.- Arrangement of machinery - construction erection action and management of various makes of Power Looms - machine calculations.

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Second Term:- Bleaching Dyeing and finishing of Cotton Fabrics.

1. Structure and Chemistry of the Cotton Fibre. 2. Impurities of the cotton Fibre. 3. Composition of the cotton Fibre. 4. Action of alkalies and acids on Celleulose..Theory of dyeing.

Bleaching of Cotton.- Marked Bleach Turkey-red Bleach - Madder Bleach - Yarn Bleaching -,Warp Bleaching - Stains and damages in Bleached goods.

Principles and practice of cotton dyeing.- 1. Direct dyeing 2. Direct dyeing followed by Fixation with metallic salts. 3. Direct dyeing followed by fixation ef with developers. 4. Direct dyeing followed by fixation with cuplers. 5. Dyeing on Tannic Mordant. 6. Dyeing on metallic Mordants. 7. Turkey-Red dyeing Chrome dyeing Chaki dyeing as specially practised in India.

Dyeing with vegetable barks roots and pods:- Indigo dyeing artificial and natural. Aniline Black and Sulpher Blacks.

Dyeing Machinery:- makers of dyeing machinery- Hydro Extractors. Squezing rollers. Mardenting Machines. Washing and drying machines, Drying chamber, Steaming cottage, Bundling machines and baling presses.

Finishing and Mercerining cotton yarns:- Mercerising Machinery.

Testing of the colour on dyed fabrics.- Fastness to light and air - Fastness to washing - Detection on colours and fibre.

Experimental dyeing and comparative dye testing. -Colour matching. Raw materials used in dyeing, barks, roots, pods, leaves, seaweed ashes, soaps oils etc.

Design of dye houses.- dyeing room, bleaching room, dye-mixing room, finishing room, bundling room steaming room, and balign room.

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Weaving Department.

Machinery:- 1. preparing machinery- winding machines - Warping machinery - and Warping Creel, Rs. 400/-

2. Model Looms - European Hand Loom - improved native hand loom - Amptle patent loom - sweedish loom - Japanese loom - York shire electric loom - ribbon loom,- Dobby loom - etc. Rs. 500/-

3. Shuttles - temples - spindles - bobbins and other miscellaneous looming accessories, Rs. 120/-

4. Model Power Looms Rs. 900/-

Yarn and stock in trade for the weaving department Rs. 1000/-

Dyeing department.

Apparatus required for the dyeing department:-

3 Tthermometers 0 -to 150°C.
4 graduated Burettes.
one revolving burette support for 8 burettes.
12 pipettes 10 cc graduated.
6 Do. 5 cc graduated.
6 Do. 1 cc graduated.
6 full pipettes 1 cc.
3 Do. 25 cc.
3 Do. 50 cc.
2 measuring 100 cc.
4 Do. 500 cc.
4 Do. 250 cc.
6 Do. 100 cc.
6 Do. 50 cc.
3 Do. 25 cc.
3 Do. 10 cc.
3 glass funnels big size.
6 glass funnels medium size.
3 Do. small size.
200 test tubes in two boxes.
2 evaporating pans big size.
20 cm.
6 Do. medium size 10 cm.
2 dozen Do. 5 cm.
2 dozen Do. 3 cm.
6 primas stoves.
1 oil bath with six holes and 12 pots of porceline fitting it.
Destilling apparatus.
1 small steam chest to steam printed goods.
1 squeezing machine with India Rubber rollers.
6 porcelain pots 1000 cc.
24 Do. 500 cc.
24 Do. 100 cc.
50 glass rods long 20 cm.
50 glass rods short 10 cm.
12 big suqeezing taps.
6 small suqeezing taps.
Baume's Aereometers
0,500 to - -0.700
2 - - 0.766 } one of each sort.
0.766 - -1.000
1.00 - - 10.0

one brass tongue for holding evaporating pans.
glass flasks 2 of 1000 cc.

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Glass flasks 6 of 500c cc.
3 of 250 cc.
3 of 100 cc.
one water bath with copper rings.
Enamelled pots 1 round holding 10L.
,, 1 Do. 5L
,, 1 Do. 3L
Do. 1 long flat square holding 5L.
Filtered paper chemically pure 200 sheets.
For funnels -- 200 sheets.
one pair of laboratory scales.
one set of nickle plated weights.
one pair of ordinary scales, with brass pans and set of brass weights.
one big white glass bottle with wide mouth.
one set of cork borers.
one cork bore grinder.
one-i
2 iron retord stands with clamps.
1 morter and pestle.
2 big diameter 20 cm.
2 medium diameter 10 cm.
2 spirit lamps.
2 stands for evaporating spans.
Chemicals Litmus paper
100 gr -- Litmus.
50 ,, -- Phemol phtalien
50 ,, -- Methyl orange.
50 ,, -- Lack moid.
500 ,, -- Oxalic acid.
50 ,, -- Permanganate of Potash.
50 ,, -- Silver Nitrate.
500 ,, -- Caustic Soda in sticks.
500 ,, -- Caustic Potash in sticks.
1000 ,, -- Ammonia Liquor.
1 Ko Carbonate of Soda pure.
1000 gr -- Hydrocloric Acid.
1000 ,, -- Sulphuric Acid.
500 ,, Nitric Acid
1 Ko ,, common salt pure.
100 ,, Potasium Iodide.
500 ,, Thio Sulphate.
1 Ko Marseilles soap.
Sead Carbonate.
,, Caustic.
,, Soda Nitrite.
,, Soda Sulpide.
Acid Sulphuric
,, Hydrocloric
,, Nitric.
,, Tartaric 200grs.
,, Citric 200grs.
Alchohol absolutis 500 grms.
Potasium Caustic.
,, Carbonate.
,, Ferrocyanide.
,, Ferri Cyanide,
,, Ammonium Oxalate.
Sodium Phosphate.
Barium Choloride.
Potassium Bichromate.
Sodium Bichromate.
Glycerine.
Ether,
Bleaching powder.
Lime.
Resin.
Acitate of lead.
Sodium acetate.
Tannin
Tartar Emetic.

Resorcin.
Betanaphtol.
Amidonaphtol Ether.
Nerogene D
Phenol.
Paranitra Aniline, B.B.
Aniline oil.
Aniline salt.
Alum.
Ascetic acid.
Blue stone.
Copperas.

₹.450. Cost of apparatus and chemicals for the dyeing department.

₹.1500. Cost of Dyeing Machinery.

₹.250. Cost of Dyeing vats, Dyeing rods, sticks and bars, and lanceswood stieks.

₹.600. Cost of reversible desks, black-boards, tables and chairs.

Staff.

Lecturer in weaving.. .. 100 to 150 ₹. per mensem.

2. Weaving Maistries..Each.on 25 to 30 ₹. per mensem.

Lecturer in Dyeing.. .. 150 to 200 ₹. per mensem.

Science Assistant.. .. .. 60 ₹. per mensem.

2. Dyeing Maistries.. each on 25 to 30 ₹. per mensem.

4 Labaratory peons. each on 8 ₹. per mensem.

4. Weaving shed peons.each on ₹.8 per mensem.

1. Engineer in charge of the Engine Room. ₹.100. per mensem.

2. Attendants for the Engine Room each on ₹.8 per mensem.

Contingencies for the Weaving and Dyeing Department ₹.60. per mensem.

Library of Technological Books ₹.500.

Museum of Textile Fabrics and Dye Materials ₹.800.

Machines, pipe fittings, labaratory benches. ₹.400.

Buildings, land extra.

Order no. 313 & 12-5-05 12-

The Govt of I. will be addressed.

No. 314.

From

H. D. TAYLOR, Esq., I.C.S.,
Acting Secretary to the Government of Madras,
Educational Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
HOME DEPARTMENT.

Dated Ootacamund, 12th May 1905.

SIR,

I am directed to reply to your letter No. 593, dated 30th September 1903, on the subject of industrial education.

2. The subject has been under the consideration of His Excellency in Council for a considerable period; the steps which should be taken for the solution of the problem have provoked much discussion and given rise to differences of opinion both as to the means to be adopted and the method of their application and their adaptation to local conditions and to the various stages of industrial progress in the Madras Presidency, which necessarily vary considerably from those of other provinces. It has therefore been no easy task to decide on a line of action which commends itself to the Government, as, on the whole, most likely to prove successful in this Presidency without running counter to the general principles laid down by the Government of India.

3. In this province organized industry practically does not exist. A list of the industries in Madras is given in Mr. Chatterton's note printed in the report of the Committee and reproduced for convenient reference in the margin of this letter. There are no great industrial centres in this Presidency where capital is employed in the organization of industry on a large scale and the small industries or local handicrafts appear to be decaying rather than advancing. The Government regard this condition of things with great concern. But as only 11 *per cent.* of the population live in towns, they cannot look upon the establishment of industrial schools in a few centres as an adequate means for the general advancement of industrial education among the masses.

"There are no important industries in this Presidency such as "exist in Bombay, Cawnpore and Calcutta. There are a few "cotton mills, weaving sheds, cotton presses and ginning factories, "several large railway workshops, two or three small iron works, "one Portland cement works, one or two oil presses and a number "of important tanneries, all of which are carried on by joint stock "companies with European or Native capital. The other indus-"tries of this Presidency are practically unorganized and in the "hands of artizans. They may be sub-divided as follows:—

"(*a*) Building trades, including brick-making, carpentry, "stone-mason's work.

"(*b*) Metal-work trades, including goldsmiths, silversmiths, "coppersmiths, brass and bell-metal workers, tinsmiths and a great "variety of minor sub-divisions.

"(*c*) Textile trades, including cotton weaving and printing by "hand blocks, silk weaving and the manufacture of carpets.

"(*d*) Wood-working, such as cabinet-making, coach and "carriage building, boat-building and ornamental woodwork of "various kinds.

"(*e*) Tanning and the preparation of hides and skins for "export trade.

"(*f*) A variety of miscellaneous industries, such as glass manufacture, fireworks and pepper-mat making."

4. While admitting the difficulty of the subject, this Government have not been blind in the past to the necessity for aiding the industries which from the figures noted in the margin appear to be the most important in this Presidency.

Census figures of 1901.

Landowners and agricultural labourers	26,500,000
Weavers and dyers	1,245,000
Graziers	509,000
Leather workers	476,000
Fishermen	394,000
Carpenters	385,000
Workers in precious stones	315,000
Masons and builders	281,000
Potters	225,000
Basket and mat manufacturers	210,000
Oil pressers and sellers	163,000
Ironsmiths	157,000
Tailors and embroiderers, etc.	78,000
Silk weavers and dyers	62,000
Brass and copper workers	58,000
All the other various kinds of industries employ less than workers.	50,000

Special endeavours are being made for agriculture and agricultural training and a scheme is under consideration for the reorganization of the Agricultural College, which has in the past proved a failure so far as its capability to provide trained agriculturists engaged in agricultural pursuits or in agricultural teaching. Experimental farms have been established under more than one District Board, and the Government have noticed with pleasure a tendency to the formation of District Agricultural societies and to the holding of agricultural exhibitions which they do all in their power to foster and encourage.

The Veterinary Department is to be largely extended and is looking after the interests of graziers in a special degree and the more well-to-do and enlightened of the District Boards are also responding to the call to establish Veterinary Institutes of their own.

An officer has been placed on special duty to devise means for the improvement of the weaving and tanning industries, and as a preliminary to this duty, he was specially deputed while on leave last year to inquire into the possibility of introducing improved teaching and processes and was allowed to visit the chief works relating to these industries in England and America.

Proposals are now before the Government of India for deputing another officer on special duty in regard to Fisheries and for formulating plans for their development as a means of increasing both the food-supply and the manurial resources of the country.

Carpentry is taught in most of the existing Industrial schools.

5. His Excellency the Governor in Council is inclined to doubt the practicability of assisting to any considerable extent any industry in this Presidency by adding new schools of the class described in paragraphs 10 and 11 of your letter to those which already exist. The existing schools, it is feared, are attended mainly with the object of securing the general education imparted in them at a less expense than it can be obtained elsewhere. Nor are they attended chiefly by those whose hereditary caste occupation is the particular industry taught. It is calculated that there are not 100 pupils in the whole Presidency receiving instruction in the methods and processes or underlying principles of their hereditary caste industry. The multiplication of industrial schools even tentatively and experimentally and in one particular industry to begin with, does not commend itself to the Government as a measure which can be carried out immediately or as a first step in the solution of the industrial problem. The state of most of the industries in this Presidency is such that endeavours must first be made to develop and foster the industries and the workers must be taught rather than their children. It would be useless or worse than useless to afford facilities for technical education pre-supposing openings for employment which do not at present exist, but must, if possible, be created. The handloom weaving industry is suggested by the Government of India as an industry in regard to which a beginning might be made. But His Excellency the Governor in Council fears that money spent on teaching the principles underlying the various processes of weaving to the youth of the weaving caste while the industry is becoming more and more unremunerative and before capitalists are ready to assist in the introduction of improvements or to develop ideas, would in all likelihood be money wasted. Similar considerations apply to such other industries as exist in this Presidency. His Excellency in Council has therefore no advice to offer at present as to establishment of

technical schools to promote any particular industry or as to the appointment of a specialist to inspect them. Captains of industry, industrial enterprise, willingness and power to introduce innovations, can scarcely be said to exist at the present time in South India.

6. His Excellency in Council, however, does not consider it impossible to devise means of furthering industrial development in this Presidency, such as the appointment of special officers to investigate and formulate plans for developing or introducing particular industries, a course which has already been adopted in the appointment to special duty of Mr. Chatterton. The Government propose to continue to advance cautiously on the lines on which a commencement has already been made. They concur with the Committee in their conclusion that "in the absence of a complete "survey of industries it is impossible to make detailed recommendations as to particular "industries and methods of instruction that may with advantage be applied to each; "the making of such a survey must necessarily precede the development of any scheme "of industrial instruction." But, in their opinion, the survey should be followed by such attempts to develop or introduce industries as may, after full consideration, be found advisable; for they believe that the demand for industrial schools cannot precede but must rather follow such development or introduction. The Government do not propose to work industries experimentally on a commercial scale. It is true that the experiment of introducing the aluminium industry met with a fair measure of success, that manufacturing operations on a considerable scale were conducted at a profit and that the business was eventually sold at a price that covered all expenses, direct and indirect. But it is not the function of a Government to initiate such enterprises except in very exceptional circumstances. The Government, however, consider that, in view of the decadence of the industries of Southern India, they would be fully justified in initiating experiments and in considering proposals emanating either from their own officers or from private individuals for the improvement of existing industries or for the development of new industries. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which would be incurred by acceptance, would be considered, the prospects of success would be carefully weighed and adequate measures taken to prevent the misapplication of public funds. Of the proposals which have been considered, those which suggest simple improvements in common processes seem to the Government most suitable for adoption. For instance, M.R.Ry. L. K. Tulasiraman of Madura, a weaver and dyer in a large way of business, has made suggestions in regard to the establishment of a textile school and experimental dye-house, which he would start and manage himself if he were promised a grant-in-aid; and the officer on special duty in connection with the development of industries is examining the possibility of using chrome tanned leather to be manufactured in this country for the leather buckets in which water is raised for purposes of irrigation; as also the possibility of improving the present method of preparing the warp with a view to inducing weavers to adopt the fly-shuttle. The Government would particularly welcome proposals for introducing or making known agricultural improvements. Such experiments may be expensive and abortive in many instances; but it must be remembered that one even partial success will more than cover in value many hundreds of failures.

7. The Government accordingly propose to take up the more important industries of the Presidency and to arrange for a detailed study of them with a view to discovering whether it is possible to effect improvements and if so to point out the lines upon which improvements can be made and to assist private enterprise with expert advice as far as possible. Native enterprise cannot afford to experiment for itself or to risk failure and is undoubtedly very much hampered through difficulty in obtaining disinterested technical advice; and it is possible that if it was made known that Government were prepared to place expert advice at the disposal of pioneers of industry, a considerable number of really useful developments might result. I am directed to observe that this solution of the industrial problem appears to be regarded by the Government of India as admissible. I am to refer to paragraph 3 of the Home Department letter communicating the views of the Government of India on the recommendations of the Simla Conference.

8. At the same time His Excellency in Council agrees with the Government of India in considering that the separation of general from industrial education lies at the root of the problem and should be no longer deferred. It is therefore proposed to

place under an officer entirely separate from and not subordinate to the Director of Public Instruction the development of industries both by assistance, advice and demonstration, the control of existing industrial and technical education, and the extension of such education when the time is ripe. The establishment of separate executive departments to deal with "the whole range of operations which are concerned "with technical education as applied to industries and with the encouragement of "country trades and manufactures" is advocated in Sir Edward Buck's report of 1901. The proposal was recommended for consideration in the 31st resolution of the Simla Conference on Technical Education. I am directed to say that the Government are of opinion that the establishment of the new department is essential and that without it no satisfactory progress is likely to be made in the improvement of industries and the furtherance of industrial education. The Director of Public Instruction is overburdened with other work and even if he had time to deal adequately with the matter, the problem, in the aspect it assumes in this Presidency, is not primarily an educational problem and so is not within his competence. Even though it were considered that the control of technical education could properly be left to the Director of Public Instruction, he would not ordinarily be the best adviser of Government in regard to proposals for the introduction of agricultural or industrial innovations.

9. The Government consider that it would be sufficient in the beginning to appoint a Director of Technical Education with a small office staff. This officer would occupy, in relation to the Engineering College, the Agricultural College, the School of Arts, Commercial Schools, the Chingleput Reformatory School and all mufassal technical and industrial schools, the position now occupied by the Director of Public Instruction. He would also take over the duties of the Inspector of Technical Schools and the control and management of the Government Technical Examinations. But his main duties would for the present be those of initiating new developments of industrial methods and training, of procuring and imparting information and of providing for a supply of capable instructors. He would be directly subordinate to the Government, but would work in connection with the Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, and so on. An example is likely to be found in the department lately established in Ireland. The Government consider Rs. 1,250—50—1,500 would be a suitable salary for the Director. I am directed to request that the sanction of the Secretary of State may be obtained to the creation of the appointment. A proposition statement is enclosed.

10. It is also considered that one of the objects which the Government of India wish to attain by means of industrial schools—diffusion of ideals of scientific precision in workmanship—should be sought by means of general, not of technical education. It is, in the opinion of His Excellency in Council, no part, and cannot usefully be made a part, of technical education to teach fundamental scientific notions or the elements of science. Some knowledge of elementary scientific laws is, however, a part of general education in its elementary stage. The Government consider the present primary and lower secondary school curricula far too literary and they will, partly with a view to providing a basis for the technical education of the future, revise them and introduce or quicken instruction in science. The present curriculum for primary schools in this Presidency embraces as optional subjects elementary science, drawing and mensuration. The Government would be prepared to consider the question of making drawing and mensuration compulsory subjects in both the primary and lower secondary stages of education and of making elementary geometry and geometrical drawing compulsory subjects in lower secondary schools. They would also be prepared to consider proposals for the complete differentiation of the ordinary and technical curricula in high schools.

11. A suggestion which the Government are inclined to accept, if means can be found to carry it into effect, is that persons should be trained in the principles and technique of a particular industry and appointed itinerant teachers. It is understood that itinerant instructors have been found most useful in Ireland and that information penetrates through them to classes which it is otherwise impossible to reach. In view of the general illiteracy of the industrial classes of this Presidency it is considered that itinerant teachers are likely to be required in order that information collected or results obtained by the technical department may be communicated to those interested. The proposal can hardly be applied in the near future to any very large extent though when the experiments in connection with chrome tanned leather are matured it will be

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necessary to employ this agency to bring the leather to the notice and knowledge of the ryots as well as to teach them how to apply the process so far as is necessary for their own purposes. It will also be necessary to employ itinerant teachers in connection with weaving problems. The establishment of schools for imparting technical knowledge to boys is not likely to have any genuine success or to touch the real problem of industrial education until the value of technical knowledge has been impressed on the minds of parents.

12. In conclusion, with regard to the special considerations attaching to great industrial centres advanced in your letter, I am directed to say that the Government doubt whether the time is yet ripe for the establishment of technical schools of the sort described by you even in the Presidency town. It has, however, been suggested that special departments sufficient to meet the demand for the finished product should be added to the Madras College of Engineering and School of Arts, specialists engaged and laboratories and workshops built. The Government have as yet come to no conclusion in regard to this suggestion and have now under consideration the report of a Committee which has been sitting to make proposals concerning the curriculum of the College of Engineering and the improvement of its workshops and laboratories. A proposal that technical schools should be opened in conjunction with the railway workshops at Perambur and Negapatam is also under consideration. Finally the reorganization of the Madras School of Arts and of the Agricultural College, Saidapet, is being considered, and the principles enunciated by the Government of India will be applied, as far as they are applicable, to these institutions.

13. It is not possible to make any accurate estimate of the cost involved in the above proposals; but it would probably not be inconsiderable.

To recapitulate those proposals—

(1) The Government propose to provide a foundation for the technical education of the future by revising the curriculum of elementary schools for general education. Before this can be done, it will be necessary to train more schoolmasters in normal schools and more thoroughly than they have been trained in the past and to improve the prospects of the class. It will probably be possible to defray some part of the expenditure out of the special grant of six lakhs for the improvement of primary education recently made by the Government of India to this Government.

(2) The Government propose to sever technical education completely from general education and to create a separate department which will deal practically with the promotion of industries by experiment and advice, as well as with the imparting of theoretical instruction in technical schools and colleges. The cost of the department at present is estimated at Rs. $1,781\frac{11}{12}$ *per mensem* for salaries. Travelling allowance and contingent expenditure may be expected to raise the cost to some Rs. 2,000 *per mensem*, while some initial expenditure will probably be incurred in providing office buildings. The cost of schemes which the Department would be expected to formulate or of the experiments which the Department would conduct the Government cannot of course now estimate with any particularity. They would, however, propose to make a budget provision of a lakh of rupees in the estimates for 1906–1907 and they would suggest that a grant of that amount be sanctioned by the Government of India.

(3) The Government propose the appointment of itinerant instructors; but have not worked out the proposal in detail.

14. The above are the proposals which His Excellency in Council has approved. It will, however, be observed that other proposals involving expenditure have been referred to in the preceding paragraph and are still under consideration.

I have the honour to be,

Sir,

Your most obedient servant,

H. D. TAYLOR,

Ag. Secretary to Government.

ANNEXURE.

STATEMENT of Proposition for revision of establishment.

Order sanctioning present establishment, Government of Madras, Educational Department.		Office to which the proposition refers.	Present scale.	Nature of charge.						Proposition.	
				Proposed scale.						Permanent.	
						Pay.					
Number.	Date.			Number.	Designation.	Minimum.	Increment.	Maximum.	Average cost.	Increase per month. Amount.	Decrease per month. Amount.
1	2	3	4	5	6	7	8	9	10	11	12
						Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
		Office of Director of Technical Education.	Nil.	1	Director of Technical Education.	1,250	50	1,500	1,416 2/3	1,416 2/3	..
				1	Manager	125	5	150	143 3/4	143 3/4	..
				1	Clerk	75	5	100	93 3/4	93 3/4	..
				1	,, ...	50	4	70	65	65	..
				1	Type-writing clerk ..	20	1	35	28 3/4	28 3/4	*
				1	Attender	12	..	12	12	12	
				1	Peon	8	..	8	8	8	
				2	Peons	14	..	14	14	14	..
				9	Total ..	1,554	..	1,889	1,781 11/12	1,781 11/12	..

* Within the powers of sanction of the Local Government.

EDUCATIONAL DEPARTMENT.

NOTES CONNECTED WITH G.O., No. 313, EDUCATIONAL, DATED 12th May JUNE 1905

[SUBJECT.—*Report of the Committee appointed to consider the subject of industrial education.*]

From the Government of India, No. 593, *dated* 30*th September* 1903.

Submitted that the letter from the Government of India may be circulated to the Honourable Members for perusal only with reference to memorandum No. 671, Public, dated 29th April 1901. It may be submitted to His Excellency in Madras after his return from tour.

N.L.R.—13-10-03.

[The report mentioned in paragraph 1 was received in the Madras office and has not been sent up.]

P. T. THARYAN—13-10-03.

A. G. CARDEW—14-10-03.

Seen. Very interesting all of it, but rather a fizzle out!

Perhaps the local Government may be able to gather some ideas from the report.

H. W[INTERBOTHAM]—16-10-03.

Seen.

G. S. F[ORBES]—16-10-03.

All that this amounts to is that we have got to solve the problem. The Government of India give it up.

A[MPTHILL]—27-10-03.

[Reference No. 592, Educational, dated 22nd October 1903.]

From the Director of Puclic Instruction, No. 8070, *dated* 26*th June* 1904.

The recommendations of the Committee on Industrial Education will be found summarized on pages (iii) and (iv) prefixed to Part I of their * report. There are 47 of them. The leading points in them are briefly described in paragraphs 2 and 3 of the letter from the Government of India, No. 593, dated 30th September 1903. To express the whole thing in one sentence as has been done by the Government of India in paragraph 4 of their letter the scheme of industrial education sketched by the Committee "is one which has for its end the abolition of the industrial schools and the substitution for them of a system of supervision of workshops."

2. This scheme has been rejected by the Government of India whose suggestion is, that half-time industrial primary and higher primary schools should be started in selected places, the course of studies in such schools being "designed with special reference to teaching that accuracy of workmanship in which Indian artizans are

* Volume put up.

conspicuously deficient and to familiarizing the pupils with the best designs and processes as applied to their hereditary trade"—*vide* paragraph 10 of their letter. The intention is that the boys should "spend half the day at the primary school and "the other half in working as registered and supervised apprentices under approved "artizans who would receive a monetary reward for each apprentice on the conditions—

"(1) that they taught them the trade thoroughly and not merely the "elementary processes, and

"(2) that they accepted supervision and control by a Government expert"—*vide* paragraph 10 of the letter from the Government of India.

3. This scheme involves, India points out, the appointment of a competent Inspector for whom however there will not be enough work in a single province; if he is employed for more provinces than one there will be the language difficulty. The Government of India accordingly ask for the advice of this Government how these difficulties may be overcome—paragraph 12 of their letter.

4. It is also suggested by the Government of India that the schools may be started as an experiment in connection with a single industry weaving by preference —paragraph 12.

5. Mr. Chatterton to whom the suggestions of the Government of India were referred by the late Director considers that the establishment of half-time schools will not be practicable in this Presidency—*vide* paragraph 11 of his letter No. 587, dated 13th November 1903. He is of opinion "that the industrial development of a country "can only be carried by men who have received a thoroughly sound engineering "training", paragraph 8, and that the College of Engineering should be made a technical institution of the highest character capable of satisfactorily providing for the industrial requirements of the Presidency—paragraph 8. He considers also that it is of far greater importance to improve the existing industrial schools than to establish new ones and that the existing schools should be improved by requiring that no literary education shall be given in them, by limiting admission as far as possible to boys who have passed the primary examination, by fixing the lowest limit of age for admission at 13 years, by employing workmen freely, by making adequate provision for instruction in drawing and designing suited to the requirements of the trade and by employing thoroughly qualified men as Superintendents or Headmasters—paragraph 11. He admits however that it will be necessary for Government to set up temporary special industrial schools *analogous* to the late Aluminium Department of the School of Arts—paragraph 11.

6. Mr. James, Professor of Engineering, College of Engineering, doubts whether the suggested half-time schools will work well in practice—letter dated 20th June 1904.

7. The Director of Public Instruction in his letter of 26th June 1904, No. 8070, says that Mr. Chatterton's letter "does not perhaps bring us much nearer the "practical beginning which the Government of India have in view"—paragraph 3 of the letter. The Director's final proposal is that two schools for the children of weavers may be started, one at Madura and the other at Salem, each at an intial expenditure of Rs. 10,000 for plant, apparatus, chemicals, furniture and such things and Rs. 30,000 for land and building and a recurring expenditure of Rs. 10,000 per annum, ~~page 16 of the current file~~. In this connection the Director invites attention to a scheme for a weaving school drawn up by L. K. Tulasiram of Madura This scheme will be found in a letter from Tulasiram, dated 18th June 1904, appended to the Director of Public Instruction's current letter.

But I should not limit the instruction to children only.

H. D. TAYLOR—7-7-04.

8. The Director thinks that half-time schools may be necessary to induce parents to spare their children from work, but that specialized schools with a course of studies designed with special reference to teaching accuracy of workmanship and to familiarizing the pupils with the best designs and processes applicable to weaving are not necessary or even desirable.

Why "weaving"—except that Government of India suggest it?

G. S. F[ORBES].

9. If the proposal to start two schools for weavers is not approved, the only

other practical suggestion which the Director can make is that Government should secure the services, for some limited period, of some real expert with commercial experience who after a patient investigation of the whole state of affairs with regard to weaving could advise on a line of action, paragraph 13.

But "technical education" is not *apprenticeship* to a trade.

G. S. F[ORBES].

10. In conclusion the Director submits that the real problem is not an educational one but one outside that department. The technical schools should, he thinks, teach drawing and designing and impart manual training and perhaps teach a trade to many who might otherwise seek clerical employment, but they are not likely to touch the hereditarily industrial classes, paragraph 15.

11. It is submitted that copies of the Director's letter and its enclosures marked A, B, C and D may be forwarded to the Government of India with the remark that his proposal to establish two weaving schools is accepted and that steps will be taken to start them as soon as possible. The Director may then be asked to submit detailed proposals. The Government of India admit "that it is impracticable to build up rapidly a great fabric of technical education in India at the present time", paragraph 7 of their letter. All that they want now is that experiments must be tried.

H. D. TAYLOR.

I think such a proposal is rubbish in that crude form.

G.S.F.

G.S.

12. As regards an Inspector it is submitted that the Government should *find one exclusively* for this Presidency. It will not be convenient to have an Inspector in common with any other Presidency or Presidencies. If this suggestion is approved, the most suitable person for the post is apparently Mr. Chatterton. He will have enough of work in other directions also. His leave will be up next February and it is not likely that a beginning in regard to weaving schools can be made before then. One of the subjects which he proposed to investigate during his special duty while on furlough is weaving, and he is sure to come out with better knowledge on the subject than he possessed during the past.

Yes. Divided authority would spell failure. If there are only two schools Mr. Chatterton could attend to them as well as other duties.

H.D.T.—7-7-04.

G.O., R. No. 592, dated 24th February 1903.

G.O., Nos. 65, 66, Educational, dated 27th January 1904.

Please see also G.O., No. 239, Educational, dated 13th April 1904.

13. Failing Mr. Chatterton the only other person who can be thought of is Mr. J. W. Coombes who is now Deputy Superintendent of the Reformatory School, Chingleput. He has paid some attention to a scientific study of the subject at home. If he is selected he can be in charge of one of the schools with supervision over the other.

G.O., No. 18, Educational, dated 10th January 1902.

14. We have promised to let the Government of India have our reply by the end of this month—*vide* letter R. No. 301, Educational, dated 11th June 1904.

P.T.T.—1-7-04.

Quite so: they want a free ventilation and expression of opinion; while Director of Public Instruction thinks he is hidebound by their suggestions?

G.S.F.

The Government of India are very diffident? Is it clear that they want any new departure to be made?

Yes. The object is, I take it, to educate the craftsmen in improvement of their craft by means of revised methods and processes. The practice and observation is everything. I have seen wild jungle hillmen become quite expert saw mill hands after a little practice.

That is not technical education.

G.S.F.

Yes, "*practice*", not the Educational Department.

G.S.F.

H.D.T.

Yes. Weaving schools of that type would be not educational but for trade improvement.

G.S.F.

The weaving experiment, if it is to be made, may be made on *industrial* rather than educational lines by the Board of Revenue rather than by the Educational Department? Perhaps the Government of India would be willing to pay for a weaving expert in place of the Inspector of their paragraph 12?

2. Submitted that technical schools for small boys have been tried and found wanting all over the world.

3. When we hear of what technical education has done for Germany (*e.g.*, that it has created a chemical industry with an annual outturn of 50 million sterling), what sort of technical education is it? Surely a highly specialized scientific education of young men in the University (or post-University) stage in a very few * elaborately-equipped and splendidly staffed† institutions. The men turned out are of use to manufacturers only because they have had the highest theoretical training and are capable of original research and discovery in their own special branch.

But Germany has the machinery. India has not—at least not in rural areas.
H. D. Taylor.

* 9 to be exact.
A. Gallfttii.

† There are nearly 400 professors, lecturers and assistants at the Berlin Technical High school—one to every 8 or 9 students—Berlin is, of course, far and away the biggest of these institutions.
A.G.

4. Submitted that Mr. Chatterton's suggestion ‡—improvement of the Madras College of Engineering by widening the curriculum to include such subjects as electricity, by adding experts in the new subjects to the staff, by lengthening the course, by improving and adding laboratories and workshops, might be recommended to the Government of India on the ground that money spent on higher technical education might perhaps be money well-spent while elementary technical schools almost always fail in their object.

‡ Page 28 current.

But the highly-paid staff would only turn out a few expert engineers and specialists who would not confer any material or lasting benefit on the masses.
H.D.T.

5. If I have read the Government of India's letter right, it was composed chiefly in order to damn their Committee's report. The alternative scheme which they suggest in paragraphs 9—12 is an alternative in which they have very little faith, and if the Madras Government said they did not want to start new schools, but would try to develop the existing schools on the principles (or such of them as the Government accept) stated in paragraphs 10 and 11, that would satisfy them.
A. Gallatti—2-7-04.

G.S.F.

G. S. F[orbes].

(Mr. Risley—because he wanted information about the Casanova school at Naples—spoke to me about the Committee's report last year. He was very strong on the uselessness of the Committee's recommendations (for which I understood Mr. Radice, C.S., who ought to have known better than to crack up Italian Elementary Industrial Schools — admitted failures —, was chiefly responsible); and seemed to think that very little could be done to improve elementary technical education in this country).
A.G.

Cafp

The Government of India do not definitely lay down any scheme for adoption or criticism, but leave it to local Governments to formulate and work out proposals for industrial schools in one or more industries.

2. In paragraph 5 of their letter they controvert the proposals of the committee and lay down four principles—

(*a*) that there should be a separation of general and technical education;

(*b*) that technical instruction should include the principles underlying the processes, as well as the actual practical development of those processes;

Precisely technical education is teaching the *reason* of an operation, or teaching scientific methods which help an artizan to do better work, *e.g.*, drawing, geometry, the use of exact instruments, etc.
G.S.F.

(*c*) that the instruction imparted should be of an educational nature, and not restricted to mere commercial enterprises for sake of profit;

(*d*) that there must be schools at more than one centre of each industry and

and that the instruction cannot be concentrated at a single centre.

3. In paragraph 10 the Government of India develop their proposals still further. They start with the industrial element and propose—

(*a*) to keep up and develop a boy's inherited manual skill,

(*b*) to give him a general education which will enlarge his prospects as a craftsman while preventing him from falling into the clerical groove. Paragraph 11 lays down three conditions which the Government of India consider essential for the carrying out of these principles. The Government of India are however very diffident and do not appear desirous of imposing their own views upon local administrations.

General education is in itself "technical education" in a wide sense.

G. S. F[ORBES].

G.S.F.

4. The proposals as I take it are for the development of industries as apart from fine arts, and the education is to take the form of imparting to young artizans a scientific knowledge of the principles of their craft, and possible improvements in methods which will ensure for themselves, the producers, a better market for their wares, and for the public, an article superior in quality at the same cost as they paid before. The schools are not to be mere workshops in themselves on a commercial basis, but they should so educate the artizans or craftsmen that he will be able to produce a superior article for the public good. The persons so educated cannot be expected to compete with countries outside, but they may at least replace amongst their own people home-manufactured goods in place of those made in Germany.

The development of industries is for the Revenue department.

Yes—scientific, but apprenticeship instruction in a craft is not scientific education.

G.S.F.—8-7-04.

* And his own.

G.S.F.

Hence, I consider that the industries which it is proposed to improve should be limited to those which provide for the people of this country an article of daily demand.

There is no intention to develop or encourage new trades or new arts and in fact the present proposals do not relate to "Art" as such at all.

5. It cannot be expected that craftsmen who speak different languages can for this purpose be concentrated at a single centre, such as Madras. The instruction must be taken to the people and hence the school must be started at centres of existing trades, and if there is only to be a single instructor and not a specialist to preside over each branch, it is essential that the instruction to be effectively and intelligently supervised should be strictly limited to one or two industries alone, and the officer who supervises those industries should be under the entire control of one administration and not distributed over two or three provinces. Though an Imperial grant may be made to foster such industries and carry out the scheme, the supervision should be strictly provincial.

6. The proposals made by the Director of Public Instruction are practically on these lines and he proposes to limit the scope of these schools, tentatively, to weaving and to start two schools for weavers at Madura and Salem, respectively, and to provide these schools with improved machinery and plant and the best raw materials on the most approved processes which are capable of being grafted as an improvement upon the industries as they exist amongst the native craftsmen. The Director of Public Instruction is certainly not sanguine in the matter, but an experiment may be made. The Director of Public Instruction's proposals are based largely on the proposals of Mr. L. K. Tulasiram of Madura and partly upon the fact that Mr. Chatterton is making special inquiries into weaving at home and suitable methods in machinery for introduction into this country. Given

The initial cost is estimated at Rs. 40,000 with Rs. 10,000 a year for maintenance, but the figures have not been worked out in detail.

H. D. TAYLOR—7-7-04.

important heads of industries such as Mr. Tulasiram, interested in the proposals and willing to assist them, together with an officer of special experience to guide and direct, the experiment may prove a success—but whether the new and improved processes and the use of improved materials will spread from the centres of industry at which these schools are established to outlying hamlets is much to be doubted.

7. Finally the Director of Public Instruction points out that the development of industries is a technical matter, and that it is entirely outside the province of education proper. He would therefore entirely sever the connection between industrial as apart from technical schools and the Educational Department. This may be to some extent true, but there is no other department to take up the work. Mr. Chatterton will, it is anticipated, still remain, though on special duty, nominally in the capacity of Superintendent of the School of Arts and the question of the department under which he should work is being separately considered.

H. D. Taylor—7-7-04.

I very much regret that I cannot dispose of this file before I give over charge: but there have arisen so many difficult subjects of more urgent importance that I have never been able to give sufficient continuous attention and have only read up bits of the subject at intervals. The whole question is one of extreme difficulty in this country where the ordinary education which must be the preliminary to technical instruction is so little advanced, among the population at large and more especially among the classes and castes who are likely to adopt an industrial life.

It seems pretty clear that the Government of India themselves are in a maze as to the course to be followed, or as Lord Ampthill noted have practically "given it up". The Director of Public Instruction after several months cogitation can come no nearer a solution; and the proposals he does make do not commend themselves to me altogether.

2. The real fact seems to be that the country is not ripe for any extensive system of technical education in its proper sense; and that the few (insignificant compared with the population) who have a fairly competent knowledge of such mathematics, science, etc., as are the essential groundwork of an intelligent understanding of practical arts and industries will not take up technical education. Nor is the genius of the people either practical or inventive. At the same time they are most extraordinarily imitative and adaptive; and the large European workshops in this country where the most complicated machinery is used find comparatively little difficulty in obtaining native workmen who become quite expert in its use. There is thus little or no difficulty in finding satisfactory native mechanics, where the demand for it is effective, as in Railway workshops.

3. The problem of extending industries and arts in this country is, taking things as they are at present, by showing the people that certain machinery is more *paying* than that in use. They are not, so far as I can judge, at all conservative in this direction. If they seem to be, it is rather because they are unable to afford the more expensive substitute recommended to them, and because it has not been shown to them that with the market they have to supply the substitution would be worth the expenditure. But to demonstrate the advantages, in outturn and in economy, of a modern machine is not technical education nor for the Educational Department: it is for the Revenue Department. For instance if the improved types of loom are to be popularized it is by practical demonstrations and a *few* lessons in its use is all that is needed. The persons who will adopt it on that demonstration are quite incompetent to understand the scientific and technical reasons for the superiority, upon which a technical teacher would expatiate.

4. "Technical Education" is defined in England as "the special education the "object of which is to train persons in the arts and sciences *that underlie* the practice "of some trade or profession"—Encyclopædia Brittanica, Volume XXIII. It is *not* apprenticeship, as Mr. Chatterton would fain make it.

5. I once had a long conversation with Mr. George Stuart, the late Director of Public Instruction, on this subject, and we agreed that Government in extending sound ordinary education among the people was in the circumstances of the country doing nearly all that it could do for technical education, since the former is the very foundation of the latter.

6. At the same time we connot well rest there at the present day: and we must adopt some compromise. Elementary geometry, or elementary chemistry and drawing are the technical basis of almost every art or industry. At the same time accuracy in measurements, in drawing to scale, in setting out to scale are also fundamental and essential if any native industry or art is to be improved. Accuracy and preciseness are besides the very qualities in which ordinary native workmen are most deficient.

7. I see no use in expending funds from *Educational* grants in merely giving boys opportunities for learning blacksmithy, or carpentry or weaving, *unless* (*a*) the teacher can instruct in the technology of the tools and the scientific reason why they are used in a particular way, and (*b*) the pupils are able to understand such instruction. *Mere* manual dexterity they can learn equally well in their fathers' shops; while as to the use of higher forms of machinery native craftsmen have never, as I have already noted, shown any difficulty in acquiring the necessary facility when their services were wanted. Nor at *boys'* schools could much more than the use of the simpler and commoner tools and machinery be taught in any case.

8. Some local bodies have opened so-called technical schools which are no more than apprenticeship shops—teaching only the manual use of the tools of the carpenter, the blacksmith or the weaver, without any scientific instruction and without even having any portion of the day devoted to an ordinary school course, as the Government of India recommend. Money spent on such places from the Educational allotments is in my view misappropriated, and if they cannot be placed on any other footing I should close them.

9. The general policy—which however I have not been able to work out—should, I think, be confined so far as *primary* and *secondary* schools are concerned to developing on the *compulsory* side subjects which more directly serve the industrial and technical arts.

10. In the *primary* stage it would have to be decided at what point small boys should begin to pay attention to the subjects I refer to.

It will be observed that our present curriculum for *primary* schools embraces as *optional* subjects *elementary science*, *drawing*, *mensuration*, etc. (pages 35, 36 Calendar of Commissioner for Government Examinations). What I should be inclined to do is to make *drawing and mensuration compulsory*. To whatever line of life a boy is to turn these are useful and educative. With *mensuration* I should require practical lessons in drawing to scale, and make such practical examination also compulsory. No advance will ever be made of any importance unless subjects are made compulsory.

11. In the *lower secondary stage*, drawing, etc., would be still further developed as compulsory subjects and I should transfer to the same head *geometry*, but instead of Euclid Book I., would prescribe some of the modern geometries of the same standard. There is no question modern geometry, taught as it is now in the elementary stages, lends itself very specially to the end in view, since the bulk of it is done by actual measurements, the application of similar figures, the noting of correspondences, etc., etc.

Vide page 38 *et seq.* of calendar *ibid.*

12. It would be going too far to prescribe as compulsory either "elementary science" or "one of the subjects of the elementary technical exrminations". But I can see no reasonable objection to making compulsory the subjects I have mentioned for the standards in question on general educational grounds. They are moreover fundamental for any sound understanding of or progress in industrial education.

13. The *upper secondary schools* might be revised on similar lines; while in the *high schools* (and perhaps some upper secondary schools) complete differentiation made between the ordinary and technical curricula—such schools having two sides.

14. If local bodies can afford it, and with a certain percentage of school they should be required to do so, a workshop should be attached to the school in which tools or some simple machinery are available. I do not think it matters a bit what the tools or the machinery are. All they are wanted for in my view is to have material on which the boy may have object lessons in his drawing, his mensuration, his scales, and his practical geometry. The manual dexterity obtained by an hour or an hour and-a-half a day (and so restricted) in the workshop will be all the better; but that I do not regard as an end of supreme importance, which is to give a certain *class* of instruction and education, and to develop a certain turn of mind.

15. Real technical education in its strict sense is already afforded in the *Engineering College*—the *Agricultural College*—the *Medical College*—the *Veterinary College*, etc. With regard to the *Government Engineering College* which is in the first rank, proposals are now under consideration for improving and extending it. I think Government might however take into consideration the question, and it is of great importance, of opening technical schools in connection with the Railway Workshops at Perambúr, at Negapatam and other centres of the kind. These schools would have to be mainly night schools and the curricula should be formed on strictly technical lines—give instruction in mathematics and mechanics, etc. Those who are admitted should prove that they have the ordinary education requisite to render the course profitable. I should not mind much how few attended at first. It is no use in having sham technical schools.

I do not know we can do much more for the mechanical Arts and Industries at present.

16. With regard to *art industries*, the School of Arts in Madras professes to be a school of technical education; but as it is at present run, it scarcely seems to fulfil that design; but seems to be degenerating, so far as the Educational department is concerned, into a commercial venture. Its reform is a matter for serious consideration. It should occupy a corresponding position with that of the Engineering College and start suitable courses of lecture in chemistry, and its applications to dyeing, etc., lectures on design, etc., drawing, etc. To some extent instruction in these latter subjects is given, I understand: but the whole curriculum requires, I think, revision and reform.

17. I have jotted down the above remarks from the rough notes of the general conclusions I have come to in reading the subject. I only regret that I have found it impossible, with more pressing subjects, to work out the question in any detail, or to find time to discuss the matter with Dr. Bourne since he returned.

G. S. Forbes—13-12-04.

Shewn to Hon'ble Sir James Thomson.

H. D. Taylor—18-12-04.

The Hon'ble Mr. G. Stokes, C.S.I.

H. D. Taylor—18-12-04.

I have had the benefit of consulting Dr. Bourne on the subject of this file. He agrees with me, I think, in what I say below.

1. The scheme which the Government of India propounds will be impracticable in this Presidency. No instruction in connection with, or bearing on, technical education can be given in primary or upper primary schools. Such schools teach only the three R's and technical instruction in any form presupposes much more than that.

2. It is no part, and cannot usefully be made a part, of technical education to teach the elements of science. Before a pupil enters a technical school he should be familiar with the fundamental truths of science. For example, such fundamental ideas as gravity and its laws, or the laws of motion of air or water, or the axiomatic conceptions of dynamics such as velocity, and the methods of weighing, measuring and determining such phenomena which need no teaching but examination as matters of daily experience and knowledge are presupposed in a technical school. How far a pupil should be taken in science or physics is a detail and a matter for subsequent discussion. A great point of failure in our present system of education is that it is

practically altogether literary, and that there is wanting in it effective instruction in regard to the elementary notions of science even in our secondary schools. It is in such schools and as a compulsory subject that the elements of Science and Physics and such subjects as Drawing, and Geometry which teach accuracy of method and observation should be taught.

4. With a view to start technical education the first practical step which should now be taken would therefore seem to be to revise the existing course of instruction and to introduce or to quicken instruction in science. This is a matter of general education and should be developed with advantage whether technical education is now started or not.

5. Technical education seems to me impossible unless there is a demand for those technically trained or an opening through which they can utilise their knowledge to gain a livelihood. There is no use in affording facilities for technical education beyond the openings for employment available as a means of living to the pupils so instructed. The case of the Agricultural College shows this very plainly. As India recognises, the problem of technical education in arts and industries in the large centres of industry is very different to what it is in the rural tracts. It is possible that one technical school for arts and industries in the Presidency town might find sufficient support in the whole Presidency, but what will have to be done in the country must be on a much lower plane. There I think we cannot get further than industrial schools, *i.e.*, schools in which the best methods and practice of a particular industry or industries should be taught. The state of most of our industries in this Presidency is such that we must first develop the industry. With moribund industries we must teach the workers and not the boys. It is necessary always to remember that agriculture, which is our chief industry, will need particular treatment.

6. So far as technical education in arts and industries is concerned, the School of Arts as an existing institution should be modelled to give all the instruction which is needed. We have, however, a number of other technical schools—the College of Engineering, the Medical College and the Medical schools, the Agricultural College, Commercial schools, Carpentry schools, the Reformatory, and so on. Industrial schools will follow as above indicated the development of industries. The superintendence and development of this field of work is in itself sufficient to afford ample and full employment to a special officer. The Director of Public Instruction has now more than he can do in looking after general education. I think therefore that the next practical step which should be taken in this matter is the appointment of an officer entirely separate from and not subordinate to the Director of Public Instruction for the control and development of technical education and of industries both by assistance, advice and demonstration. He could work in connection with the Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, with the Surgeon-General as to medical education, and so on. His relations in this respect are matter of detail to be settled in each case.

7. There are many points of similarity in regard to technical and commercial education between the case of this country and of Irleand. Here, as there, the initial difficulty will be to provide teachers and the necessary appliances and books. Alone the establishment of schools for boys for instruction in connection with industries is little likely to be successful. As in Ireland the first step must be to impress on the parents the value of technical knowledge. This can only be done by itinerant teachers as there. That is, to take the case of weaving, by teachers who can show the weaver the faults in his work and can demonstrate to him the advantages of their correction and the manner in which that correction can best be made.

8. I think a reply should be sent to India on the above lines.

G. S[TOKES]—5-1-05.

To His Excellency the Governor.

10

849 10

Demi-official from L. M. WYNCH, Esq., Private Secretary to His Excellency the Governor, to the Secretary to Government, Educational Department, dated 10th January 1905.

This file connected with the Report of the Committee appointed to consider the subject of industrial education reached me three or four days ago in a very urgent red covered file.

I do not know when I am going to get time to read the report and the notes and still less when His Excellency will find time to do so.

India, I see, want recommendations with a statement of probable cost and promise a grant for the purpose.

I have glanced through the Hon'ble Mr. Stokes' note and he seems to suggest the appointment of a special officer and some itinerant teachers and the modelling of the School of Arts on certain lines. I am not quite clear whether the marginal note that Sir James Thomson saw the papers on 18th December means that he is in accord with these ideas, because if so it seems to me that much time might be saved if these were worked up as the Government of India seem to require into definite recommendations with a statement of probable cost. Or does the Honourable Member want that the reply to India should merely ask for approval first of the general line of policy he has sketched out.

Could you kindly get this point cleared up and then return the file to me.

I have looked at this file long enough to know what should be done with it, but I don't know.

2. The idea of the Government of India to combine primary education with the thorough learning of a trade, in particular places and under efficient supervision, is not impossible of execution, but is an inversion of proper education and carries small promise of usefulness with it. The particular children might be got in a large town or place; the thoroughly competent artizans might also be got together; and the whole might be duly supervised;—resulting in a Government school and workshop or factory where goods would be produced at a cost above the market value, ordinary trade interfered with, and the canons of trading broken, and out of which the finished apprentice would proceed where and to what? All these schemes for improvement in the quality of labour imply a demand for the improved product and a willingness to pay for it, a probability of capital appearing to foster and support the improved industry and to wait for and create a market for the product, and to go on extending that market. What sign have we of that in, say, weaving? The finished apprentice will have been trained on the best and say cheapest loom procurable; in almost every case he could not afford to buy one for himself; and if he did he would require a proper sizing and warping apparatus to keep him going. The combination of capital and of labour is essential to the finished apprentices' progress, and, further, a market is required for their wares at remunerative prices on the top of that combination.

3. I asked the Diwan of Mysore the other day about the State's technical or industrial schools. He said one was doing well, applying itself to produce common country cloths. He did not seem to think there was much use in handling any other product. A State may teach and may show improved methods, it may pioneer new industries, but what is the good unless the private trader will take them up? When Mr. Chatterton says that in the South of India industrial enterprise is almost non-existent, it was incumbent on him to show that it could be made to exist and be supported before he went on to propose the improvement of the status of existing industries and the introduction of new ones. When he proposes to set up special industrial schools analogous to the late aluminium school, he omits the radical distinction between a totally new industry and old industries, but he knows and sees that he is advocating the engagement of Government in trade with all the disabilities and objections that attach thereto; and "for the financing of such undertaking—a "serious difficulty—I am hardly in a position to suggest any satisfactory solution."

Nor can I. If we could foresee for weaving, etc., what was predictable for the aluminium industry we should have warrant for seeking to do something that the spinning and weaving mills of the country are not doing. But what is that? The field of the hand-loom as against that of the power-loom is an unknown quantity to me.

4. Hon'ble Mr. Forbes's proposals have reference to general education for industrial ends, and the consideration of these proposals is properly for the Educational department. Technical education proper is hardly the concern of these papers. Hon'ble Mr. Stokes follows; but considers that, for the bulk of the country, industries first require to be developed or resuscitated by the instruction of the present workers. This would be by peripatetic teachers. There may be promise in that idea if the right sort of apostle can be found or created.

5. At the same time I do not see why the continuance and improvement of such industrial * schools as we have should not be striven after and their wider introduction favoured wherever opportunities seem to open. I cannot see any good in making commercial ventures of them. They should be places where the ordinary handicrafts and any special to the neighbourhood can be soonest and best learnt from thoroughly competent instructors, and where the implements of the calling are taught to be used and are on exhibit. They will be expensive to maintain, but that is no objection in these times. Boys might be stipended in them, but only such as are likely to stick to the trade or craft. And while there may well be a minimum limit of age for admission, it will not be possible, I think, for many years to come to insist on a minimum of general education as a preliminary to admission.

* Misnamed technical.

6. Mr. Chatterton is with us now for purposes cognate with this and it ought to be made a chief duty of his to see what can be done on these modest lines. It is not work for the Director; and Mr. Chatterton and the Board should have special charge of it.

7. As for the School of Arts, the key-note of Mr. Chatterton's letter and proposals is that there is no demand for the scholars there educated or for the work they are intended for, and therefore Government must create a market for both.

If the School of Arts fell to be treated as an ordinary technical school, like—say—the College of Engineering, one would have no difficulty in knowing what answer to make to this suggestion. If fifty years has not called into existence such a body of art followers and such a market for their wares as will enable them to live and prosecute art, what guarantee is there that more money expended on teachers and taught, and turning the place into a shop, will alter matters in the desired direction? I should say little or none. As a school for drawing and design the place serves a useful purpose: painting hardly counts: the bulk of the creatures that fill the classes at the present time do not seem fit for admittance and are, I understand, presently shroffed out. The work section in furniture, metals, carpets, etc., may be regarded as the higher form of an industrial school. I have no wish to see the place converted into a shop or factory such as Mr. Chatterton contemplates even if it is an art shop; I think that for teaching purposes it ought to carefully select its students and then educate them thoroughly, but always should have regard to the probabilities of their finding employment or making a living; I would not grudge the establishment and equipment necessary to these ends. But if the school cannot live on those lines, it will conclusively show that it is not wanted. At any rate, the first thing to do at the present time is to find what the admittance to the school should amount to and what the crafts taught should be and to what amount of outturn, and the staff regulated accordingly. With the restricted classes that I contemplate the staffing of the school should be a simple matter and the establishment of the work sections similarly easy.

J. T[HOMSON]—26-2-05.

~~[No. Educational, dated June 1904.]~~

H. E. the Governor

3.3.05.

Rep.

54

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86/12 P

This is by far the most difficult question upon which I have as yet been required to form an opinion and I am at the disadvantage of having to note while the Government of India are sending impatient reminders on account of long delays in which I have had no share.

The present situation is well described by the Director of Public Instruction in paragraph 11 of his letter in which he says "The position appears to be this: Sir Edward Buck, "the Simla Conference, the Committee on Industrial "Education and the Government of India have all "enunciated general principles and even as to "these there is a considerable difference of "opinion. The most definite proposals have been "those of the Committee. These are condemned "by the Government of India while the suggestions "for a practical beginning made in the letters "under reference are considered impracticable "by Mr. Chatterton, the man who has been for the "past three years employed in furthering the "progress of technical and industrial education "in this Presidency".

We have been told that the solution of the problem rests mainly with the Local Government and thus far there has been no more unanimity of opinion among ourselves than there was among the authorities enumerated in the passage quoted above. The first question then is what is the "problem". The Government of India admit that it is impracticable to build up rapidly a great fabric of technical education in India at the present time, but think that the time for action has

arrived and that experiments must be tried. The choice of methods is to be unrestricted save by the "general considerations and the problem for Madras is where and how and on what lines to try experiments.

The general considerations suggested by the Government of India fall into two categories:-
(a) those applicable to great industrial centres, &
(b) those applicable to local handicrafts in small towns.

As regards (a), the Government of India thinks it might be possible to set up whole-time schools to which pupils should be admitted after reaching ~~an~~ a higher standard of education as ~~could~~ can be exacted. The schools should be fitted with plant appropriate to some one trade and the pupils given a course of instruction fairly divided between workshop practice and the study of the principles and scientific processes on which the trade depends. The Director of Public Instruction thinks that Madras hardly comes under the head of a great industrial centre and makes no proposals under this head. Mr. Chatterton suggests the improvement of the College of Engineering, widening the curriculum, adding experts ~~on~~ and new subjects and building laboratories and workshops. As a Committee has just been setting to make proposals about the curriculum at the College of Engineering and the extension of workshops and laboratories, it is premature to discuss this proposal. Mr. Chatterton also suggests the re-organization of the School of Arts in Madras which has an industrial side, but this matter again is I believe under separate consideration. There remains the suggestion of the Hon'ble Mr. Forbes who proposes the opening

Ref.

456 385/4 P

of technical schools in conjunction with the railway workshops at Perambur and Negapatam. My Hon'ble colleagues have not commented on this proposal and there is no information on the papers about these workshops. The College of Engineering apparently furnishes technical instruction for the higher grades of employés, for I see from para 8 of Mr.Chatterton's report that students in the Mechanical Engineering Department attend the locomotive workshops. There is nothing in the papers on which to base an opinion as to whether technical schools (which would apparently be night schools) would be of any use to the ordinary artisans of the workshops and their children, but I am inclined to think that the Railway authorities have their own schools at all the large centres. The suggestion however might be referred to the Director of Public Instruction for consideration and the Government of India might be told that this is being done. Nothing else seems practicable at present in Madras as regards great industrial centres until the schemes for the re-organization of the College of Engineering and the School of Arts are matured.

As regards (b), considerations applicable to the case of local handicrafts, the case is much more difficult. The Government of India recognise the difficulties themselves and they suggest that a commencement might be made by starting half-time primary and higher primary schools, - pupils to spend half the day in the school and the other half as registered apprentices under approved artisans, the schools to be under the management of Government and the trade and subjects of instruction carefully selected.

57 F(15) 30-158

The experiment should at the outset be confined to a single industry and the Government of India suggest that preference should be given to weaving.

The Director of Public Instruction has discussed this proposal at length in his report and comes to the conclusion that it would not work. He sums up his objections at page 15 of the current file in the following sentence :-

"To teach principles underlying processes "to children when the industry is on its last "legs and there are no signs of capital forth-"coming, to put into practice the new processes "taught or develop ideas is like offering a "stone in place of bread."

The Hon'ble Mr.Stokes concurs that the scheme is impracticable while the Hon'ble Sir James Thomson, though hedoes not think it impossible of execution, is of opinion that it is an inversion of proper education and carries small promise of usefulness with it.

So far therefore the results of the examination of the problem are entirely negative. There are however some suggestions to be gleaned from the notes though they are not exactly on the lines of the recommendations of the Government of India.

The Government of India say that only through small industries can any impression be made on the industrial classes of India and before considering the suggestions made it will be as well to collect a few observations on the industries of Madras from the Committee's report and the notes of Mr.Chatterton and [redacted] of the Director of Public Instruction.

58
5 16 90 168

In a note drawn up for the Committee (page ~~182~~ 162 Part II of the Report) Mr.Chatterton writes:-

" There are no important industries "in this Presidency such as exist in Bombay, "Cawnpore and Calcutta. There are a few cotton "mills, weaving sheds, cotton presses and ~~gunny~~ ginning "factories, ~~seven~~ several large railway workshops, 2 or 3 "small iron works, one ~~porcelain~~ Portland cement works, "one or two oil presses and ~~quite~~ a number of "important tanneries, all of which are carried on "by Joint Stock Companies with European or native "capital. The other industries of this Presidency "are practically unorganised and in the hands of "artisans. They may be sub-divided as follows:-

(a) Building trades, including brick-making, carpentry, stone-masons work.

(b) Metal-work trades, including goldsmiths, silversmiths, coppersmiths, Brass and Bell-metal workers, tinsmiths and a great variety of minor sub-divisions.

(c) Textile trades, including cotton-weaving and printing by hand blocks, silk-weaving and the manufacture of carpets.

(d) Wood-working, such as Cabinet-making, coach and carriage building, boat building and ornamental wood-work of various kinds.

(e) Tanning and the preparation of hides and skins for export trade.

(f) A variety of miscellaneous industries, such as glass manufacture, fire-works and pepper-mat making."

A list of existing industrial schools is given at page 156 and Dr.Bourne has analysed (page 14 of the current file) what is now being done in these schools. He eliminates Europeans &

Eurasians, Native Christians, Brahmans, Mohammedans and Panchamas as being outside the scope of the present inquiry which concerns Non-Brahman Caste Hindus whose hereditary occupation is an industry and finds that there are not 100 pupils in the whole Presidency who are at present receiving instruction in the methods and processes of their hereditary caste occupation or in the principles underlying the same, so that although the existing schools are doing useful work in other ways they are doing nothing towards the real problem of industrial education.

As the Government of India have themselves remarked, both employers and employed need to be convinced of the value of systematic training as a basis for manual skill. Sir James Thomson says that the combination of capital and labour is essential to the finished apprentices progress and further a market is required for their wares at a remunerative price ~~on~~ the top of ~~their~~ that combination, and the Hon'ble Mr. Stokes remarks that "the state of most of our industries in "this Presidency is such that we must first "develop the industry" and again "industrial "schools will follow the development of industries." Mr. Chatterton is not at all in favour of starting a number of industrial schools, but on the other hand he advocates Government aid in developing industries.

Now in a previous letter communicating their views on the results of the Simla Conference the Government of India seem to have recognised the possibility of this conclusion. They say (paragraph 3 page 3 of G.O.No.695 Educational (28th November 1901) that if any Local Government

feels especial efforts are required to organise or help any particular industry from the mercantile point of view they should either invoke the assistance of private enterprise or they should arrange for its development by means of special officers not connected with the Educational Department.

It is on these lines that Madras appears to be advancing at present and the following figures taken from the census table of 1901 (Part I page 212)are instructive in this connection:-

Landowners & agricultural labourers	26,500,000
Weavers and dyers	1,245,000
Graziers ~~Clothiers~~	509,000
Leather workers	476,000
Fishermen	394,000
Carpenters	385,000
Workers in precious stones ...	315,000
Masons and builders ...	281,000
Potters	225,000
Basket & Mat manufacturers ...	210,000
Oil-pressers & sellers ...	163,000
Ironsmiths	157,000
Tailors & embroiders etc., ...	78,000
Silk-weavers & dyers ...	69,000
Brass & Copper workers ...	58,000

All the other various kinds of industries employ less than 50,000 workers.

Now when it is remembered that only 11 per cent of the population live in towns the difficulty of getting at the industrial classes by means of industrial schools for a small handicraftsmen seems to be almost outside the scope of practicability at present.

But meanwhile let us see what we are doing for the industries which appear from the above figures to be the most important in this Presidency.

Special endeavours are being made for agriculture and agricultural training and the

whole scheme of the Agricultural College is once more in the melting pot.

The Veterinary Dept. is looking after the interests of graziersin a special degree.

Mr.Chatterton has been put on special duty to devise means for improving the weaving and the tanning industries and placed under the orders of the Board of Revenue.

Proposals are now before the Government of India for deputing Sir.Frederick Nicholson on special duty in regard to fisheries.

Carpentry is taught in most of the existing industrial schools.

Now I think it is generally agreed that what are wanted are capital and "captains of industry." Industrial schools on the lines of the Government of India letter are not likely to furnish either but special officers may be able to indicate the means of attracting the one and discovering the other. On page 21 of the current file Mr.Chatterton has some very pertinent remarks as to the necessity of taking up one by one the important industries of the Presidency and making a detailed survey of them in order to discover whether it is possible to effectimprovemen and if so to point out the lines on which they could be made and to assist private enterprise with expert advice. This leads up to what seems to me the most practical suggestion on these papers viz: the appointment of an officer entirely separate from and not subordinate to the Director of Public Instruction for the control and development of technical education and of industries both by assistance, advice and demonstration (the Hon'ble Mr.Stokes' note, para 6). Mr.Chatterton advocates this measure which he says was contem-

-plated in Resolution 128 of the Simla Conference. He says that such an Officer would control the work of the Engineering College, the Agricultural College, the School of Arts and all mofussal technical and industrial schools. He would also take over the control and management of the Government Technical examinations and would afford considerable relief to the Director of Public Instruction. The Director of Public Instruction apparently concurs, for he says in the concluding paragraph of his letter that the real problem is not an educational one and is outside the functions of his department.

Another practical suggestion is the revision of the present curriculum in our primary schools. The ideas of the Director of Public Instruction (para 6 of his letter) have been elaborated in some detail by the Hon'ble Mr. Forbes and the Hon'ble Mr. Stokes concurs. The Hon'ble Sir James Thomson points out that technical education proper as opposed to industrial schools is hardly the concern of these papers and that it is a matter for the Educational Department. This is true, but it seems advisable to refer to it briefly in the reply to India in order to complete the enunciation of the views of Madras Government. A third suggestion is made by the Hon'ble Mr. Stokes at the end of his note to the effect that ~~attenuant~~ teachers should be appointed as in Ireland and the Hon'ble Sir James Thomson thinks this is a promising idea if the right sort of apostle can be found or created.

With these remarks I think that the reply to the Government of India should be to

the following effect:-

1. that their proposals to starting industrial schools do not commend themselves to the Madras Government who have therefore no advice to offer as to the appointment of an Inspector for such schools,
2. that as industrial enterprise is almost non-existent in Southern India, the Madras Government would prefer to continue to advance cautiously on the lines on which a commencement has already been made viz: by appointing special officers to investigate and devise means for developing particular industries,
3. that a demand for industrial schools is more likely to follow than to precede such development,
4. that a separate department for ~~this~~ technical and industrial education should be started with a Director, independent of the Director of Public Instruction, at its head,
5. that the revision of the curriculum of primary schools will be undertaken in order to remove its present defect of being too literary,
6. that for particular industries, e.g. weaving, something might be done by the appointment of ~~attenuant~~ itinerant teachers,
7. that the organization and improvement of our existing technical & industrial schools will be attended to (Government of India letter para 14 and the Hon'ble Sir James Thomson's note para 5),
8. that the re-organization of the School of Arts will be separately dealt with, and
9. that proposals are being made by the Director of Public Instruction to start schools for weaving at Madura and Salem on the lines suggested by Mr. Tulasiram of Madura, but

64 (22) 96 228

that these are at present in too crude a shape for any estimate of cost to be submitted (these proposals may be referred to Mr. Chatterton for further examination and elaboration).

20-4-05.

V.C.

A1.

Please draft. Reference may also be made to the recent orders in regard to Mr Chatterton, whose sphere of duties will include agricultural experiment in the direction of irrigation by means of pumping, which will affect the agricultural community which forms by far the largest class of the rural population of the Presidency

H.W.I
21.4.05

Lec[d]

Draft submitted. – The references ordered by H.E. should be to Mr. Chatterton and from the Revenue Dep[t]? the Director is not to have anything to do with the proposed weaving schools at Salem and Madura or technical schools at Perambur and Negapatam, if they are ever started!

2. Should not India be told that industrial schools have been permanently

I think this is the intention
H.W.

transferred to the Board of Revenue (if this is intended by the recent decision)?
I have briefly mentioned this in the draft. I understand the decision applies only to technical Colleges and Schools whose technd is an industry and not those whose technd is a profession i.e. not to Colleges and Schools which turn out engineers, doctors, drawing-masters, shorthand-writers and typists. This would exclude the Medical College, the Medical Schools at Vizag., Tanjore Royapuram, the Engineering College, the Commercial School, Calicut, the School of Arts on the Art side etc. — I have slurred over the point in the draft as notes and orders seem to be conflicting; but perhaps it had better be made clear. — The Agricultural College, I presume, will be classified as industrial, agriculture is an industry ~~rather than~~ and not a profession. — Submitted that there seems to be no reason why the Director should not be relieved of the Medical and Engineering Colleges and Schools as he is really only a wheel in the machine and the Surgeon-General and Chief Engineer are really responsible and might just as well write direct to Govt; but that would also

The assessment still under consideration. The exact scope of Mr Chatterton's duties remains to be more clearly defined. HOJ

This is, I take it, the intention — for the present. HSD

I think the draft may stand, until we see difficulties arising in the future. HD

no reason why communication should be through Mr. Chatterton and the Board. The control of commercial schools and the School of Arts on the Art side [it would perhaps be as well to make separate institutions of the Art and the Industrial sides] might, it is submitted, continue to rest with the Director.

HG 22.4.05

P.S. I have assumed that it is not the intention of Govt to ask for a grant at present.

HG 22/

With reference to the note above I think that the draft may stand as it is: the precise position that Mr. Chatterton is to occupy in relation to the Revenue and Educational Dept (in respect of technical schools), has not as yet been very clearly defined. This seems to be a separate question, connected with the appointment of a separate Director of Technical and Industrial Education.

The functions of the Agricultural College, the School of Arts, and the Engineering College, and the lines on which they should be conducted are still "in the air".

Office copy of draft typed to come early on Monday HG

Recd 7-30 pm 23/4/5
Typed and submitted
PJ3
24/4/5 - 10 am
Sent to Secy
House 11.30 a.m.

67 25 99-258

The draft is circulated for approval.

HOL
25.4.05

HM.

The Hon'ble Mr Stokes C.S.I.

H.E. the Governor.

As soon the draft will be ready
29.4.05

Sirs I attended at the Hon Mr Stokes' yesterday and to-day to receive instructions for the preparation of a new draft. This is submitted – marked No II. No I draft passed by the Hon'ble Sir James Thomson is also re-submitted. – Both drafts follow His Excellency's note closely, but they are very different in tone. HG 2.5.05

Encl A3

48 to 100 268

The revised draft is recirculated. It has been considerably amplified and is more specific in its recommendations, especially as to the appointment of a special Officer as Inspector of Technical Education.

The reference to para 10 to Technical Education in Ireland is somewhat vague and indefinite - but no definite information on the subject is locally obtainable, unless the D.P.I. knows about it.

HDJ

2-5-01

The Hon Mr Sloten C.S.I.

The Hon Sir James Thomson K.C.S.I.

As I did not like the draft No 1. I sent for Mr Gokhale and gave him instructions as to the preparation of the draft as far with it draft which is marked No II. I then turned to him the notes in pencil on the margin which characterised the first draft. I hope draft No II will meet with the approval of my Hon'ble colleagues.

3/5/05.

I will not refuse assent to
draft now of this Excellency proposes
it. But my opinion is that the
time and the country are not
ripe for a full blown Director of
Technical Instruction, and we ourselves
show that the proposal is premature
when we show so small a field
of labour for him. It is one thing
to keep the Charleston or Spartan duty
experimenting and protecting; it is a
heavy responsibility to create a Dept.
on such crude grounds as we are
able to offer: indeed it seems to me
probable
the fiasco of the College of Agricul-
ture all over again.

And while I can imagine a Director of
Technical Instruction fit to give orders
to the Engineering College authorities I
cannot easily picture one able to
take Command of the Medical College.
No doubt both are Technical Schools
but not the Schools we are now
agitating. At any rate any Director
of Tech. Schools in London had better

70 28 102

employ himself with dead matter
and by manipulation know of and
let the human body & the functions
of matter of healing & prevention of
disease alone.

L
L 5.7.03

His Excellency the Governor

Noted
4.5.03

Executive Council.

Draft approved subject to the alteration
& first four five paragraphs in accordance
with instructions given to Lee.

The alterations are noted on the
draft. Draft to be remitted
again to H.E. before issue.

HD
5.5.03

103 298
Edk

Council

5-8-07.

Draft to India re
Technical & Industrial Education

Instructions to Secretary Edk

—

Note provisionally

para 1 to 4 to be put into
plain simple English

para 5 to be rounded off
and expanded

Reference to Ireland — wording
as suggested by Sir James Ross

RR
5-7-07.

72 29 104 3807

A revised draft is submitted for approval
Paras 2. 3 and the first portion of para 3
have been thrown together - as para 2. The
remaining portion of para 4 becomes para 3,
while para 5 (new para 4) has been
slightly rounded off and expanded.
The remaining paras have been re-
-numbered and the whole draft
as revised has been retyped. Orders are
also solicited on the linked file. HJT
7.5.05

To. His Excellency the Governor.

The revised draft will do very
well and may issue at once.
Hon'ble Members did not wish to
see it again.
I have noted on the linked
file.

9-5-05

Row issue sharp
HJT
10.5.05

5

NoI 73

Educational Department. -105-

O R D E R:--

The Government of India will be addressed. 1452 25.4.01

L E T T E R:--

To

The Secretary to the Govt. of India,
Home Department.

Sir,

I am directed to reply to your letter No.593, dated 30th September 1903, on the subject of industrial education.

2. It is stated in your letter that the solution of the problem must rest mainly with local Governments. The Madras Government have delayed ~~making proposals~~ in the hope of evolving a constructive policy which they could confidently recommend to the Government of India. ~~I am directed to say that~~ The criticism evoked by the various proposals which have been advanced has been mainly negative ~~but~~ And the Government fear that further deliberation would yield no useful result. I am therefore ~~about~~ to proceed to lay before the Government of India ~~[redacted]~~ the conclusions ~~to~~ at which ~~my~~ this Government have arrived ~~some~~.

Page 1 of current file

The Secretary of State

74

-706-

Page 5 of Current file.

I cannot quote authority for this. But it is what I have always heard. Dr Bowen, I know, believes this to be the case.

46 ante
p 17 Note file.

3. ~~I am directed to say that~~ His Excellency the Governor in Council is inclined to doubt the practicability of assisting to any considerable extent any industry in this Presidency by adding new schools of the class described in paragraphs 10 and 11 of your letter to those which already exist. The existing schools, it is feared, are attended mainly with the object of securing at a less expense than it can be obtained elsewhere the general education imparted in them. Nor are they attended chiefly by those whose hereditary caste occupation is the particular industry taught. It is calculated that there are not 100 pupils in the whole Presidency receiving instruction in the methods and processes or underlying principles of their hereditary caste industry. The existence of a few schools in the industrial classes in this Presidency ~~[redacted]~~ does not, ~~this~~ in the opinion of Govt ~~Excellency in Council fears~~, indicate that there is any demand for industrial education. ~~more schools of a similar type~~. The multiplication of such schools, even tentatively and experimentally and in one particular industry to begin with, does not commend itself to the Madras Government as a measure likely to advance the solution of the real problem of industrial education. The handloom weaving industry has been suggested as an industry in regard to which a beginning might be made ~~in this Presidency~~, but

But the Government fear that money spent on teaching the principles underlying the processes of weaving to the youth of the caste which the industry in this Presidency is becoming more and more unremunerative and where there are no signs of capital forthcoming to assist in the introduction of improvements or to develop ideas, would in all likelihood be money wasted, unless perhaps the Government were prepared themselves to furnish capital and embark on experiments. In that case the solution is no longer the solution of an educational problem. The particular children might be got together in a large town or place; thoroughly competent artizans might also be got together; and the whole might be duly supervised. But the resulting establishment would in all probability be only a combination of school and workshop where goods would be produced at a cost above the market value, ordinary trade interfered with and the canons of trading broken, while the finished apprentice would probably not find employment or ~~wish to continue in it if found~~ would not find at a rate he had been led to expect. The Government see no signs of a demand for labour of an improved quality in the weaving industry or of any willingness to pay for it or of any probability of capital appearing to foster and support the improved industry and to wait for and create a market for the product, and to go on extending the market. Similar considerations apply to

such

such other industries as exist in this Presidency.

4. The Madras Government have therefore no advice to offer as to the appointment of an expert Inspector of Industrial schools, mainly on the ground that industrial enterprise ~~is~~, as far as they are at present aware, non-existent in Southern India. They are, however, engaged in obtaining fuller information as to existing industries than they at present possess and thereby, ~~in attempting to form more precise ideas~~ arrive at conclusions as to the possibility of developing them and of introducing new industries; and they would prefer, before starting any experiment in industrial education to advance cautiously on the lines on which a commencement has already been made, viz: by appointing special officers to investigate and devise means for developing or introducing particular industries. In fact they concur with the Commission in their conclusions that "in the absence of a complete survey of "industries it is impossible to make "detailed recommendations as to particular "industries and the methods of instruction "that may with advantage be applied to "each; the making of such a survey must "necessarily precede the development of "any scheme of industrial instruction". ~~and would add that~~ the survey should be followed by such attempts to develop or introduce industries as may, after full consideration, be found advisable, for they believe that a demand for industrial schools

schools is not likely to precede such development or introduction.

5. The ~~Madras Government~~ further consider that one of the objects which the Government of India wish to attain by means of industrial schools, the diffusion of ideals of scientific precision in workmanship, may to some extent be attained through the agency of the existing schools. They ~~Government consider~~ that in extending a sound general education among the people they are, in the circumstances of the country, doing nearly all that can be done for technical education, since the former is the very foundation of the latter. They ~~Government would, however, be~~ are prepared to revise their elementary and lower secondary curriculum so as to ensure greater attention being devoted to studies conducing to exact habits of thought and lying at the foundation of any sound understanding of any technical education. The present curriculum for primary schools in this Presidency embraces as optional subjects elementary science, drawing and mensuration. The Government would be prepared to consider the question of making drawing and mensuration compulsory subjects in both the primary and lower secondary stages of education and of making elementary geometry, taught not from Euclid but by modern methods, a compulsory subject in lower secondary schools. They would also be prepared to consider proposals for the complete differentiation

between the ordinary and technical curricula in high schools.

6. Another suggestion which the Government are inclined to accept, if means can be found to carry it into effect, is that persons should be trained, under any arrangements which the Government of India may think fit, or it may be possible for the Madras Government to make, in the principles and technique of a particular industry and appointed itinerant teachers. The ~~Government consider that the~~ establishment of schools for imparting technical knowledge to boys are not likely to have any genuine success or to touch the real problem of industrial education until the value of technical knowledge has been impressed on the minds of parents.

Page 6 of permanent file

7. With reference to paragraph 14 of your letter I am directed to say that the instructions of the Government of India will be carefully attended to. The Madras Government will strive after the continuance and improvement of such industrial schools as the Presidency already possesses and will favour their wider introduction wherever opportunies seem to open. In this connection they are definitely considering a proposal ~~have come to a decision to carry out immediately Resolution No.128 of the Simla Conference. They propose~~ to take from the Director of Public Instruction, an officer who has neither the leisure nor the expert knowledge requisite for the control of industrial education,

No 128 is not printed - so far as I can find out. I don't know what it is. If this should be stated in the next sentence we have not decided how we have not determined what may be in our letter

It was in the special file: but not with GO No 695 of 1901 (B); it is numbered as No 31 of the Resolutions on Technical Education

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and to appoint the officer (Mr.Chatterton) who has been placed on Special Duty in connection with the investigation and development of certain industries, to ~~control~~ supervise and develop industrial education in a position subordinate to the Board of Revenue and independent of the Director. The control of the existing industrial schools and of the industrial departments of the Madras School of Arts will accordingly most probably ~~singly~~ be entrusted to Mr. Chatterton, whose sphere of duties will also include for the present agricultural experiment in the direction of irrigation by means of pumping, experiments in chrome tanning with a view to the improvement of the leather industry of this Presidency and experiments with weaving apparatus. It is also proposed to start weaving schools at Madura and Salem; but the proposals are in too ~~crude~~ Crude a shape to be submitted with any estimate of cost.

The point is not yet definitely settled by

8. ~~In~~ In conclusion with regard to the special considerations attaching to great industrial centres advanced in your letter, I am directed to say that in the opinion of this Government the time is not ripe for the establishment of technical schools of the sort described by you even in the Presidency town. It has however been suggested that special departments should be added to the Madras College of Engineering, specialists engaged and laboratories and workshops built. The Government have as yet come to no conclusion in regard

Can't School of Arts

to

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712

have now under consideration

to this suggestion and ~~are awaiting~~ the report of a Committee which has been sitting to make proposals concerning the curriculum of the College (of Engineering) and the extension of workshops and laboratories. A proposal ~~tion~~ that technical schools should be opened in conjunction with the railway workshops at Perambur and Negapatam is also under consideration. Finally the re-organization of the Madras School of Arts and of the Agricultural College, Saidapet, are being considered, and the principles enunciated by the Government of India will be applied, as far as they are applicable, to these institutions.

9. Should the Govt of India approve of the creation of a separate department of Industrial Education as a permanent arrangement, details will be settled and a proposition statement submitted in due course. It is probable that, with the aid of the new department, the Government of Madras will be able to formulate schemes on which money can be laid out to advantage; but I am directed to say that no grant will be required for the development of industrial education in the present financial year.

KG 24.4.05

25.4.05

11 29/4/05

8/1

No II

Educational Department.

913-

ORDER:-- ~~No 313 dated 12-5-03~~

The Government of India will be addressed.

LETTER:-- ~~No 514 dated 12-5-03~~

To

The Secretary to the Govt. of India,
Home Department.

Sir,

I am directed to reply to your letter No.593, dated 30th September 1903, on the subject of industrial education.

2. I am directed to refer in the first place to the difficulty of the subject and the perplexing diversity of opinion even as to general principles exhibited by different authorities. Much time has elapsed since His Excellency in Council first addressed himself to the solution of the problem. But doubts and difficulties have been suggested, objections have been put forward, every proposal made has been subjected to adverse criticism. Hence it has been no easy task to decide on the line of action which commends itself to the Government, as, on

the

the whole, most likely to prove successful in this Presidency.

3. It is understood that the Government of India do not insist on the application of the scheme sketched out in paragraphs 10 to 12 of your letter under reply, but desire an expression of opinion from this Government regarding it, and, should that opinion be unfavourable, are prepared to accept any proposals which will not run counter to the general principles laid down by them. The solution of the problem, it is observed, is to rest mainly with local Governments and the Government of India, it is understood, will not require any great degree of uniformity in the solutions to be adopted in the different provinces and consider that the advantages of adaptation to local conditions outweigh the inconveniences of variety.

4. I am directed to say that, in the opinion of the Government of Madras, the system of technical education in the several provinces should be adapted to and vary with the state of industries in each province. A solution of the problem suitable to a province in which there exist important industries conducted in factories and with the help of machinery would probably be ill-adapted to a province in which there is no industrial organization. In this province organized industry practically does not exist. A list of such industries as exist in Madras is given in Mr. Chatterton's note printed in the report

"There are no important industries in this Presidency such as exist in Bombay, Cawnpore and Calcutta. There are a few "cotton mills, weaving sheds, cotton presses and ginning 'factories, several large railway workshops, two or three 'small iron works, one portland cement works, One or two 'oil presses and a number of important tanneries, all of 'which are carried on by joint stock companies with European "or Native capital. The other industries of this Presidency 'are practically unorganized and in the hands of artizans. 'They may be sub-divided as follows:--

"(a) Building trades, including brick-making, carpentry, 'stone-mason's work.

"(b) Metal-work trades, including Goldsmiths, Silversmiths, "Coppersmiths, Brass and Bell-metal workers, Tinsmiths and a "great variety of minor sub-divisions.

"(c) Textile trades, including cotton weaving and printing "by hand blocks, silk weaving and the manufacture of carpets.

"(d) Wood-working, such as cabinet-making, coach and carri- "age building, boat-building and ornamental woodwork of vari- "ous kinds.

"(e) Tanning and the preparation of hides and skins for export "trade.

"(f) A variety of miscellaneous industries, such as glass "manufacture, fire-works and pepper-mat-making."

report of the Committee and reproduced ~~printed~~ for convenient reference in the margin of this letter. There are no great industrial centres in this Presidency where capital is employed in the organization of industry on a large scale and the small industries or local handicrafts appear to be decaying rather than advancing. The Government regard this condition of things with great concern. But as only 11 per cent. of the population live in towns, they cannot look upon the establishment of industrial schools in a few centres as an adequate ~~solution~~.

In the general advancement of the means of education industrial among the agricultural classes.

Page 19 of the note file

5. Something is already being done in this Presidency for the industries which appear from the figures noted in the margin to be the most important in this Presidency.

Special endeavours are being made for agriculture and agricultural training and a scheme for the reorganization

Census figures of 1901.	
Landowners and Agricultural labourers	36,500,000
Weavers and dyers	1,245,000
Graziers	509,000
Leather workers	476,000
Fishermen	394,000
Carpenters	335,000
Workers in precious stones	315,000
Masons and builders	281,000
Potters.	225,000
Basket & Mat manufacturers	210,000
Oil pressers and sellers	165,000
Ironsmiths	157,000
Tailors and embroiderers etc.	78,000
Silk weavers and dyers	62,000
Brass and Copper workers	58,000

All the other various kinds of industries employ less than 50,000 workers.

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See letter No. 4. in the Pub. Dept. to the Govt. Dept. first Govt.

reorganization of the Agricultural College is under consideration.

The Veterinary Department is looking after the interests of Graziers in a special degree.

to be largely extended and is

An officer has been put on special duty to devise means for improving the weaving and the tanning industries.

Proposals are now before the Government of India for deputing another officer on special duty in regard to fisheries.

Carpentry is taught in most of the existing industrial schools.

5. His Excellency the Governor in Council is inclined to doubt the practicability of assisting to any considerable extent any industry in this Presidency by adding new schools of the class described in paragraphs 10 and 11 of your letter to those which already exist. The existing schools, it is feared, are attended mainly with the object of securing the general education imparted in them at a less expense than it can be obtained elsewhere. Nor are they attended chiefly by those whose hereditary caste occupation is the particular industry taught. It is calculated that there are not 100 pupils in the whole Presidency receiving instruction in the methods and processes or underlying principles of their hereditary caste industry. The multiplication of industrial schools even tentatively and experimentally and in one particular

industry.

industry to begin with, does not commend itself to the Government as a measure which can be carried out immediately and as a first step in the solution of the industrial problem. The state of most of the industries in this Presidency is such that endeavours must first be made to develop & foster the industries and the workers must be taught rather than their children. It would be useless or worse than useless to afford facilities for technical education presupposing openings for employment which do not at present exist, but must, if possible, be created. The handloom weaving industry is suggested by the Government of India as an industry in regard to which a beginning might be made. But His Excellency the Governor in Council fears that money spent on teaching the principles underlying the various processes of weaving to the youth of the weaving caste while the industry is becoming more and more unremunerative and before capitalists are ready to assist in the introduction of improvements or to develop ideas, would in all likelihood be money wasted. Similar considerations apply to such other industries as exist in this Presidency. His Excellency in Council has therefore no advice to offer at present as to establishment of technical schools to promote any particular industry or as to the appointment of a specialist to inspect them. Captains of industry, industrial enterprise, willingness and

etc.

Dr. W. Gillett means Chevalier?
Better say "Pioneers"

Expression taken from H.E.'s note of 1.9.16 "It is all right"

and power to introduce innovations, can scarcely be said to exist at the present time in South India.

6 ~~7~~. His Excellency in Council ~~has~~, however, ~~no intention of abandoning~~ the ~~industrial problem is hopeless~~. ~~The problem has already been attacked by the appointment of~~ special officers to investigate and devise means for developing or introducing particular industries. The Government propose to continue to advance cautiously on the lines on which a commencement has already been made. They concur with the Committee in their conclusion that "in the absence of a complete "survey of industries it is impossible "to make detailed recommendations as to "particular industries and methods of "instruction that may with advantage be "applied to each; the making of such a "survey must necessarily precede the deve-"lopment of any scheme of industrial "instruction." But, in their opinion, the survey should be followed by such attempts to develop or introduce industries as may, after full consideration, be found advisable; for they believe that the demand for industrial schools ~~is not likely to~~ precede such development or introduction. The Government do not propose to work industries experimentally. It is true that the experiment of introducing the aluminium industry met with a fair measure of success, that manufacturing operations on a considerable

scale

does not consider ~~that~~ impossible to devise means of furthering industrial development in this Presidency, such as the appointment of a cadre which has already been adopted in the appointment of special duty officers in the Madras

scale were conducted at a profit and that the business was eventually sold at a price that covered all expenses, direct and indirect. But it is not the function of a Government to initiate such enterprises except in very exceptional circumstances. The Government, however, consider that, in view of the decadence of ~~South Indian~~ the industries of Southern India in initiating experiments, they would be fully justified in considering proposals emanating either from their own officers or from private individuals for the improvement of existing industries or for the development of new industries. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which would be incurred by acceptance, would be considered, the prospects of success would be carefully weighed and adequate measures taken to prevent the misapplication of public funds. Of the proposals which have been considered, those which suggest simple improvements in common processes seem to the Government most suitable for adoption. For instance, M.R.Ry. L.K. Tulasiraman of Madura, a weaver and dyer in a large way of business, has made suggestions in regard to the establishment of a textile school and experimental dye-house, which he would start and manage himself if he were promised a grant-in-aid; and the officer on special duty in connection with the development of industries is examining the possibility of using chrome tanned leather to be manu-

manufactured in this country for the leather buckets in which water is raised for purposes of irrigation; as also the possibility of improving the present method of preparing the warp with a view to inducing weavers to adopt the fly-shuttle. The Government would particularly welcome proposals for introducing or making known agricultural improvements.

7. They accordingly propose to take up the more important industries of the Presidency and to arrange for a detailed study of them with a view to discovering whether it is possible to effect improvements and if so to point out the lines upon which improvements can be made and to assist private enterprise with expert advice as far as possible. Native enterprise is undoubtedly very much hampered through difficulty in obtaining disinterested technical advice; and it is possible that if it was made known that Government were prepared to place expert advice at the disposal of pioneers of industry a considerable number of really useful developments might result. I am directed to observe that this solution of the industrial problem appears to be regarded by the Government of India as admissible. I am to refer to para.5 of the Home Department letter communicating the views of the Government of India on the recommendations of the Simla Conference.

8. At the same time His Excellency in Council agrees with the Government of India in considering that the separa-

Such experiments may be in many instances; Expensive and abortive but it must be remembered that one successful success will more than cover in value many hundreds of failures

Can not afford to experiment for itself or to risk failure and

G.O. No 695 Ed. d 28.11.01
Flag B

separation of general from industrial education should be no longer deferred. It is therefore proposed to place ~~the control of technical education, in combination with other matters~~, under an officer entirely separate from and not subordinate to the Director of Public Instruction. ~~The duties of that officer would include~~ the development of industries both by assistance, advice and demonstration, the control of existing industrial and technical education, and the extension of such education when the time is ripe. The establishment of separate executive departments to deal with "the whole range of operations "which are concerned with technical educa- "tion as applied to industries and with "the encouragement of country trades and "manufactures" is advocated in Sir Edward Buck's report of 1901. The proposal was recommended for consideration in the 31st resolution of the Simla Conference on Technical Education. I am directed to say that the Government are of opinion that the establishment of the new Department is essential and that without it no ~~improvement~~ progress is likely to be made in the ~~improvement~~ furtherance of industries and industrial education. The Director of Public Instruction is overburdened with other work and even if he had time to deal adequately with the matter, the problem, in the aspect it assumes in this Presidency, is ~~no~~ not primarily an educational problem and so is not within his competence. Even though

it were considered that the control of technical education could properly be left to the Director of Public Instruction, he would be obviously incompetent to advise the Government in regard to proposals for the introduction of agricultural or industrial innovations.

9. The Government consider that it would be sufficient in the beginning to appoint a Director of Technical Education with a small office staff. This Officer would occupy in relation to the Engineering College, ~~the Medical College and colleges~~, the Agricultural College, the School of Arts, Commercial Schools, the Chingleput Reformatory School and all mufassal technical industrial schools, the position now occupied by the Director of Public Instruction. He would also take over the duties of the Inspector of Technical schools and the control and management of the Government Technical Examinations. But his main duties ~~for~~ would for the present be those of initiating new developments of industrial methods and training, of procuring and imparting information and of providing for a supply of capable instructors. He would be directly subordinate to the Government, but would work in connection with the Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, ~~with the Surgeon General as to medical education,~~ and so on. ~~The department would~~

He might be obviously incompetent to advise as I might be to order: which need not mean much for either of us. Say - would not ordinarily be the best adviser of.

See my note
Omit the Medical College

Note

Department of Technical Education ? I think this is the official designation, but am not quite sure and there seem to be no papers here about it. - It deals of course with much else besides technical education e.g. application of principles of cooperation to dairy farming

Somewhat vague - but there is no definite information available.

2-5-07.

They will know all about it at Simla.

3/5/07

They may know about this Simla but I know nothing of it & it is useless to say the Post Journal prefers to say "An example is likely to be found in the department lately established in Ireland". At any rate I cannot say how the department would for could be worked, though Ireland seems likely enough object lesson to this department country

11.

(as noted by Sir James Thomson below A)

be worked on the lines of the similar Dairy department established not many years ago in Ireland. The Government consider Rs.1,250-50-1,500 would be a suitable salary for the Director. I am directed to request that the Sanction of the Secretary of State may be obtained to the creation of the appointment. A proposition statement is enclosed.

10

12. It is also considered that one of the objects which the Government of India wish to attain by means of industrial schools - diffusion of ideals of scientific precision in workmanship - should be sought by means of general, not of technical education. It is, in the opinion of His Excellency in Council, no part, and cannot usefully be made a part, of technical education to teach fundamental scientific notions or the elements of science. Some knowledge of elementary scientific laws is, however, a part of general education in its elementary stage. The Government consider the present primary and lower secondary school curricula far too literary and they will, partly with a view to providing a basis for the technical education of the future, revise them and introduce or quicken instruction in science. The present curriculum for primary schools in this Presidency embraces as optional subjects elementary science, drawing and mensuration. The Government would be prepared to consider the

question

question of making drawing and mensuration compulsory subjects in both the primary and lower secondary stages of education and of making elementary geometry and geometrical drawing compulsory subjects in lower secondary schools. They would ~~xxx~~ also be prepared to consider proposals for the complete differentiation of the ordinary and technical curricula in high schools.

12. A suggestion which the Government are inclined to accept, if means can be found to carry it into effect, is that persons should be trained ~~under any arrangements which the Government of India may think fit, or it may be possible for the Madras Government to make~~ in the principles and technique of a particular industry and appointed itinerant teachers. It is understood that itinerant instructors have been found most useful in Ireland and that information penetrates through them to classes which it is otherwise impossible to reach. In view of the general illiteracy of the industrial classes of this Presidency it is considered that itinerant teachers are likely to be required in order that information collected or results obtained by the Technical Department may be communicated to those interested. At the same time the establishment of schools for imparting technical knowledge to boys is not likely to have any genuine success or to touch the real problem of industrial education until the value of

(I insert the para. added by the Hon'ble Mr. Stokes at the end of the draft X)

of technical knowledge has been impressed on the minds of parents.

13. With reference to paragraph 14 of your letter I am directed to say that the instructions of the Government of India will be carefully attended to. The Madras Government will strive after the continuance and improvement of such industrial schools as the Presidency already possesses and will favour their wider introduction wherever opportunities seem to open.

14. In conclusion, with regard to the special considerations attaching to great industrial centres advanced in your letter I am directed to say that the Government doubt whether the time is yet ripe for the establishment of technical schools of the sort described by you even in the Presidency town. It has however been suggested that special departments should be added to the Madras College of Engineering and School of Arts, specialists engaged and laboratories and workshops built. The Government have as yet come to no conclusion in regard to this suggestion and have now under consideration the report of a Committee which has been sitting to make proposals concerning the curriculum of the College of Engineering and the improvement of its workshops and laboratories. A proposal that technical schools should be opened in conjunction with the railway workshops at Perambur and Negapatam is also under

consideration. Finally the reorganization of the Madras School of Arts and of the Agricultural College, Saidapet, ~~are~~ being considered, and the principles enunciated by the Government of India will be applied, ~~are~~ as far as they are applicable, to these institutions.

13
~~15~~. It is not possible to make any accurate estimate of the cost involved in the above proposals; but it would probably not be inconsiderable. To recapitulate those proposals.

(1) The Government propose to provide a foundation ~~for~~ for the technical education of the future by revising the curriculum of elementary schools for general education. Before this can be done, it will be necessary to ~~train~~ train more schoolmasters in normal schools and more thoroughly than they have been trained in the past and to improve the prospects of the class. It will probably be possible to defray some part of the expenditure out of the special grant of six lakhs for the improvement of primary education recently made by the Government of India to this Government.

(2) The Government propose to sever technical education completely from general education and to create a separate department which will deal practically with the promotion of industries by experiment and advice, as well as with the imparting of theoretical instruction in technical schools and colleges. The cost of the department is estimated at Rs. 1731 15/12

per mensem for salaries. Travelling allowance and contingent expenditure may be expected to raise the cost to some Rs.2,000 per mensem, while some initial expenditure will probably be incurred in providing office buildings. ~~As to what may be~~ The cost of schemes which the Department would be expected to formulate or of the experiments which the Department would conduct, the Government ~~can hazard no conjecture.~~ Can not of course hazard estimate with any particularity They would however propose to make a budget provision of a lakh of rupees in the estimates for 1906-07 and they would suggest that a grant of that amount be sanctioned by the Government of India.

(3) The Government propose the appointment of itinerant instructors; but have not worked out the proposal in detail. The proposal can hardly be settled in the near future & any very large scheme

The above are the proposals which His Excellency in Council has approved. It will however be observed that other proposals involving expenditure have been referred to in the precedent paragraph and are still under consideration.

H 2.5.05

HSR 2.5.05

H 3/5/5

Mr. Stokes' para below to be added inserted on p. 12 X

14 HR

Though when the experiments in connection with Cheese tanning matters are matured it will be necessary to employ this agency to bring the matter to the notice & knowledge of the Ryots as well as to teach them how to apply the process to fur as is necessary for their own purposes. It will also be necessary to employ ~~Government~~ Itinerant Teachers in connection with Weaving matters.

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Educational Department.

18

ORDER:-- no. 313 d/12-5-05-

The Government of India will be addressed.

403
8.5.05.

LETTER:-- no. 314 d/12-5-05-

To

The Secretary to the Govt. of India,
Home Department.

Sir,

I am directed to reply to your letter No.595, dated 30th September 1903, on the subject of industrial education.

2. The subject has been under the consideration of His Excellency in Council for a considerable period; the steps which should be taken for the solution of the problem have provoked much discussion and given rise to differences of opinion both as to the means to be adopted and the method of their application and their adaptation to local conditions and to the various stages of industrial progress, in the Madras Presidency which necessarily vary considerably from those of other provinces. It has therefore been no easy task to decide on a line of action which commends itself to the Government, as, on the whole, most

Page 1 of the current file

-129- 2P

most likely to prove successful in this Presidency without running counter to the general principles laid down by the Government of India.

3. In this province organized industry practically does not exist. A list of the industries in Madras is given in Mr. Chatterton's note printed in the report of the Committee and reproduced for convenient reference in the margin of this letter. There are no great industrial centres in this Presidency where capital is employed in the organization of industry on a large scale and the small industries or local handicrafts appear to be decaying rather than advancing. The Government regard this condition of things with great concern. But as only 11 per cent. of the population live in towns, they cannot look upon the establishment of industrial schools in a few centres as an adequate means for the general advancement of industrial education among the masses.

Page 162 19th report. Vol: II.

"There are no important industries in this Presidency such "as exist in Bombay, Cawnpore and Calcutta. There are a few "cotton mills, weaving sheds, cotton presses and ginning "factories, several large railway workshops, two or three "small iron works, one portland cement works, one or two oil "presses and a number of important tanneries, all of which "are carried on by joint stock companies with European or "Native Capital. The other industries of this Presidency "are practically unorganized and in the hands of artizans. "They may be sub-divided as follows:--

"(a) Building trades, including brick-making, carpentry, "stone-mason's work.

"(b) Metal-work trades, including Goldsmiths, Silversmiths "Coppersmiths, Brass and Bell-metal workers, Tinsmiths and a "great variety of minor sub-divisions.

"(c) Textile trades, including cotton weaving and printing "by hand blocks, silk weaving and the manufacture of carpets.

"(d)Wood-working, such as cabinet-making, coach and carriage "building, boat-building and ornamental woodwork of various "kinds.

"(e) Tanning and the preparation of hides and skins for "export trade.

"(f) A variety of miscellaneous industries, such as glass "manufacture, fireworks and pepper-mat making."

4. While admitting the difficulty of the subject, this Government have not been blind in the past to the necessity

-1303 P

for aiding the industries which from the figures noted in the margin appear to be the most important in this Presidency.

Census figures of 1901.	
Landowners and agricultural labourers	26,500,000
Weavers and dyers	1,245,000
Graziers	509,000
Leather workers	476,000
Fishermen	394,000
Carpenters	385,000
Workers in precious stones	315,000
Masons and builders	281,000
Potters	225,000
Basket and mat manufacturers	210,000
Oil pressers and sellers	163,000
Ironsmiths	157,000
Tailors and embroiderers etc.	78,000
Silk weavers and dyers	62,000
Brass and Copper workers	58,000
All the other various kinds of industries employ less than 50,000 workers.	

Special endeavours are being made for agriculture and agricultural training and a scheme is under consideration for the reorganization of the Agricultural College, which has in the past proved a failure so far as its capability to provide trained agriculturists engaged in agricultural pursuits & experimental farms have been established under more than one District Board, and the Government have noticed with pleasure a tendency to the formation of District Agricultural Societies and to the holding of Agricultural Exhibitions which they do all in their power to foster and encourage.

The Veterinary Department is to be largely extended and is looking after the interests of graziers in a special degree and the more well-to-do and enlightened of the District Boards are also responding to the call to establish Veterinary Institutes of their own.

An Officer has been placed on special duty to devise means for the improvement of the weaving and tanning industries, and as a preliminary to this duty, he was specially deputed while on leave last

E.g. Madura & Kistna - 50 L / 17-1-05 + 1116 L / 7-9-04 Q & R.

* Please see the Hon'ble Mr. Castlestuart Stuart's speech on page 355 of the Council Proc. of 6th April - O.

+ H.E.'s speech on page 317 - do -

E.g. S.O. No 2171 L / 17-12-01, 443 L / 6-4-04 & 1569 L / 9-12-04 S. T. V

S.O. No 159 Rev: dt 18-2-05 in linked file - Z.

Gp. 20765.66 d 27-1-04. F.

Please see his reply Gp. 20343 Rev. dt 5th May 1905. M.

Letter no 288 Rev / 27-3-05 VIII

year to inquire into the possibility of introducing improved teaching and processes and was allowed to visit the chief works relating to these industries in England and America.

Proposals are now before the Government of India for deputing another Officer on special duty in regard to Fisheries and for formulating plans for their development as a means of increasing both the food supply and the manurial resources of the country.

5. His Excellency the Governor in Council is inclined to doubt the practicability of assisting to any considerable extent any industry in this Presidency by adding new schools of the class described in paragraphs 10 and 11 of your letter to those which already exist. The existing schools, it is feared, are attended mainly with the object of securing the general education imparted in them at a less expense than it can be obtained elsewhere. Nor are they attended chiefly by those whose hereditary caste occupation is the particular industry taught. It is calculated that there are not 100 pupils in the whole Presidency receiving instruction in the methods and processes or underlying principles of their hereditary caste industry. The multiplication of industrial schools even tentatively and experimentally and in one particular industry to begin with, does not commend itself

Carpentry is taught in most of the existing Industrial Schools.

Page 5 ref.

A.E. note p 17. note file.

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to the Government as a measure which can be carried out immediately or as a first step in the solution of the industrial problem. The state of most of the industries in this Presidency is such that endeavours must first be made to develop and foster the industries and the workers must ~~first~~ be taught rather than their children. It would be useless or worse than useless to afford facilities for technical education pre-supposing openings for employment which do not at present exist, but must, if possible, be created. The handloom weaving industry is suggested by the Government of India as an industry in regard to which a beginning might be made. But His Excellency the Governor in Council fears that money spent on teaching the principles underlying the various processes of weaving to the youth of the weaving caste while the industry is becoming more and more unremunerative and before capitalists are ready to assist in the introduction of improvements or to develop ideas, would in all likelihood be money wasted. Similar considerations apply to such other industries as exist in this Presidency. His Excellency in Council has therefore no advice to offer at present as to establishment of technical schools to promote any particular industry or as to the appointment of a specialist to inspect them. Captains of industry, industrial enterprise, willingness and power to introduce innovations, can scarcely be said to exist at the present time in South India.

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Formulate Plans

6. His Excellency in Council, however, does not consider impossible to devise means of furthering industrial development in this Presidency, such as the appointment of Special Officers to investigate and ~~devise means~~ for developing or introducing particular industries, a course which has already been adopted in the appointment to special duty of Mr. Chatterton. The Government propose to continue to advance cautiously on the lines on which a commencement has already been made. They concur with the Committee in their conclusion that "in the absence "of a complete survey of industries it is "impossible to make detailed recommenda- "tions as to particular industries and "methods of instruction that may with "advantage be applied to each; the making "of such a survey must necessarily precede "the development of any scheme of indus- "trial instruction". But, in their opinion the survey should be followed by such attempts to develop or introduce industries as may, after full consideration, be found advisable; for they believe that the demand for industrial schools cannot precede but must rather follow such development or introduction. The Government do not propose to work industries experimentally on a commercial scale. It is true that the experiment of introducing the aluminium industry met with a fair measure of success, that manufacturing operations on a considerable scale

were conducted at a profit and that the business was eventually sold at a price that covered all expenses, direct and indirect. But it is not the function of a Government to initiate such enterprises except in very exceptional circumstances. The Government, however, consider that, in view of the decadence of the industries of Southern India, they would be fully justified in initiating experiments and in considering proposals emanating either from their own officers or from private individuals for the improvement of existing industries or for the development of new industries. The character of the proposals, the energy and ability of the individual who puts them forward, the nature and extent of the liability which would be incurred by acceptance, would be considered, the prospects of success would be carefully weighed and adequate measures taken to prevent the misapplication of public funds. Of the proposals which have been considered, those which suggest simple improvements in common processes seem to the Government most suitable for adoption. For instance, M.R.Ry. L.K. Tulasiraman of Madura, a weaver and dyer in a large way of business, has made suggestions in regard to the establishment of a textile school and experimental dye-house, which he would start and manage himself if he were promised a grant-in-aid; and the Officer on special duty in connection with the

development of industries is examining the possibility of using chrome tanned leather to be manufactured in this country for the leather buckets in which water is raised for purposes of irrigation; as also the possibility of improving the present method of preparing the warp with a view to inducing weavers to adopt the fly-shuttle. The Government would particularly welcome proposals for introducing or making known agricultural improvements. Such experiments may be expensive and abortive in many instances; but it must be remembered that one even partial success will more than cover in value many hundreds of failures.

7. They accordingly propose to take up the more important industries of the Presidency and to arrange for a detailed study of them with a view to discovering whether it is possible to effect improvements and if so to point out the lines upon which improvements can be made and to assist private enterprise with expert advice as far as possible. Native enterprise cannot afford to experiment for itself or to risk failure and is undoubtedly very much hampered through difficulty in obtaining disinterested technical advice; and it is possible that if it was made known that Government were prepared to place expert advice at the disposal of pioneers of industry a considerable number of really useful developments might result. I am directed to observe that this solution of the ~~Indian~~

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industrial problem appears to be regarded by the Government of India as admissible. I am to refer to para. 3 of the Home Department letter communicating the views of the Government of India on the recommendations of the Simla Conference.

3. At the same time His Excellency in Council agrees with the Government of India in considering that the separation of general from industrial education lies at the root of the problem and should be no longer deferred. It is therefore proposed to place under an officer entirely separate from and not subordinate to the Director of Public Instruction the development of industries both by assistance, advice and demonstration, the control of existing industrial and technical education, and the extension of such education when the time is ripe. The establishment of separate executive departments to deal with "the whole range of operations which "are concerned with technical education "as applied to industries and with the "encouragement of country trades and "manufactures" is advocated in Sir Edward Buck's report of 1901. The proposal was recommended for consideration in the 31st resolution of the Simla Conference on Technical Education. I am directed to say that the Government are of opinion that the establishment of the new Department is essential and that without it no satisfactory progress is likely to be made in the improvement of industries

Preface page iii - para 19.

Annexure to Home Dept. letter no. 501 dt 20-11-01 - See enfol. Cover in the Cover

and the furtherance of industrial education. The Director of Public Instruction is overburdened with other work and even if he had time to deal adequately with the matter, the problem, in the aspect it assumes in this Presidency, is not primarily an educational problem and so is not within his competence. Even though it were considered that the control of technical education could properly be left to the Director of Public Instruction he would not ordinarily be the best adviser of Government in regard to proposals for the introduction of agricultural or industrial innovations.

9. The Government consider that it would be sufficient in the beginning to appoint a Director of Technical Education with a small office staff. This officer would occupy, in relation to the Engineering College, the Agricultural College, the School of Arts, Commercial Schools, the Chingleput Reformatory School and all mufassal technical and industrial schools, the position now occupied by the Director of Public Instruction. He would also take over the duties of the Inspector of Technical Schools and the control and management of the Government Technical Examinations. But his main duties would for the present be those of initiating ne developments of industrial methods and training, of procuring and imparting information and of providing for a suppl of capable instructors. He would be directly subordinate to the Governmen but would work in connection with t

Board of Revenue so far as agriculture is concerned, with the Director of Public Instruction so far as general education is concerned, and so on. An example is likely to be found in the department lately established in Ireland. The Government consider Rs.1,250-50-1,500 would be a suitable salary for the Director. I am directed to request that the sanction of the Secretary of State may be obtained to the creation of the appointment. A proposition statement is enclosed.

10. It is also considered that one of the objects which the Government of India wish to attain by means of industrial schools - diffusion of ideals of scientific precision in workmanship - should be sought by means of general, not of technical education. It is, in the opinion of His Excellency in Council, no part, and cannot usefully be made a part, of technical education to teach fundamental scientific notions or the elements of science. Some knowledge of elementary scientific laws is, however, a part of general education in its elementary stage. The Government consider the present primary and lower secondary school curricula far too literary and they will, partly with a view to providing a basis for the technical education of the future, revise them and introduce or quicken instruction in science. The present curriculum for primary schools in this Presidency embraces as optional subjects elementary science, drawing and mensuration. The

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Government would be prepared to consider the question of making drawing and mensuration compulsory subjects in both the primary and lower secondary stages of education and of making elementary geometry and geometrical drawing compulsory subjects in lower secondary schools. They would also be prepared to consider proposals for the complete differentiation of the ordinary and technical curricula in high schools.

11. A suggestion which the Government are inclined to accept, if means can be found to carry it into effect, is that persons should be trained in the principles and technique of a particular industry and appointed itinerant teachers. It is understood that itinerant instructors have been found most useful in Ireland and that information penetrates through them to classes which it is otherwise impossible to reach. In view of the general illiteracy of the industrial classes of this Presidency it is considered that itinerant teachers are likely to be required in order that information collected or results obtained by the technical department may be communicated to those interested. The proposal can hardly be applied in the near future to any very large extent though when the experiments in connection with chrome tanned leather are matured it will be necessary to employ this agency to bring

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the leather to the notice and knowledge of the ryots as well as to teach them how to apply the process so far as is necessary for their own purposes. It will also be necessary to employ itinerant teachers in connection with weaving problems. ~~At the same time~~ The establishment of schools for imparting technical knowledge to boys is not likely to have any genuine success or to touch the real problem of industrial education until the value of technical knowledge has been impressed on the minds of parents.

12. In conclusion, with regard to the special considerations attaching to great industrial centres advanced in your letter, I am directed to say that the Government doubt whether the time is yet ripe for the establishment of technical schools of the sort described by you even in the Presidency town. It has however been suggested that special departments sufficient to ~~limit~~ meet the demand for the finished product should be added to the Madras College of Engineering and School of Arts, specialists engaged and laboratories and workshops built. The Government have as yet come to no conclusion in regard to this suggestion and have now under consideration the report of a Committee which has been sitting to make proposals concerning the curriculum of the College of Engineering and the improvement of its workshops and laboratories. A proposal that technical schools should be opened in conjunc-

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tion with the railway workshops at Perambur and Negapatam is also under consideration. Finally the reorganization of the Madras School of Arts and of the Agricultural College, Saidapet, is being considered, and the principles enunciated by the Government of India will be applied, as far as they are applicable, to these institutions.

13. It is not possible to make any accurate estimate of the cost involved in the above proposals; but it would probably not be inconsiderable.

To recapitulate those proposals

(1) The Government propose to provide a foundation for the technical education of the future by revising the curriculum of elementary schools for general education. Before this can be done, it will be necessary to train more schoolmasters in normal schools and more thoroughly than they have been trained in the past and to improve the prospects of the class. It will probably be possible to defray some part of the expenditure out of the special grant of six lakhs for the improvement of primary education recently made by the Government of India to this Government.

(2) The Government propose to sever technical education completely from general education and to create a separate department which will deal practically with the promotion of industries by experiments and advice, as well as with the imparting of theoretical

H&P. 15-P

instruction in technical schools and colleges. The cost of the department at present is estimated at Rs.1,781 11/12 per mensem for salaries. Travelling allowance and contingent expenditure may be expected to raise the cost to some Rs.2,000 per mensem, while some initial expenditure will probably be incurred in providing office buildings. The cost of schemes which the Department would be expected to formulate or of the experiments which the Department would conduct the Government cannot of course now estimate with any particularity. They would however propose to make a budget provision of a lakh of rupees in the estimates for 1906-07 and they would suggest that a grant of that amount be sanctioned by the Government of India.

(3) The Government propose the appointment of itinerant instructors; but have not worked out the proposal in detail.

14. The above are the proposals which His Excellency in Council has approved. It will however be observed that other proposals involving expenditure have been referred to in the precedent paragraph and are still under consideration.

H&P
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9-5-05

Statement of Proposition ... vision of Establishment.

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Nature of Charge.	Present scale.				Proposed scale.				Proposition								Orders of the Government of India.			
									Permanent.			Temporary.								
	Pay.			Average cost.		Pay.			Average cost.	Increase per month.	Decrease per month.	Increase per month.		Decrease per month.		Grounds of proposition.	Local Government's recommendation.	Home Department.	Financial Department.	
on.	Minimum.	Increment.	Maximum.		Number.	Designation.	Minimum.	Increment.		Amount.	Amount.	Period.	Amount.	Period.	Amount.			Remarks.	Remarks.	Orders.
5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	23	24	25	26
	RS. A	RS. A.	RS. A.	RS. A.			RS. A.	RS. A.	RS. A.	RS. A.	RS. A.		RS. A.		RS. A.					
					1	Director of Technical Education	1250	50	1500	166 2/3	1416 2/3					Requires sanction of Secretary of State				
					1	Manager	125	5	150	3 1/4	143 3/4					Local Govt can sanction.				
					1	Clerk	75	5	100	3 1/4	93 3/4									
					1	Clerk	50	4	70	5	65									
					1	Typewriting Clerk	20	1	35	3 1/4	28 3/4									
					1	attender	12			2	12									
					1	Peon	8			8	8									
					2	Peons	14			14	14									
											365 1/4									

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To

The Secretary to Government,
through the Accountant-General,
dated the 23rd Sept

ment,
se to G.O., No. 1695,
Financial Department.

If Local Government is competent to sanction, its order will be written across these four columns.

Signature

(Officer's Designation.)

No.

THE entries in the Columr of "Present Scale" have
Registers of this Office, and are correct with the exception
red ink.

ACCOUNTANT-GENERAL'S OFFICE,
Fort St. George,
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GOVERNMENT OF MADRAS.

No.

FORT ST. GEORGE,
190 .

Secretary to the Governm
of Fort S