

Contents.

1. East India (Forest Service). Correspondence relating to the Training of Forestry Students. 1905. T9(JA).2.N D5 pp. 1-39.
2. East India (State Technical Scholarships). Report: ^{to} inquire into the system of state technical sholarships established by the Government of India in 1904, with Appendices. (Chairman: Sir Theodore Morison) 1913. T9(A):812.2.N1 E3 pp. 40-128.
3. Minute on Indian Education, with Special reference to the Reorganisation of the Indian Education Department. 1913. pp.129-144.
T.2,WM:1.N1 E3
4. Report of the Conference of Directors of Public Instruction, Delhi. 1917. pp.145-161.
T:831p2,N17 E7
5. Report of the Conference held at Simla on the 20th and 21st August 1917, to consider the question of English and Vernacular teaching in secondary schools. pp.162-174.
T2:3,(P5)p2,N17 E7
-----000-----

51431

15631

EAST INDIA (FOREST SERVICE).

S1431

CORRESPONDENCE

RELATING TO THE

TRAINING

OF

FORESTRY STUDENTS.



the
estry
open

Presented to both Houses of Parliament by Command of His Majesty.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C.,
and 32, ABINGDON STREET, WESTMINSTER, S.W.;
or OLIVER & BOYD, EDINBURGH;
or E. PONSONBY, 116, GRAFTON STREET, DUBLIN.

1905.

[Cd. 2523.] Price 8d.

T9(JA).2.N

D5

15 6 31

TABLE OF CONTENTS.

No. of Paper.	Document.	Date.	From	To	Subject.	Page.
		1902.				
1	Extracts from Report of Committee on British Forestry. (Cd. 1319.)	Nov. 29	—	—	Recommendation to transfer the Forestry Department of Coopers Hill College to a University.	1
		1903.				
2	Extract from Report of Committee on Cooper's Hill College. (Cd. 2055.)	August 17	—	—	Recommendation regarding training of Forestry probationers.	2
		1904.				
3	Letter	May 20	India Office	President, R.I.E. College.	Request for Dr. Schlich's views as to arrangements he would advise after closing of College.	3
4	Ditto (with an enclosure).	May 31	President, R.I.E. College.	India Office	Memorandum by Dr. Schlich, with observations thereon	3
5	Ditto (with an enclosure).	July 8	University of Cambridge.	Ditto	Proposed arrangements for the teaching of Forestry at the University of Cambridge.	10
6	Letter	July 11	India Office	University of Cambridge.	Acknowledgment of receipt of No. 5.	13
7	Ditto	August 19	Ditto	University of Oxford.	Suggesting arrangements for the training at Oxford of Forestry probationers selected by open competition.	14
8	Ditto (with an enclosure).	Oct. 25	University of Oxford.	India Office	Ditto. Reply to No. 7	16
9	Letter	Nov. 22	University of Cambridge.	Ditto	Request for reply to No. 5... ..	19
10	Ditto	Nov. 28	India Office	University of Cambridge.	Request for observations regarding scheme referred to in Nos. 7 and 8.	19
11	Ditto	Dec. 5	University of Cambridge.	India Office	Suggests amendments of scheme, and urges the claims of Cambridge University for consideration	20
12	Ditto (with an enclosure).	Dec. 9	India Office	University of Oxford.	Preliminary draft of Regulations as to selection and training of probationers under new scheme of training.	22
13	Ditto	Dec. 16	University of Edinburgh.	India Office	Request for information regarding future training of Forestry students.	25
14	Letter	Dec. 20	India Office	University of Cambridge.	Reasons for decision to locate Forestry School at Oxford.	25
		1905.				
15	Ditto	Jan. 25	University of Cambridge.	India Office	Suggesting a Conference between India Office and the two Universities to frame an acceptable scheme.	26
16	Ditto	Jan. 27	India Office	University of Oxford.	} Asking that representatives may attend Conference at India Office.	27
17	Ditto	Jan. 27	Ditto	University of Cambridge.		28
18	Ditto	Jan. 30	Ditto	Sir D. Brandis		Request to join in Conference ... ..	28

TABLE OF CONTENTS—*continued.*

No. of Paper.	Document.	Date.	From.	To	Subject	Page
		1905.				
19	Narrative	Feb 2	—	—	Proceedings of Conference held at the India Office.	29
20	Report (with an appendix).	Feb 8	India Office representatives at the Conference.	Secretary of State	Reporting on the Proceedings of the Conference.	57
21	Letter	March 11	University of Cambridge.	India Office	Suggestion as to selection of candidates and period of probation.	60
22	Ditto	March 17	India Office	Civil Service Commission.	Request to arrange for an examination under Regulations enclosed.	61
23	Ditto	March 17	Ditto	University of Cambridge.	Training of candidates selected by open competition to be carried on at Oxford for an experimental period of three years.	61
24	Ditto	March 17	Ditto	University of Oxford		62
25	Ditto	March 23	Ditto	University of Edinburgh		63
26	Ditto	March 20	University of Cambridge.	India Office	Takes exception to the temporary scheme proposed.	64
27	Ditto	March 29	India Office	University of Cambridge.	Publication of correspondence ...	64
28	Ditto	April 25	Civil Service Commission.	India Office	Forwarding draft Syllabus, etc. ...	65
29	Ditto (with an enclosure).	May 11	India Office	Civil Service Commission.	Forwarding final Regulations ...	65

EAST INDIA (FOREST SERVICE).

CORRESPONDENCE

RELATING TO THE

TRAINING OF FORESTRY STUDENTS.

No. 1.

*Extracts from the Report, dated the 29th November, 1902, of the Departmental Committee appointed by the Board of Agriculture to enquire and report upon British Forestry.**

Paragraph 16:—

The desirability of a great State Forest School on the model of Nancy or of Eberswalde has not escaped our attention, but we do not feel justified, under present conditions, in recommending so great an outlay as would be necessitated by the creation of such an institution. We think, however, that many of the advantages of an institution of this type could be secured at a comparatively small outlay by the transference of the Forestry Department at Coopers Hill to a University centre. This would at once place the highest form of forestry education available in this country within the reach of a large proportion of the prospective land-owners and land-agents, while the advantages to the candidates for the Indian Forest Service of three years' residence in a University are obvious. The Colonies make increasing demands on this country for qualified forest experts, and we anticipate that an increasing number of lecturers and advisory experts will be required for work in the United Kingdom. Our Universities contain many students thoroughly well-grounded in natural science and economics, who, at the end of their period of study of pure subjects, would readily be attracted to the study of forestry, and would rapidly qualify as forest experts.

Paragraph 36:—

We recommend—

(a) That two areas for practical demonstration be acquired, the one in England and the other in Scotland, of not less than 2,000 acres, if possible, nor over 10,000 acres in each case. We suggest that the Alice Holt Woods in Hampshire be made available as soon as possible to serve as a Demonstration Area in England; and that a suitable estate be purchased in Scotland, as convenient as possible to Edinburgh, for the same purpose. These recommendations would have

* Parliamentary Paper, Cd. 1319 of 1902.

to be carried out by arrangement between the Commissioners of Woods and Forests and the Board of Agriculture; and assistance should be looked for from local authorities, societies, and individuals interested in forestry and technical education.

(b) That additional facilities for instruction be afforded, by the appointment of a lecturer on forestry in connection with each of the Universities of Cambridge and Oxford, and that example plots, as defined in paragraph 15, be provided in connection with each of these centres and with Edinburgh.

No. 2.

*Extract from the Report dated the 17th August, 1903, of the Committee appointed to enquire into Royal Indian Engineering College at Coopers Hill, and other matters.**

Paragraph 35:—

We next deal with the question of the recruitment and training of officers for the Forest Service.

As there is no efficient teaching of Forestry in the United Kingdom, it will be necessary for some years to come that the Government of India should continue to provide for the education of the selected candidates. The Professor of Forestry and one of his Assistants must be maintained as heretofore. The question then arises—where, in the absence of Coopers Hill, are Forest officers to be trained? Although the average number of Forest officers required by the Government of India will be only eight annually, the Government of India is too deeply interested in the matter to allow of its being left to chance or to the future establishment of schools for instruction in Forestry in accordance with the recommendation of the Departmental Committee on British Forestry, which reported to the Board of Agriculture last year. We think that it is possible without much difficulty to arrange for the transfer of the Professor of Forestry and one of his Assistants from Coopers Hill to Cambridge or Oxford or Edinburgh. At the last-named University there is already the foundation of a Forest School, but it may be inconvenient to have the students so far from London. On the whole, looking to the evidence given by Sir W. Thiselton-Dyer as to the facilities at Cambridge, we recommend that for the immediate future, at any rate, an arrangement should be made with that University. For the present the candidates may be selected, as now, by the Civil Service Commissioners, and required to go to Cambridge for their Forest Education as they now go to Coopers Hill. On the understanding that the pay of the Professor of Forestry and his Assistant is provided by the Government of India, that Government should have a controlling voice in the choice of a Professor and in prescribing the course of instruction to be followed. Hereafter when Schools of Forestry, with suitable staffs and sufficient equipment, shall have been established with success, their degrees or diplomas may be accepted as proof of sufficient technical training, and the selection may be made from those who have acquired those degrees and diplomas and are otherwise well qualified. When this condition has been reached, the Government of India need no longer concern themselves with the teaching staff or the course of instruction.

* Parliamentary Paper, Cd. 2055 of 1904.

No. 3.

Letter from the India Office to the President, Royal Indian Engineering College, dated the 20th May, 1904.

In continuation of the letter* from this Office, dated the 11th May, 1904, J. & P. 973, I am directed by the Secretary of State to request that you will be so good as to ascertain from Doctor Schlich his views as to the arrangements which he would advise for the training of the probationers for the Forest Service, after the system of training at Coopers Hill has been brought to a close, and that you will submit them with any observations of your own which you may desire to make.

I am, &c.,
(Signed) A. GODLEY.

No. 4.

Letter from the President, Royal Indian Engineering College, to the Under Secretary of State for India, dated the 31st May, 1904.

With reference to your letter J. and P. 1164, dated the 20th May, 1904, I have now the honour to forward, in original, a Memorandum drawn up by Dr. Schlich detailing the arrangements which he advises for the training of the probationers for the Forest Service, after the system of training at Coopers Hill has been brought to a close.

2. It will be observed that Dr. Schlich is quite clear that the education of the Foresters should be conducted at either Cambridge or Oxford, and that of these two he greatly prefers Oxford. He points out that Oxford is far more favourably situated as regards opportunities for practical illustration of forestry teaching. At Cambridge they would only have a few small patches of private woods in the immediate vicinity and the woods of His Grace The Duke of Bedford at Woburn, which are distant about an hour's rail from Cambridge. He remarks that these latter woods can be equally well reached from Oxford in one and a half hours by rail, and in addition to this, it is easy to reach from Oxford the following woods and forests:—

- I. The Forest of Dean and the High Meadow Woods, which are Crown property.
- II. The Alice Holt Woods, which are Crown property.
- III. The Beech Woods of the Chiltern Hills (one hour by rail).
- IV. The Woods of Lord Bathurst, near Cirencester.

In addition to these, there are quite a variety of woods in the immediate vicinity of Oxford, amongst which may be mentioned:—

- I. Bagley Wood, of some 400 acres, at a distance of $2\frac{1}{2}$ miles.
- II. Appleton Woods (distance, 6 miles).
- III. Wytham Wood (distance, $3\frac{1}{2}$ miles).
- IV. Wychwood Forest (distance, 13 miles by rail); and numerous other woods.

* Not printed.

Attention may be drawn to paragraph 7 of Dr. Schlich's Memorandum, and the accompanying railway map showing the position of the larger woods above-mentioned.

3. As regards the question of selection of candidates, Dr. Schlich recommends (paragraph 8) that in future candidates should be drawn from undergraduates of the University who have passed certain examinations. In the case of Oxford, this would be (A) Responsions; (B) The Preliminary Examination in the Honours School of Natural Science; and he points out that a candidate thus selected at Oxford would receive one year's preliminary instruction in Science at the University, followed by two years' instruction in special subjects, and, lastly, a year's practical experience on the Continent, making up four years in all from the date of entry to the University. He points out that at Cambridge the course would have to be one of five years, unless the special period of instruction were curtailed to one year, a procedure to which he is mostly strongly opposed.

4. After careful consideration of all that Dr. Schlich has written, it appears to me that the advantages in favour of Oxford outweigh those obtained at Cambridge, and I therefore recommend to your favourable consideration the suggestion that Oxford should be the University selected for the future training of Forest Students.

5. It will be observed that the provisional nomination of the candidates for the Indian Forest Service should be made at the end of the Trinity Term (July) from those undergraduates who have passed the Preliminary Examination for the Honours School of Natural Science. In connection with this, attention may be invited to paragraph 11 of Dr. Schlich's Memorandum.

6. Dr. Schlich's views, as regards the probable expense at Oxford, will be found stated in his paragraphs 14 to 16, inclusive, and may be thus summarised:—The salaries and travelling expenses of the Professor and Assistant Professor will amount to £1,400 a year. It is understood that the cost of teaching Forest Botany will be undertaken by the Universities, as they are willing to utilise the now vacant Sibthorpe Professorship of Rural Economy, and to augment the emoluments to an amount sufficient to secure the services of a competent teacher. In this connection, I would draw attention to Dr. Schlich's suggestion that the appointment of a Reader in Forest Botany should be made only after consulting the Professor of Forestry, and that the Syllabus of the studies in this subject should be drawn up jointly by the Reader in Forest Botany and the Professor of Forestry. The next item of expenditure refers to the formation of a Forest Garden and experimenting area. For this purpose, Dr. Schlich requires about 100 acres, and estimates that the following outlay would be required:—Fencing, say, £120, and an outlay of, say, £150 a year, being the cost of a man in charge and the rent, &c., of the land.

7. Under the head of "Accommodation," Dr. Schlich points out that Lecture Rooms, Professors' Rooms, and a Museum will be required. In his Memorandum he has not stated the probable cost of these requirements but I have ascertained from him that all he requires could be provided for a sum which should not exceed £2,000. I understand that a suitable site for this building is available, and it will probably be considered advisable either to make a grant of the whole of this amount or else a large portion of it.

8. Attention is invited to paragraph 17 of Dr. Schlich's Memorandum, in which he states that it would be essential to issue a notice early next October to the effect that a given number of candidates for the Indian Forest Service would be provisionally nominated in July, 1905.

9. It is satisfactory to learn from Dr. Schlich's paragraph 18 that he anticipates no difficulty whatever in dealing in 1905 with the Forest Students admitted to Coopers Hill this year, whose course of study would be incomplete at the close of the next Session.

10. Dr. Schlich wishes me to bring to your notice that he proposes starting for the Continent on the 7th June next, and expects to be back in England about the middle of July, but that if absolutely necessary he could postpone his departure until the 11th June, though he would prefer to leave on the date first-named.

I have, &c.,

(Signed) JOHN W. OTTLEY,
President, Royal Indian Engineering College.

Enclosure in No. 4.

Letter from the Principal Professor of Forestry to the President, Royal Indian Engineering College, Coopers Hill, dated the 30th May, 1904.

In compliance with the request contained in your endorsement of the 21st instant, forwarding to me letter of the 20th instant, from the Under Secretary of State for India to your address, I have the honour to forward herewith a Memorandum setting forth my views as to the arrangements which I should advise for the training of probationers for the Indian Forest Service, after the system of training at Coopers Hill has been brought to a close.

I have, &c.,

(Signed) W. SCHLICH,
Principal Professor of Forestry,
Coopers Hill College.

Annexure.

Memorandum on the System of Training of Probationers for the Indian Forest Service, to be adopted after the system of training at Coopers Hill has been brought to a close.

1. Two distinct matters have to be considered:—

- (a) The general system of training in the future; and
- (b) How to deal with the probationers, whose course of study may be incomplete, when Coopers Hill College is closed.

I shall first deal with the general case.

2. The Committee of 1903, which proposed the closing of Coopers Hill College, suggested the transfer of the Professor of Forestry and one of his assistants from Coopers Hill to Cambridge, Oxford, or Edinburgh. It was added, that one of the first two would be preferable, with which I agree. Of the two English Universities, the Committee favoured Cambridge. The Committee further proposed, that for the present, the candidates might be selected, as in the past, by the Civil Service Commissioners, and required to go to Cambridge for their forest education as they now go to Coopers Hill, on the understanding that the pay of the Professor of Forestry and his assistant is provided by the Government of India, and that the latter should have a controlling voice in the choice of the Professor, and in prescribing the course of instruction to be followed. The Committee added that hereafter, when schools of forestry, with a suitable staff and sufficient equipment, shall have been established with success, their degrees or diplomas may be accepted as proof of sufficient technical training, and the selection may be made from those who have acquired these degrees and diplomas and are otherwise well qualified.

The Government of India, on the other hand, suggest in their despatch* of the 22nd October, 1903, that "if Coopers Hill is to be closed, they would strongly urge a reversion to the system which obtained before candidates for the forest service were admitted to the College," in other words, to revert to the former continental training, but under more efficient supervision than in the past.

3. When the transfer of the forest students to Coopers Hill was first proposed in 1882, I was Inspector-General of Forests to the Government of India, and, on my advice, that Government urged the Secretary of State for India to continue the continental training, at any rate for another five years, as I did not consider matters ripe for a start in England. At the same time I believed that such a change would ultimately have to be made, so as to become, by degrees, independent of the continental training. Since then considerable progress has been made in this country. We have developed a satisfactory system of teaching the theoretical part of forestry, and a certain portion of the practical part; we have written a complete Manual of Forestry in five volumes. Systematic management has been introduced into several forests belonging to the Crown, such as (a) the Forest of Dean; (b) the High Meadow Woods, worked under working plans prepared by the late Mr. H. C. Hill; (c) the Alice Holt Woods, for which I have prepared a working plan. Several landed proprietors, such as His Grace the Duke of Bedford, Lord Selborne, Mr. Munro Ferguson, and others, have adopted a systematic management of their extensive forests. We have even started a forest school for working foresters, in connection with the Forest of Dean and the High Meadow Woods. Thus a substantial start has been made, and with a little more patience and continuity of action we shall, within a reasonable space of time, have training grounds for practical illustration and instruction at our disposal, which will, gradually, make us more and more independent of continental training. For some time to come, we shall, no doubt, have to rely on the continent for the final practical training, but I am satisfied that the theoretical and certain portions of the practical part of the training can be done in a satisfactory manner in this country. To re-transfer the whole business now to the continent would mean that the fruits of our exertions during the last 19 years would be once more annihilated, while I feel sure that a fresh start would be made in this country before many years are passed.

4. To send young men at the age of 18 years to continental establishments, when their training can be done just as well in this country, seems to me, to say the least of it, a very doubtful policy; they had much better be trained in their own country. That the former method has considerable drawbacks, has been amply proved in the past, and it is by no means so easy to provide the necessary efficient supervision, while the students are in continental establishments, as the Government of India seem to think. Later on, when the students have completed their university career in this country, and have arrived at the age of, say, 21 years, they may safely be sent abroad for practical instruction, especially as they will be placed, two and two with specially selected experienced forest officers. The latter system has now been perfected to such an extent, that no difficulties arise, and that we obtain the most satisfactory results.

5. There is, however, another important reason, why we should hesitate to destroy again the progress so far made, and why we should take a somewhat wider view of the whole question. It is well known that the demand for qualified forest officers for service in the Colonies is steadily increasing, a demand which has, up to date, been met chiefly by members of the Indian Forest Service being lent or permanently transferred to Colonial Governments. This has been a heavy tax on the Indian service, and of late, the demands could not all be complied with. Sir William Thiselton Dyer and myself are constantly asked to find trained forest officers, but they are not available in this country. I may mention that I had, during the last 12 months, applications for five such officers, one for the Sudan, two for Uganda, one for Travancore, and one for the Federated Malay States (quite apart from a demand for a first class officer for the Transvaal and one for Siam). I had only one Englishman, whom I could recommend for Uganda; for the Sudan we took in a young man to be trained with our probationers; for Travancore I selected and sent out a young German officer; and for the Federated Malay States I am searching for another suitable German forest officer, at the special request of the Secretary of State for the Colonies, after I had failed to find a qualified Englishman. It is clear that the means of efficient instruction in forestry for the benefit of the Empire as a whole must soon be provided, and I am of opinion that we shall do well to fall in with these requirements. The field of selection, for service in India, will be considerably extended without sacrificing the interests of the Indian Empire in any way.

6. For all these reasons I am strongly of opinion that a high class school of forestry should be established, either at Oxford or Cambridge, where the probationers for service in India will be educated. As to the choice between these two universities, something can be said in favour of either. The teaching of science is said to be more advanced at Cambridge; at the same time I am satisfied that the standard obtaining at Oxford is quite sufficient for our requirements, apart from certain special instruction which has to be provided at either university. On the other hand, Oxford is far more favourably situated as regards opportunities for practical illustrations. At Cambridge we should only have a few small patches of private woods in the immediate vicinity, and the woods of his Grace the Duke of Bedford at Woburn, distant about an hour's rail from Cambridge. I have no doubt that His Grace would permit his woods being used for practical illustration. At the same time they can be reached from Oxford in an hour and a half by rail. In addition, it is easy to reach from Oxford:—

(a) The Forest of Dean and the High Meadow Woods (Crown properties).

(b) The Alice Holt Woods (Crown property).

- (c) The Beech woods of the Chiltern Hills (one hour's rail).
 (d) The woods of Lord Bathurst near Cirencester.

There are quite a variety of woods in the immediate vicinity of Oxford, of which I may mention:—

- (1) Bagley Wood, area some 400 acres, the property of St. John's College, Oxford. This wood consists of oak, ash, sycamore, birch, alder and a few spruce, with a considerable area lately planted with larch, ash, spruce, Scotch pine, and sycamore. Distance from Oxford $2\frac{1}{2}$ miles.
- (2) Appleton Woods, a considerable portion of which belongs to Magdalen College. Distance from Oxford 6 miles.
- (3) Wytham Wood, belonging to the Earl of Abingdon, distance from Oxford $3\frac{1}{2}$ miles.
- (4) Wychwood Forest, distance from Oxford 13 miles by rail.

There are also numerous other woods. I have no doubt that satisfactory arrangements can be made with the owners to use these woods for the illustration of points placed before the students in lectures; while longer excursions can be arranged, from time to time, to the more distant forests mentioned above.

7. Under the circumstances detailed above, I am of opinion that of the two universities, Oxford is to be preferred because it offers far better opportunities for practical illustration and work, in the immediate vicinity of the forest school. The accompanying railway map* will further illustrate this point. At the same time I will show the arrangements which are practicable at either university.

8. I am further strongly of opinion that, after 1904, the candidates for the Indian Forest Service should not be selected on the strength of a competitive examination held by the Civil Service Commissioners. The future candidates should be men, who have a chance of taking a university degree, and that would be difficult to arrange, if candidates were selected as in the past. They should, in future, have given evidence of a proper school education and a sufficient knowledge of those branches of science upon which scientific forestry rests. Hence, I should provisionally nominate the candidates from among the men who have passed:—

In the case of *Oxford*: A. Responsions, and B. the preliminary examination in the Honour School of Natural Science; the latter they can pass after one year's residence at Oxford.

Or, in the case of *Cambridge*: A. The previous examination, and B. Part I. of the Natural Science Tripos, which they can pass after two years' residence at the university.

After nomination the candidates will receive two years' instruction in special subjects to be enumerated in paragraph 9. This would sum up to a residence of three years in the case of Oxford, and four years in the case of Cambridge. Four years seems to me too long, and the course of study at Cambridge could be compressed into three years, only by hurrying through the special subjects in the space of one year, a procedure to which I am strongly opposed.

9. The complete scheme is exhibited below:—

Candidates must have passed:—

<i>At Oxford.</i>	<i>At Cambridge.</i>
A. Responsions. B. In the Honour School of Natural Science:—the Preliminary Examination in:— (1) Mechanics and Physics. (2) Chemistry. (3) Zoology. (4) Botany.	A. The Previous Examination. B. In the Natural Science Tripos:— Part I., comprising:— (1) Physics. (2) Chemistry. (3) Zoology. (4) Botany.

C.—Special Course.

Candidates will receive special instruction in the following subjects:—

- (1) Elementary Organic Chemistry, and Chemistry of Soils.
- (2) Geology.
- (3) Forest Entomology.
- (4) Forest Botany.
- (5) Forestry.
- (6) Geometrical Drawing, Plane Trigonometry and Surveying.
- (7) German.
- (8) Engineering (elementary).
- (9) Book-keeping, in reference to Indian Forest Accounts.

* Not printed.

During the two years of the special course, excursions will be made, during term time, to forests and woods in the immediate vicinity; during the vacations to more distant forests in Britain and Normandy.

D.—A practical course in Forestry in Germany extending over nine months, as at present.

10. As regards the obtaining of the B.A. degree, the authorities of the university, where it is proposed to start, should be addressed, with a view of their admitting the examination in our special subjects, enumerated above under C., in lieu of passing in the special subjects now prescribed by the university. There may be some difficulty in this respect. If the authorities of the university are not prepared to grant a degree on those lines, then the candidates, who satisfy the examiners, will be granted a "Diploma in Forestry" until such time, when the study of Forest Science will be more fully appreciated than it is at present. In the meantime, capable students may take their degree by passing the final examinations in one of the subjects approved of by the existing university regulations. This would, presumably, be Botany.

11. In case the Secretary of State for India decides on starting at Oxford, I add the following additional observations:—

The provisional nomination of the candidates for the Indian Forest Service should be made at the end of Trinity term (July) from those undergraduates who have, as already stated, passed the Preliminary Examination in the Honour School of Natural Science. It is a "pass" examination. Hence all candidates for the Indian service should, before the commencement of the examination, intimate their intention to the Examination Committee. As soon as the list of the passed men comes out, a Committee of, say, three members should draw up a list of the candidates for service in India, according to merit, based upon the reports of the examiners and, if necessary, on inspection of the examination papers. They should then proceed to select the required number of candidates, giving due weight to their standing on the list, but not overlooking other necessary qualifications. It will be advisable that the selected candidates should at this stage be medically examined so as to see whether they are fit for service in India. This examination would be in the interest of the candidates, the actual appointment to the Indian Forest Service depending on the medical examination at the end of the whole course of instruction.

This Committee might consist of:—

- (1) The Professor of Forestry.
- (2) A member of the Examination Committee nominated by the university.
- (3) A member nominated by the Secretary of State for India.

The list of selected candidates would forthwith be submitted to the Secretary of State for India for approval.

I understand that at present about 40 undergraduates present themselves annually for the Preliminary Examination, but it is believed that the number would considerably increase, if these nominations were announced a year beforehand.

12. The selected candidates would commence their special course of instruction in October, and continue it for two academical years, that is to say, until July in the second year. The special subjects of study should be arranged into two lists, and the examination should be divided into two parts. Part I. to be taken at the end of the second academical year and Part II. at the end of the third. The division of the special subjects into Parts I. and II. cannot be made until it has been decided where the School of Forestry is to be established. Candidates will be required to satisfy the examiners in each of these two examinations, failing which they will forfeit their nomination to the Indian Service. The candidates who have satisfied the examiners in the special subjects and obtained the Diploma in Forestry (or their degree, as the case may be) will, on the 1st October following, proceed to Germany for a practical course of nine months' duration. On the completion of this course, if they have acquitted themselves to the satisfaction of the officer in charge, they will be appointed to the Indian Forest Department, provided they pass the final Medical Board.

13. The period of training thus comprises four years, counting from the date when the men leave school; this period is, in the majority of cases, the same as under existing conditions. Most of the men have, before joining at Coopers Hill, spent a year in preparing for the competitive examination. Their average age is about 19 when joining and 22 when going out to India. Under the arrangements now proposed the men can join at Oxford at the age of 18, and be ready to proceed to India when 22 years old. To send them to India at an earlier age is very much to be deprecated. On this point I hold the same views as the late Mr. H. C. Hill, who only a short time before his death wrote to me on the subject, strongly urging that the candidates should not come to India at too early an age. As to the cost of the course to the students, I am satisfied that it will not be greater, and probably smaller, than under the present arrangements. I am informed that a student can get board, lodging, and tuition, at an Oxford College for £120 during the first year, and about £140 during the second and third years, for which he pays £180 at Coopers Hill College.

14. Turning now to the special arrangements to be made at Oxford, in case we go there, I understand that the university authorities are prepared to provide the required instruction, on the assumption that the Government of India pays the emoluments of the Professor of Forestry and his assistant. This would involve, on the part of the Government, under existing conditions an expenditure of—

	£	s.	d.
Pay and house allowance of the Professor	816	13	4
Pay of the Assistant Professor	500	0	0
Travelling expenses of the Professor and his assistant, say	83	7	8
Total	£1,400	0	0

The Professor of Forestry would, at any rate for the present, continue to supervise the students while on their practical course on the continent.

Of the special subjects of study, Organic Chemistry, Chemistry of Soils, Geology, Entomology, and German can be taught by the existing staff of the university, and in a satisfactory manner. The authorities at Oxford are now occupied in establishing a course of instruction in Surveying. Instruction in Geometrical Drawing and Plane Trigonometry is also available. For instruction in Forest Botany the authorities are, I understand, willing to utilise the now vacant Sibthorpe Professorship of Rural Economy and to augment the emoluments to an amount sufficient to secure the services of a competent teacher. It might, however, be as well to suggest that the appointment of Reader in Forest Botany should be made only after consulting the Professor of Forestry. The syllabus of the studies in this subject should be drawn up, jointly, by the Reader in Forest Botany and the Professor of Forestry.

The study of forestry should extend to Sylviculture, Forest Protection, Forest Utilisation, Forest Management and Administration, and to Forest Law. The teaching would be done by the Professor of Forestry and his assistant. Their pay should be guaranteed by the Secretary of State for a number of years, when the question might be reconsidered. By that time, I have no doubt, a regular School of Forestry will have been established at Oxford, where, in addition to the candidates for India, a number of students preparing for service in the Colonies, and even in these islands, will be found taking advantage of the opportunities thus offered for the study of a subject which is, year by year, becoming of greater importance to the Empire.

Book-keeping with reference to Indian forest accounts has, for years past, been taught by me, and as long as I hold my present post, I should continue doing so.

By way of engineering the students have hitherto been given ten lectures on road-making, laying down tramways, and the antiseptic treatment of timber. Part of this would continue to be dealt with under the head of Surveying, and the rest could be attended to by one of the Lecturers in Forestry, until other arrangements can be made. Road construction is also attended to during the practical course in Germany.

15. It will be necessary to secure near Oxford an area of, say, 100 acres for a forest garden and experimental area. I understand that there would be no difficulty in obtaining the land on a long lease at an annual outlay of £50 to £75. Possibly, land belonging to one of the colleges may be obtainable. On this area we should establish a forest nursery for the practical instruction of the students, and the rest would by degrees be planted up so as to produce small woods for further practical instruction. The area would have to be fenced at a cost of about £120, and there should be a man in charge at a cost of, say, £70 a year. All other expenses would be covered by the sale of plants.

16. There remains the question of accommodation. Lecture rooms and laboratories are available for all branches except for forestry proper. For the latter we should require a lecture room, a Professor's room and a museum. I understand that two moderate-sized rooms and a temporary shed are available at the new museum, but, after a personal inspection, I do not consider that accommodation sufficient as a permanent settlement of the question. With a view to securing appropriate accommodation for the Forest School, the Secretary of State for India may, perhaps, be willing to give a grant-in-aid towards the erection of a modest building in a suitable situation, on the condition that the university finds the rest.

17. In case the Secretary of State for India should accept the above proposals, it would be essential, that a notice should be issued early in October to the effect that a certain number of candidates for the Indian Forest Service will provisionally be nominated in July, 1905.

18. The case of the forest students at Coopers Hill, whose course of study may be incomplete when Coopers Hill College is closed, will be very simple. We should take them with us to Oxford, lodge them suitably and complete their course of instruction in the usual way. The fees paid by them would be quite sufficient to meet all necessary expenses.

19. Should His Majesty's Secretary of State for India prefer to start at Cambridge, then arrangements similar to those now proposed for Oxford would have to be made.

W. SCHLICH,
Principal Professor of Forestry,
Coopers Hill College.

Coopers Hill,
30th May, 1904.

No. 5.

Letter from the Vice-Chancellor of the University of Cambridge to the Secretary of State for India, dated the 8th July, 1904.

May I call your attention to the following matters relating to the University of Cambridge and the teaching of Forestry to those who are studying for the Public Works Department?

In consequence of a Report of a Departmental Committee appointed by the Board of Agriculture to inquire into British Forestry (a copy of which I enclose), and in particular of its recommendation (see page 4) as to Oxford and Cambridge, the Board of Agricultural Studies in this University considered the question of teaching Forestry in the University, and drew up a Memorandum, of which I enclose copies. This Memorandum shows what the Board of Agricultural Studies propose as to the teaching of Forestry in Cambridge.

In the Report of the Committee of Enquiry into matters connected with the Royal Indian Engineering College, the following Recommendation of the Committee occurs (paragraph 35):—

“On the whole, looking to the evidence given by Sir W. Thiselton-Dyer as to the facilities at Cambridge, we recommend that for the immediate future, at any rate, an arrangement should be made with that University. For the present, the candidates may be selected, as now, by the Civil Service Commissioners, and required to go to Cambridge for their Forest Education as they now go to Coopers Hill.”

We have not as yet had any official communication on this matter. In view of the development of the Departments of Botany and of Agriculture in this University, we venture earnestly to hope that the above Recommendation of the Committee as to the University of Cambridge will receive favourable consideration.

The Departments of Botany and of Agriculture in Cambridge, as I have already implied, have greatly developed lately. The new Botanical Laboratory, opened by His Majesty the King on last March 1st, with its very complete equipment is a sufficient guarantee that these studies are now carried on in Cambridge under the best conditions.

I am *ex officio* Chairman of the Board of Agricultural Studies, and I need hardly add that I shall be very happy to furnish you with any information which you may desire.

I am, &c.,
(Signed) F. H. CHASE,
Vice-Chancellor.

Enclosure in No. 5.

University of Cambridge.—Department of Agriculture.

Report of Committee appointed by the Board of Agricultural Studies to consider the Recommendations of the Departmental Committee on British Forestry.

We have considered the Report of the Departmental Committee on British Forestry appointed by the President of the Board of Agriculture, and we have also had before us the Minutes of Evidence. The points which more especially concern the University are:—

- (1) That the Departmental Committee recommends the provision of instruction in Forestry by the University (Report, page 9).
- (2) That the Committee suggests the transference of the Forestry students from Coopers Hill to a University centre (Report, page 5).
- (3) That the transference of the Forest School from Coopers Hill to Cambridge has been recommended to the Secretary of State for India (Minutes of Evidence, page 205).

It has also come to our knowledge that the question of transferring the Forest School from Coopers Hill to Cambridge, has been referred to a Committee recently appointed to report on the Royal Indian Engineering College.

In the event of the above recommendations being carried out, instruction would be necessary for two classes of students, viz., for professional foresters, and for agriculturists (land owners and agents).

Students of Forestry.

We have carefully considered the requirements of these students, and we have come to the conclusion that the greater part of the necessary training could be given in the University, but that instruction in the purely technical subjects must be provided at a properly-staffed forest school.

A school of the kind required could not be located in Cambridge, for it must be in or near established woods.

If, however, a State School for practical forestry were maintained at Coopers Hill or elsewhere, it could be used to supplement the theoretical instruction given in Cambridge, and we would suggest the following course as suitable for training Indian, Colonial, and other foresters.

Course of Study.

The course of study would extend over three University years, the months of July, August, and September in the first and second years being spent at a forest school. At the end of the third year candidates for the Indian and Colonial Forest Services would be selected by an appropriate examination held either by Government or by the University, and we suggest that selected candidates should spend a further period of from six months to one year in the study of practical forestry in British and foreign forests.

The course of examinations taken by a student might be on the following lines:—

- (1) At entrance, the Previous Examination, with additional subjects.
- (2) At the end of the first year (June) Part I. of the Examination in Agricultural Science (Physics, Chemistry, Botany, and Geology).

- (3) At the end of the second year (June) Part I. of the Natural Sciences Tripos (Chemistry, Botany, and Geology).
- (4) At the end of the third year (June) the student would be entitled to graduate B.A. without a further examination. The special examination in Forestry for the selection of candidates, and possibly for a certificate in the subject, might be taken during the following Long Vacation.

While we do not at this stage wish to lay down a definite scheme for the Examination in Forestry, we have prepared a schedule to show the character of the course which we think would be desirable.

Schedule.

(a.) Sylviculture. Forest Soils. Characters of the chief timber trees. Sylvicultural systems. Formation of Woods, Planting, Thinning, Felling, &c. Surveying and Mapping of forest areas. Measuring and estimating yield of forests. Forest accounts.

(b.) Diseases of Trees:—

(i.) Forest Mycology.

(ii.) Forest Entomology.

(iii.) Injuries caused by frost, game, &c.

(c.) Forest produce. Structure, properties, preservation and conversion of timber. Minor forest products.

Arrangement of Studies.

The preliminary scientific studies would occupy nearly the whole of the time of the student during the first six terms of his residence at the University, but in the Lent or May Term of his first year, he would attend a class on Forestry designed to give him a general introduction to the subject. During the two Long Vacations at the Forest School, attention would be given to the habits and characters of trees, to methods of planting, sowing, selection for thinning and felling, to forest surveying, measuring, and book-keeping, and to the preparation of timber for market. The third year at the University would be spent in reading for the forestry examination, and in laboratory work in connection with Mycology, Entomology, and the Structure and Properties of Timbers.

Instruction.

The course in the general principles of forestry would require the services of a special lecturer. If the Director of the Forest School, or one of his assistants, were appointed University Lecturer in Forestry, this would afford the necessary connection with the University suggested by the Departmental Committee. Technical Chemistry might be studied in the Agricultural Department, and the Entomologist who teaches agricultural students might also undertake the teaching of Forest Entomology. In view of the large amount of Botanical work, it would probably be necessary to appoint a lecturer in Forest Botany to assist the Professor.

Advantages of Course.

The course outlined would give the usual Christmas and Easter Vacations and about a fortnight at Midsummer, or ten weeks' holiday in the year. The out-of-door work at the forest school would provide a complete change from Cambridge Laboratories, and the suggested vacations should prove sufficient. Agricultural students usually go to farms in different parts of the country during the Long Vacation, and the Forest students at Yale and Cornell Universities are sent to forest schools for the summer

months, so that were the foregoing suggestions carried into effect, Cambridge Forestry students would be following the usual course. The advantages which we claim for the scheme are:—

- (1) That University graduates may be prepared for Indian and Colonial Forest Service.
- (2) That the entire scientific training may be given at the University.
- (3) That the instruction in practical silviculture may be given at the most suitable centres in the country.
- (4) That research in forestal problems could be carried on in the laboratories of the University. Every facility and encouragement for research would be provided.

Agricultural Students.

The ordinary requirements of agricultural students would be met by attending the elementary class on forestry. Young land-owners and others specially interested would also have an opportunity of attending some of the special classes provided for forest students, such as those on the Diseases of Trees. It would further be desirable that such students should spend a summer in studying practical silviculture at the Forest School.

Demonstration Plots.

The Botanic Gardens provide specimens of all the common trees, and if, as we have suggested, those agricultural students interested in forestry were to go for a term to a forest school, we do not think it would be necessary to establish demonstration forest plots at Cambridge. We think it likely, however, that local woods would be available for teaching purposes, for land-owners would doubtless permit the Lecturer in Forestry to lay out experimental plots in their woods, in the same way that they now permit land to be used for agricultural experiments. We are of opinion that the Botanic Gardens and local woods would furnish as much material for illustrative purposes as the Lecturer in Forestry could utilise while the students were in residence.

Recommendation.

The above appears to this Committee to show that it is practicable in a large measure to give effect to the suggestion contained in the Report of the Departmental Committee, and should the Board agree in this view, the Committee are prepared to open communication with the proper authorities with a view to fuller discussion of the subject.

[The above Report was presented to the Board of Agricultural Studies of the University, and received its approval. The Committee, consisting of Professor Marshall Ward, Professor Middleton, and Dr. D. MacAlister, were empowered to take such further steps as might be deemed desirable.]

26th January, 1904.

No. 6.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated the 11th July, 1904.

I am directed to acknowledge the receipt of your letter of the 8th instant, which will receive attention.

I am, &c.,
(Signed) A. GODLEY.

No. 7.

Letter from the India Office to the Vice-Chancellor of the University of Oxford, dated the 19th August, 1904.

I am directed by the Secretary of State for India in Council to inform you that he has recently had under his consideration the future arrangements which should be made for the selection and training of probationers for the Indian Forest Service, in view of the intention to close the Royal Indian Engineering College at Coopers Hill in 1906. Mr. Brodrick is, therefore, anxious to ascertain whether and to what extent he can secure the co-operation of the University of Oxford in this matter.

2. As at present advised, the Secretary of State considers that the candidates chosen for the Forest Service should be selected by open competition from candidates declared eligible by him. After their selection, it is desired that the selected candidates should become, in case they are not already, members of the University of Oxford, and should undergo there a special course of instruction to be followed by a brief period of training in Germany. It is hoped that the University may be able to offer to the selected candidates facilities for acquiring a degree. The part, then, which the University is asked to take in the scheme thus outlined affects three stages—the first, that of selection by examiners; the second, that of subsequent education; and, finally, the grant of degrees.

3. As regards the first of these points, it is desired to maintain the principle of open competition, subject only to such regulations as to eligibility as this Office may eventually issue. A list of candidates desiring to compete for the vacancies in each year would be kept in this Office, and in due course it would be furnished, when revised under the regulations, to the authority responsible for the examination. I am to enquire whether the University would undertake to conduct that examination at Oxford, and forward to this Office the names of the selected candidates. Inasmuch as these selected candidates will thereupon, if this plan is carried out, become members of the University (if they are not members already), I am to enquire what general acquirements will be expected of them by the University. Either the examination for the Forest Service might include a paper which would test these general acquirements, or the test can be applied at an earlier stage at the time the candidates' names are registered in this Office. It might, for instance, meet the requirements of the University, if candidates before admission to the Secretary of State's list, were required to have passed Responsions or any one of the alternative examinations accepted by the University as equivalent to Responsions. As to the competitive examination to be held at Oxford for selection, it is believed that the subjects required for the preliminary examination of the Honours School of Natural Science, *i.e.*, Mechanics, Chemistry, Zoology, and Botany, would afford a good test, and so far as concerns those competitors who are undergraduates of Oxford, it might be possible to utilise the results of that examination for the purposes of selection, holding a simultaneous examination in the same papers for candidates from other Universities or schools entered in the list furnished by this Office. I am to invite an expression of opinion on this proposal and to say that the Secretary of State will be happy to consider any other alternative suggested by you.

4. The candidates having been selected by the results of the above examination would be required to enter into residence at Oxford, if not already in residence, in the month of October following their selection, and to continue their studies for two academical years. On this part of the scheme I am to give an outline of the provision which it will be necessary to make for instruction and other means of carrying out the proposals. The Secretary of State for India would be prepared to arrange for the residence at Oxford of the Professor and Assistant Professor of Forestry now engaged at Coopers Hill, and to pay for their services. The University

might, it is suggested, entrust to the Sibthorpean Professor of Rural Economy the duty of giving lectures in Forest Botany, and perhaps consult the Secretary of State as to his appointment. The two Professors thus named might jointly draw up a syllabus of the course to be studied in Forest Botany. The University provides, it is believed, instruction in Organic Chemistry, Chemistry of Soils, Geology, Entomology, Surveying, Geometrical Drawing, Plane Trigonometry, and German. If the University can render available at the outset temporary accommodation for a lecture room, a room for the Professor of Forestry, and a Museum of Forestry, the improvement of that accommodation may be made a matter of arrangement between it and the India Office. The Secretary of State for India would be prepared to provide and maintain a Forest Garden at Oxford. Any arrangements which might be made on the basis of the scheme just described would be subject to reconsideration at the end of five years.

5. Passing on to the special course of instruction to be pursued by the probationers, I am to say that it should comprise the following subjects:—

- (1.) Elementary Organic Chemistry and the Chemistry of Soils.
- (2.) Geology.
- (3.) Forest Entomology.
- (4.) Forest Botany.
- (5.) Forestry.
- (6.) Geometrical Drawing, Plane Trigonometry, and Surveying.
- (7.) German.
- (8.) Engineering (elementary).
- (9.) Book-keeping in reference to Indian Forest Accounts.

In the course of the two years during which they would be receiving instruction in these subjects they would visit, during term time, woods and forests in the vicinity of Oxford, and, during the vacations, more distant forests in the United Kingdom or on the Continent.

At the end of the two years their training at Oxford University would be completed.

6. On leaving Oxford the probationers would further be required to undergo (in the third year after their selection) a practical course in Forestry in Germany, which would extend over nine months, as at present

On completion of such course, they would be finally appointed to the Indian Forest Service.

It would be required that their conduct and course of study should have been considered satisfactory at all stages by the Secretary of State in Council.

7. Lastly, I am directed to refer to the subject of degrees, diplomas, and University distinctions. The Secretary of State in Council would consider it a matter for regret were these probationers to be debarred from, or hindered in, obtaining a University degree by reason of the fact that their studies had been specialised for Indian needs. He is aware that it would be open to such of them as were desirous of so doing to adjust their studies in such a way as to qualify for a degree in the ordinary course, presumably in Botany. But it can hardly be doubted that their special course of study would to some extent be thereby interfered with.

8. I am accordingly to inquire whether the University authorities would be willing to admit the special subjects which the probationers would be required to study as subjects in which a degree in Forestry could be acquired. The Secretary of State in Council recognises that this is not a matter in which he can press his own opinion, but he desires to commenc

it earnestly to the attention of the University authorities. If it be decided that a degree in Forestry cannot properly be given, a "Diploma in Forestry" might perhaps take its place.

9. The Secretary of State would be glad to receive an early reply on the suggestions contained in this letter. He considers it important that, if possible, a notice should be issued early in October to the effect that a certain number of probationers for the Indian Forest Service will be selected in the manner proposed in the summer of 1905.

10. It should be added that the number of Forest Officers required by India is about 8 or 10 a year, and that arrangements may have to be made to select and train one or two probationers for service in the Colonies in the same manner as the probationers for the Indian Service.

I have, &c.,
(Signed) A. GODLEY.

No. 8.

Letter from the President of Magdalen College, Oxford, to the India Office, dated the 25th October, 1904.

COOPERS HILL COLLEGE. FORESTRY STUDENTS.

You will remember the letter which you wrote to the Vice-Chancellor on August 19th, 1904, dealing with the question of the future arrangements for the selection and training of probationers for the Indian Forest Service, and enquiring whether and to what extent the co-operation of the University of Oxford in this matter could be secured. I am asked by the Hebdomadal Council to write to you on the matter, and to say that the Council has, on meeting again after the Long Vacation, taken your important letter into consideration and wishes me to reply in the following sense. The Council would be glad to see the University co-operate in this matter. They appreciate the offer made by the Secretary of State for India to arrange for the residence at Oxford of a Professor and Assistant Professor of Forestry now engaged at Coopers Hill and to pay for their services, and also to provide and maintain the Forest garden at Oxford, and in the future to consider the improvement of any accommodation made for a lecture room, Professor's room and forestry museum. Such help would go a considerable way to enable the University to undertake and carry on the work desired. With regard to the scheme suggested, taking the three sections indicated by you in your letter in order, namely, (1) Selection by examiners; (2) Subsequent education; (3) The granting of degrees. I am to say:—

(1) Selection.

The Council are of opinion that the University could without difficulty hold such a competitive examination for the selection of candidates as you suggest, in June annually here, and that it would be possible to utilise the preliminary examination of the Honour School of Natural Science for this purpose. If a separate examination should prove to be necessary, some provision would have to be made to meet the expense, but we hope that it would not be necessary. We should welcome and gladly recommend the adoption of the suggestion made in your letter that all candidates for admission on the Secretary of State's list should be required to have passed Responsions or an equivalent examination.

(2) *Subsequent Education.*

We think that all the subjects required are either already taught in the University or the teaching of them could be arranged for without difficulty, excepting Forest Botany and Forest Entomology. With regard to these we have reason to hope that the University might with the aid of a College be able to provide for the first (Forest Botany), if for the teaching of the second, namely, Forest Entomology, a sum of about two hundred pounds per annum for a Lecturer and Assistant could be provided from some external source. We also think that the University could provide the temporary accommodation which you indicate is needed for a lecture room, for a Professor and for a museum of forestry, in the hope, already noted, that you would be able later on to consider the improvement of such accommodation.

(3) *Degrees and Diplomas.*

We do not feel able to recommend to the University that a special Degree for Forestry should be established, but we think on careful and repeated consideration that a student could take Honours in one of the existing Honour Schools such as Botany, Geology, or Chemistry without any undue interference with his special studies. The University, as you probably are aware, requires ordinarily three years' residence for a degree, but if students after matriculating spent, as you seem to contemplate, one year at Oxford for the preparing for the examination for selection (which would, moreover, if it consisted as you suggest of the University preliminary examination, be part of their degree course), and then two years further of their special course as you suggest, they would be qualified by residence. Of any others who might come in at a later stage from outside, not a few would probably be able to avail themselves of the special privileges granted to students from affiliated Colleges and to Colonial or Foreign students, from all of whom only two years' residence is required. We should be prepared to adopt the Secretary of State's alternative proposal and to recommend to the University the establishment of a Diploma in Forestry. You will see then, that we really are able to welcome and fall in with almost all the suggestions contained in your letter. For carrying out the plans suggested, there remains the question of the Sibthorpiian Professorship. We think with you that the Sibthorpiian Professor might be entrusted with the duty of giving lectures in Forest Botany. There are, however, certain difficulties connected with the Chair as at present constituted, to which we think we ought to call your attention, and which I think it would be most convenient to deal with in a separate Appendix. We do not feel able to adopt the suggestion, which, however, I see is only a suggestion, that the Secretary of State should be formally consulted as to his appointment, but we do not think that this need cause any difficulty, more particularly if the assistance in endowing the Chair, at which I have hinted above, should be forthcoming. You will see then that we are able to accept and indeed to welcome practically all the suggestions as they are made in one or other form in your letter. The only difficulty which we foresee is in providing for the teaching of Forest Entomology. This could be arranged for in the Department of the Hope Professor of Zoology, but this Department, which is poorly endowed, would need additional assistance to the extent of two hundred pounds a year. If, then, you could see your way to enabling us to get over this obstacle, we are not aware of any other that would prevent our carrying out such a scheme as your letter suggests. I am desirous, however, to ask two questions as to points on which we should wish to be informed. First, whether you would propose any limits of age for the Forestry students, and if so, what these would be; and secondly, whether the selected students would receive any grants from the Government during their residence. If there is any further question which you on your side would like to ask, or if you have any further suggestion to make, you will of course not hesitate to write again.

We have a Committee of Council to which any question could be referred, and the Council itself is very anxious to get on with the matter and carry it to a favourable issue.

In conclusion, let me ask you to express to the Secretary of State our appreciation of his attitude in the matter, and our desire to meet his views, which I hope he will consider we have endeavoured to do, as fully as possible.

I am, &c.,

(Signed) T. HERBERT WARREN.

President of Magdalen College.

Enclosure in No. 8.

Appendix on the Sibthorpiian Professorship.

The present position of the Sibthorpiian Professorship, as will be seen from the copy of the Statute relating to it which I enclose, is somewhat peculiar. It is under a scheme sanctioned by the Chancery Division of the High Court of Justice on the fourteenth day of July, 1883. The Professor, it should be noted, holds office for three years and may then be re-elected for three years more, six years in all, but not for more than six years consecutively. The endowment ought to bring in two hundred pounds a year (£200), but in the present position of the estate does not bring in more than one hundred and thirty pounds a year (£130), and the University has had to recourse to the plan of allowing sufficient funds to accumulate to elect the Professor for three years and then allowing the Chair to be vacant until there was again sufficient accumulation to pay at the rate of two hundred pounds a year for three years. Six years would of course cover the period of five years suggested in Sir Arthur Godley's letter as the period for which any arrangement might first be made, and, perhaps, before the end of that period some new arrangement of the Chair might be effected, but in the meantime it has been thought well to call the attention of the India Office to the present state of things.

Annexure.

Sibthorpiian Professor of Rural Economy.

The following scheme for the Regulation of the Sibthorpiian Professorship was sanctioned by the Chancery Division of the High Court of Justice on the 14th day of July, 1883.

- 1 The Sibthorpiian Professor of Rural Economy shall lecture and give instruction on the scientific principles of Agriculture and Forestry.
2. He shall be entitled to the emolument of £200 derived from the Benefaction of Dr. John Sibthorp, Doctor of Medicine, and assigned to the Professorship.
3. The Professor shall be elected by a Board of Electors consisting of—
 - The Vice-Chancellor,
 - The Sherardian Professor of Botany,
 - The Professor of Geology,
 - The Waynflete Professor of Physiology,
 - The Waynflete Professor of Chemistry,
 - The President of the Royal Society,
 - The President of the Linnæan Society.
4. If an Elector is himself a Candidate for the vacant office, the Hebdomadal Council shall nominate a person to act on that occasion in his room.

5. The Professor shall hold his office for a period of three years from election, and no longer. He may be re-elected for a second period of three years, and no longer; but no Professor shall hold the Professorship for more than six years consecutively.

6. The Professor shall have the use of the garden appropriated for making experiments on the subjects of his Professorship.

7. The balance of the emoluments derived from the benefaction of Dr. John Sibthorp shall be applied as directed in his Will to the purchase of books on the subjects of agriculture and forestry, the Professor making a list of such books as he judges most useful. The said books and also those which have heretofore been purchased out of Dr. John Sibthorp's Benefaction, and also those which were bequeathed by Dr. John Sibthorp, shall be carefully preserved under the care of the Professor in a place to be assigned for the purpose by the University.

8. The Professor shall give not less than twelve Lectures in the course of the academical year: they shall be given in full Term, and not more than two shall be given in any one week.

No. 9.

Letter from the Vice-Chancellor of the University of Cambridge to the India Office, dated the 22nd November, 1904.

My predecessor in office, the late Vice-Chancellor, on Monday last reported to the Council of the Senate of this University the action he had taken during the Long Vacation of this year in communicating to you in a letter dated July 8, 1904, the outline of a scheme for providing at Cambridge the preliminary training of students in the science of Forestry. The letter written by the late Vice-Chancellor was prompted by the reference (on page 22 of the Reports and Correspondence relating to the Royal Indian Engineering College, 1904) to Cambridge University as offering facilities which would make Cambridge a suitable place to which selected candidates in Forestry might be sent instead of as now to Coopers Hill College.

The Council of the Senate, deeming that possibly the Long Vacation may have been thought to be an inconvenient time for making communications to the University, have requested me to ask whether at this stage in the Academic year they may expect to receive some reply—as they hope, of a favourable nature—to the letter of the late Vice-Chancellor, the Rev. Dr. Chase, dated July 8, 1904.

I enclose another copy of the scheme, referred to above, which was sent in July with Dr. Chase's letter.

I have, &c.,

(Signed) EDWARD A. BECK,
Vice-Chancellor of the University of Cambridge

No. 10.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated the 28th November, 1904.

I am directed by the Secretary of State for India in Council to refer to the letter, dated 8th July, 1904, which you addressed to him on the subject of the recommendation made by the Committee which enquired into matters connected with the Royal Indian Engineering College, that Cambridge should be appointed as the place for training probationers selected for the India Forest Department.

I am to express regret for the delay which has occurred in answering your letter, and to explain that the Secretary of State was at the time in communication with the University of Oxford with a view to the establishment of a School of Forestry there for the training of Indian forest students, and that he thought it advisable to await the issue of the proposals which he had made to that University.

I am now to forward for your information a copy of correspondence* between this Office and the University of Oxford, and a preliminary draft† of regulations for the selection and training of probationers for the Indian Forest Service.

I am to say that the draft is still in an incomplete state, and has not been finally accepted by the University of Oxford. The Secretary of State for India has decided to communicate it to you without further delay, as he will be glad to receive any observations which the University of Cambridge may desire to make respecting the details of the proposed scheme for the selection of probationers.

I am, &c.,

(Signed) HORACE WALPOLE

No. 11.

Letter from the Vice-Chancellor of the University of Cambridge to the Under Secretary of State for India, dated the 5th December, 1904.

I have now the honour to reply more fully, at the request of the Council of the Senate, to your communication dated 28th November, 1904, in which you inform me that the proposed scheme for the transference of the Forestry School from Coopers Hill to Oxford is still in an incomplete state, and that the Secretary of State for India in Council will be glad to receive any observations which the University of Cambridge may desire to make respecting the details of the proposed scheme for the selection of probationers.

The observations which the Council of the Senate desire to make may be conveniently distributed under the following heads:—

- (1) The claims of Cambridge for consideration as a place of training for Forestry students;
- (2) The manner in which the scheme as drafted by the India Office in connection with Oxford will affect Cambridge;
- (3) The importance of equality of treatment as between Oxford and Cambridge with reference to the supply of candidates for the Public Service;
- (4) Suggestions for an amendment of the scheme.

1. With regard to the claims of Cambridge I beg leave to point out that Cambridge is already fully equipped in all the requirements of the draft scheme, except the appointment of lecturers on Forestry. As sufficient evidence of this I would refer to the printed scheme sent by the Vice-Chancellor to the Secretary of State for India on July 8th, and again on November 25th of this year, and to the Reports of Departmental Committees published within the last twelve months in favour of Cambridge as a School for Forestry.

Further, the University has already an examination for a Diploma in Agriculture in which most of the subjects are the same as those required as a test of training in Forestry. The Council is of opinion that the

* Nos 7 and 8.

† Substantially the same as that enclosed in No. 12.

University would sanction a modification of the regulations for that examination which would enable it to serve as an examination for a Diploma in Forestry; and students may and do take Agriculture as the subject of their final examination for the ordinary B.A. degree. The Council anticipate no difficulty in the carrying out of arrangements (as suggested in section 5 of the letter of Sir A. Godley to the Vice-Chancellor of Oxford University, 19th August, 1904) for the necessary excursions of students during the Terms. Arrangements for vacation study outside Cambridge in or near Forests would be merely an extension of a practice already common in the case of Engineering and Mining Students, who spend a portion of their vacations in Engineering Works and Mines.

2. With regard to the manner in which the scheme as drafted by the India Office will affect Cambridge, the Council of the Senate desire me to express unhesitatingly their conviction that the scheme will have the effect of excluding Cambridge from any share in supplying candidates for the Indian and Colonial Forest Service. In face of the proposed regulations, if they should be adopted, no schoolmaster could venture to recommend any pupil destined for the Forest Service to come to Cambridge. The necessity imposed upon Cambridge men to migrate in the middle of their course to Oxford would to loyal members of the University and their respective Colleges be just as unpopular as the converse migration would be to Oxford men. And the Council venture to think that the proposal to place entirely in the hands of another University the conduct of an Examination by which the fate of Cambridge students is to be decided is absolutely without precedent.

3. With regard to the principle hitherto admitted as sound in the interests of the Public Service, that there should be equality of treatment between the two ancient Universities, the Council have confidence that the Secretary of State for India will see his way to some amendment of the scheme by which the inequality as between Oxford and Cambridge may be redressed. The Council do not wish to press that any favour should be shown to Cambridge which may not similarly be accorded to Oxford. But, having regard to the recommendations of Departmental Committees already referred to, they consider that at least the opportunity should be allowed to the University of giving proof that it is fully able under equitable regulations to meet the demands of the Public Service in Forestry as in other departments.

4. Lastly the Council in response to the invitation of the Secretary of State for India offer some suggestions for the amendment of the scheme. The Council fully appreciate the objection which they understand has been raised, on the ground of expense to the Public, to a division of the staff of the Coopers Hill Forestry Class. But they desire to point out that the expense to the Public would be much less if the Forestry Class were transferred to Cambridge than if it were transferred to Oxford, the scientific staff, with the Laboratory accommodation, being larger in the former University. They repeat, as was said above, that they do not desire any special favour to be accorded to Cambridge. But they think that a reasonable plan would be that the selected candidates should be allowed to choose for their period of probation either Oxford or Cambridge, and that each University should receive a subsidy to enable it to provide adequate teaching in Forestry.

The Council then suggest for the consideration of the Secretary of State for India the following amendments:—

- (a) that the examination held for the selection of probationers in Forestry should be conducted, under the control of the India Office, by examiners taken equally from Oxford and Cambridge; and that the examination should be a joint examination;
- (b) that the selected candidates should be allowed to choose for the period of probation either Oxford or Cambridge;

(c) that a subsidy be made annually to both Universities with the view of enabling them to provide adequate instruction in Forestry.

The Council think it right to inform you that, as in the case of other matters of similar importance, they have consulted the Chancellor of the University with reference to the correspondence between the University and the India Office.

I have, &c.,

(Signed) EDWARD A. BECK,

Vice-Chancellor.

No. 12.

Letter from the India Office to the President of Magdalen College, Oxford, dated the 9th December, 1904.

I am directed by the Secretary of State for India in Council to acknowledge the receipt of your letter of the 25th October, on the subject of the selection and training of the Probationers for the Indian Forest Service, and to express his thanks for the assistance which the authorities of Oxford University are prepared to give in this matter.

In reply to your letter, I am to inform you that the Secretary of State has caused to be prepared, in communication with the Principal Professor of Forestry at Coopers Hill, Dr. Schlich, the enclosed preliminary draft of Regulations under which the new system might be introduced, and that he has authorised Dr. Schlich to discuss the draft with the authorities of the University in such manner as may be arranged.

Mr. Brodrick would be glad to receive any observations which the authorities of the University may desire to offer after communication with Dr. Schlich.

He desires it at the same time to be understood that the draft does not represent his final opinion in Council on all the matters therein dealt with, and he is awaiting the receipt of any observations which the authorities of the University of Cambridge may desire to offer respecting the details of the proposed scheme for the selection of Probationers.

I am to add, in reply to the enquiries made on certain points in connection with the new arrangements, that—

- (1) the Secretary of State in Council would be prepared, if necessary, to contribute a sum of "about £200 a year" for a Lecturer and Assistant in the Department of the Hope Professor of Zoology, to provide for the teaching of Forest Entomology;
- (2) the age for admission to the Open Competitive Examination is fixed (provisionally) at not less than 18, or more than 21, years on the 1st January (see paragraph 3 of the draft);
- (3) the question as to whether any grants should be made to the Probationers has not yet been fully considered, but a suggestion has been made that a premium of say £50 should be offered to each Probationer who reaches a certain standard in the practical work to be done on the Continent in his third year. In any case the Probationers would be provided with a free passage to India (or its equivalent) on their final appointment.

I am, &c.,

(Signed) HORACE WALPOLE.

Enclosure in No. 12.

Indian Forest Service — Preliminary Draft of Regulations as to the Appointment of Probationers. 1905.

1. The Secretary of State for India in Council will, in the summer of 1905, make not less than ten appointments of Probationers for the Indian Forest Service, provided that so many candidates are in all respects qualified under the conditions hereinafter set forth, upon the results of a competitive examination to be conducted in June next by the Authorities of the University of Oxford.

2. Applications for admission to the examination must be made on a printed form to be obtained from the Secretary, Judicial and Public Department, India Office, Whitehall, London, S.W., and to be returned to him not later than Monday, the 1st May, 1905.

No applications received after that date will be considered.

3. The age of candidates must not be less than 18, or more than 21, years on the 1st January, 1905.

4. Every candidate must be a natural-born British subject. He must be unmarried, and if he marries before reaching India, he will forfeit his appointment.

5. Every candidate must have passed either the examination of the University of Oxford known as Responsions, or some examination which is accepted by the University Authorities as equivalent thereto.

6. The subjects of the examination indicated in paragraph 1 and the marks assigned to each subject are as follows:—

	Marks.
(1.) Mechanics and Physics
(2.) Chemistry
(3.) Zoology
(4.) Botany
(5.) German

The examination in subjects (1) to (4) will be on the lines of the Preliminary Examination in the Honour School of Natural Science. In German, candidates are expected to satisfy the Examiner in translations of unseen passages from German into English and from English into German.

The Syllabus of the Examination forms Appendix I.*

7. A fee of £ is required from every candidate, and instructions as to the manner of payment of this fee, the time and place of the examination, or any other necessary information, will be sent to candidates direct by the University Authorities to the address supplied by the candidates to the India Office.

8. Those candidates who are successful in the competitive examination will be required, shortly after the result of the examination is declared, to undergo a strict examination by a Medical Board at the India Office, at which particular stress will be laid on good vision and hearing.

On passing this medical examination candidates will be deemed to be Probationers for the Indian Forest Service, and must, if not already matriculated members of the University of Oxford, join that University.

9. The period of probation will extend over about three years. For the first two years the Probationers will be required to undergo a special course of study as members of the University of Oxford, and during the remainder of their period of probation they will receive practical instruction, visiting under suitable supervision such Continental forests as may

* Not printed.

be selected for the purpose. Excursions may also be made for purposes of study, both during term time and during part of the vacations.

10. The Probationers will be required to defray all expenses for lodging, board, tuition, and excursions which they may incur during the period of their probation at Oxford. During the three terms of practical instruction on the Continent each Probationer will be required to pay in advance a charge of 60*l.* a term, for which the Secretary of State for India will provide (1) board, lodging, and washing; (2) travelling expenses; and (3) fees to local forest officers, &c.

11. The prescribed course of study for the Probationers comprises the following subjects:—

I.—*Auxiliary Subjects.*

- (1.) Elementary Organic Chemistry and the Chemistry of soils.
- (2.) Geology.
- (3.) Forest Entomology.
- (4.) Forest Botany.
- (5.) Geometrical Drawing, Mathematics up to and including Plane Trigonometry and Surveying.
- (6.) German.
- (7.) Engineering (elementary).
- (8.) Book-keeping, in reference to Indian Forest Accounts.

II.—*Forestry, Theoretical and Practical, in all its branches.*

12. Every Probationer will be required to conduct himself during the period of probation in a manner satisfactory to the Secretary of State, and to give evidence of satisfactory progress in his studies in such manner as may be required, failing which, or in the event of serious misconduct, he will be liable to have his name removed from the list of the Probationers.

A Probationer may also, at the discretion of the Secretary of State, be required from time to time to appear before the Medical Board, and, should the result be unsatisfactory, he will be liable to have his name removed from the list of Probationers.

13. During the period of probation, the proficiency of the Probationers will be tested by periodical examinations, and on the termination of their studies there will be a final examination.

The Probationers who satisfy the Examiners in these examinations will receive the Diploma of Forestry. It is desirable that they should, if possible, also obtain a degree in the Honour School of Natural Science at the University.

14. Probationers who (1) have obtained the Diploma of Forestry; (2) have completed the practical course in Forestry on the Continent; and (3) are of sound constitution and free from physical defects which would render them unsuitable for employment in the Indian Forest Service, will be appointed Assistant Conservators in the Indian Forest Department in the order of their standing at the end of the Final Examination. Their position on the list will be determined by the results of the examinations held during the two years residence at Oxford and the manner in which they have completed the practical course on the Continent.

15. Every Probationer, before proceeding to India, will be required to satisfy the Secretary of State, in such manner as may be determined,

of his ability to ride. It is desirable that this evidence should be forthcoming before the Probationer proceeds to the Continent for his final period of study.

* * * * *

(Paragraphs as to pay, leave, pension, and passage arrangements, &c., to be here inserted.)

No. 13.

Letter from the Secretary to the Court of the University of Edinburgh to the India Office, dated the 16th December, 1904.

If the University Court have been correctly informed, proposals are being considered by the India Office to modify the existing arrangements for the instruction of candidates in the Forestry Branch of the Indian Civil Service.

As the adoption and promulgation of any serious modification of these arrangements by so powerful a Department of State as the India Office cannot but be attended by far-reaching consequences to this University as well as to other Universities similarly situated in respect of this subject, I am instructed respectfully to inquire whether the India Office will favour the University Court with an outline of the scheme which, it is understood, is under consideration, together with such particulars as the India Office may be able to communicate

I may state in explanation of the grounds on which the Court venture to prefer this request, that Courses of Instruction in Forestry have been given in the University of Edinburgh for some fourteen years by the University Lecturer in that subject—Colonel Bailey, R.E. (retired)—and that the Court, in addition to other efforts to extend and strengthen this department of teaching, are taking steps to promote an Ordinance which, if sanctioned by His Majesty in Council, will enable the University to confer a University Degree, that of Bachelor of Science in Forestry, on candidates who qualify by a due attendance on the Courses of Instruction and pass the Examinations which may be prescribed.

I have, &c.,

(Signed) M. C. TAYLOR,

Secretary.

No. 14.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated 20th December, 1904.

I am directed to say that your letter of the 5th December, conveying the remarks of the Council of the Senate of the University of Cambridge

on the scheme for the training of Probationers for the Indian Forest Service at Oxford, has received the careful consideration of the Secretary of State in Council.

Mr. Brodrick must observe in the first place that it has been deemed essential that the Professor and Assistant Professor of Forestry, who have hitherto been entrusted with the training of the Forest Students at Coopers Hill, should be placed in charge of the training which the Probationers will in future undergo at a University; and in these circumstances it was obviously inevitable that one University, and not more than one, should be selected for the purpose of affording the necessary education. This essential condition makes it impossible to accept the proposal of your letter that selected candidates should be allowed to choose for the period of their probationary studies either Oxford or Cambridge.

In considering at which of these two Universities the School should be located, Mr. Brodrick had before him the Report of the Committee appointed by the Board of Agricultural Studies at Cambridge to consider the recommendations of the Departmental Committee on British Forestry, a copy of which was forwarded to him with your predecessor's letter of the 8th July last. He found it stated in that report that the Committee had come to the conclusion "that the greater part of the necessary training could be given in the University, but that instruction in the purely technical subjects must be provided at a properly staffed Forest School. A school of the kind required, it was urged, could not be located at Cambridge, for it must be in or near established woods. If, however, a State School for practical Forestry were maintained at Coopers Hill or elsewhere, it could be used to supplement the theoretical instruction given in Cambridge."

He also had before him a report by Dr. Schlich, the Professor of Forestry at Coopers Hill, pointing out that those requisites for practical instruction, the absence of which at Cambridge was admitted, could be supplied at Oxford, where the necessary courses of theoretical study could equally well be carried out.

I am to add that the number of Forest students trained for the Government Service in India is only 9 or 10 per annum, and that it would obviously be impracticable to charge the revenues of India with a large expenditure on account of their training at several centres.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 15.

Letter from the Vice-Chancellor of the University of Cambridge to the India Office, dated the 25th January, 1905.

I reported to the Council of the Senate the substance of what was said on the part of the University and of the India Office on January 19th, when you were good enough to receive a Deputation on the subject of the proposed transference of the Coopers Hill School of Forestry to Oxford.

You will doubtless remember that after explaining the attitude of this University in the matter, the Deputation pressed very strongly two requests which they thought the University entitled to make. These were—

- (1) that no final decision shall be taken at present;

- (2) that you would invite a conference to be attended by delegates mainly scientific, from the Universities of Oxford and Cambridge, and the scientific or other advisers of the India Office, with the view of framing a scheme which might be acceptable to all three of the bodies named.

These requests are in accordance with the weighty expression of opinion contained in the letter from the Duke of Devonshire, our Chancellor, which I read to you on the occasion of your receiving our Deputation. The Chancellor wrote: "In my view (the question) touches nearly not only the interests of our University, but also the efficiency of the Public Service."

I am now in a position to inform you that in the event of your acceding to these requests, the Council of the Senate are prepared at once to make the necessary appointment of representatives to attend a conference.

It will be a great convenience to the Council if they can hear from you on this matter as soon as possible. Their next meeting is on Monday, January 30.

I am, &c.,

(Signed) EDWARD A. BECK,

Vice-Chancellor.

No. 16.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated the 27th January, 1905.

I am directed by Mr. Brodrick to acknowledge the receipt of your letter of the 25th instant, proposing that a conference should be held to discuss the question of the training of Probationers for service in the Forest Department of the Government of India, to which the University of Cambridge should send representatives.

In reply, I am to say that Mr. Brodrick is willing that such a conference should be held, at which two representatives of the University of Cambridge should be present.

He thinks that you are aware that time presses, and he would therefore wish that the conference should meet as soon as possible. It will be necessary to refer the matter to the authorities of the University of Oxford, and to ask them also to send the same number of representatives; but pending their reply, I am to inquire whether Thursday next, the 2nd February, at 12 noon, at this Office, will be a convenient time and place for the conference.

I am, &c.,

(Signed) A. GODLEY.

No. 17.

Letter from the India Office to the President of Magdalen College, Oxford, dated the 27th January, 1905.

The representatives of the University of Cambridge urged, at their recent interview with the Secretary of State, that a conference should be held at this Office to discuss the question of the training of Probationers for the Indian Forest Department, and Mr. Brodrick has decided to accede to their request. He has asked them to nominate two representatives of the University, and has suggested Thursday next, the 2nd February, at 12 noon, as the time of meeting.

He would be very much obliged if the University of Oxford would also nominate two gentlemen to represent their views at the conference, and make arrangements (if it is not inconvenient) for them to attend here at the time suggested.

I am to apologise for giving such short notice; but you are aware that time presses.

Yours, &c.,

(Signed) A. GODLEY.

No. 18.

Letter from the India Office to Sir D. Brandis, K.C.I.E., formerly Inspector General of Forests in India, dated the 30th January, 1905.

I am directed to inform you that, at the request of the University of Cambridge, the Secretary of State for India has decided that a conference shall be held at this Office on Thursday the 2nd February, at 12 noon, to discuss questions relating to the proposed course of study for Probationers for the Indian Forest Department. The University of Cambridge will, it is expected, be represented at the conference by two delegates, and a similar number will, it is hoped, be deputed by the University of Oxford. Dr. Schlich has been asked to be present, and Mr. Brodrick will be much indebted to you if you would consent also to join the conference. The questions to be discussed are of great importance to the future of Forestry in India, and he would greatly value the assistance in arriving at a decision upon them which he would derive from your intimate and unique knowledge of the subject.

I am, &c.,

(Signed) A. GODLEY.

No. 19.

Report of a Conference held at the India Office on
Thursday, the 2nd February, 1905.

Present:—

Sir JOHN EDGE, K.C., Chairman.

Representatives of the University of Oxford { The PRESIDENT OF MAGDALEN COLLEGE, Oxford.
Prof. H. A. MIERS, D.Sc., F.R.S., Magdalen College, Oxford.

Representatives of the University of Cambridge { The MASTER OF GONVILLE AND CAIUS COLLEGE, Cambridge.
Mr. A. E. SHIPLEY, Christ's College, Cambridge.

Sir CHARLES J. LYALL, K.C.S.I., C.I.E.

Mr. T. W. HOLDERNESSE, C.S.I.

Sir DIETRICH BRANDIS, K.C.I.E., Ph.D., F.R.S., formerly Inspector-General of Forests in India.

Dr. W. SCHLICH, C.I.E., Ph.D., F.R.S., Principal Professor of Forestry at the R.I.E. College.

Mr. W. R. FISHER, Assistant Professor of Forestry at the R.I.E. College.

The CHAIRMAN.—Gentlemen, it is, I need hardly say, our duty in the India Office to see that any scheme which is agreed to is one which will give us the best trained Probationers to send out to India in the Forest Service. In this matter we are dealing with the revenues of India; we are, to a great extent, trustees for the management of those revenues; and we have to secure that our funds shall be applied to the purposes of India, although our sympathies are entirely with the creation of a still greater School of Forestry.

I do not know whether the members of the Conference have got the scheme that is proposed, but which has not yet been adopted.

The MASTER OF CAIUS COLLEGE, Cambridge.—No, we are quite ignorant of it, unfortunately.

Sir CHARLES LYALL.—That is the revise of the scheme that was sent to Cambridge in October, I think, or November. The essential point about the scheme is the same in both.

The CHAIRMAN.—I may mention that this scheme has been put forward by the Department of the India Office, but has not yet been sanctioned; it has not yet been before the Council.

The MASTER OF CAIUS COLLEGE.—Would the Chairman say precisely why we are called together?

The CHAIRMAN.—I think we are called together on account of a letter which we received from Cambridge.

The MASTER OF CAIUS COLLEGE.—Might we have that read in full?

The CHAIRMAN.—Yes.

"The Master's Lodge, Trinity Hall,
"Cambridge, January 25, 1905.

"MY DEAR SIR,

"I REPORTED to the Council of the Senate the substance of what was said on the part of the University and of the India Office on January 19th, when you were good enough to receive a deputation on the subject of the proposed transference of the Coopers Hill School of Forestry to Oxford. You will doubtless remember that, after explaining the attitude of this University in the matter, the deputation pressed very strongly two requests which they thought the University entitled to make. These were (1) that no final decision shall be taken at present; (2) that you would invite a conference to be attended by delegates, mainly scientific, from the Universities of Oxford and Cambridge and the scientific or other advisers of the India Office, with the view of framing a scheme which might be acceptable to all three bodies named.

"These requests are in accordance with the weighty expression of opinion contained in the letter from the Duke of Devonshire, our Chancellor, which I read to you on the occasion of your receiving our deputation. The Chancellor wrote, 'In my view it (the question) touches nearly not only the interests of our University but also the efficiency of the public service.'

"I am now in a position to inform you that, in the event of your acceding to these requests, the Council of the Senate are prepared at once to make the necessary appointment of representatives to attend a conference.

"It will be of great convenience to the Council if they can hear from you on this matter as soon as possible. Their next meeting is on Monday, January 30th.

"I am, my dear Sir,

"Your very faithfully,

"EDWARD A. BECK,

"Vice-Chancellor.

"To the Secretary of State for India."

That, I understand, was the immediate cause of our meeting here to-day.

The MASTER OF CAIUS COLLEGE.—And that is the subject of discussion, I suppose?

The CHAIRMAN.—Yes, I think so.

The MASTER OF CAIUS COLLEGE.—That is, the possibility of framing a scheme which will be satisfactory to all the three bodies named?

The CHAIRMAN.—Yes.

The MASTER OF CAIUS COLLEGE.—Might it not clear the way if we said at once that the first regulation could in no sense be regarded as satisfactory to the University of Cambridge?

The CHAIRMAN.—I suppose your objection there has reference to the examination by the authorities of the University of Oxford, which is mentioned in the last two lines?

The MASTER OF CAIUS COLLEGE.—What we contend, and what we set forth very strongly, is that this scheme absolutely excludes any Cambridge-trained men at all. When we take into account the large number of natural science men who pass through Cambridge every year—last year

nearly 160 got natural science honours—we think that that is a very unfair regulation and very bad for the public service. That is an outline of our objection.

The PRESIDENT OF MAGDALEN COLLEGE, Oxford.—When the Master says that it excludes Cambridge-trained men, he means, I suppose, men who have gone through their complete course of training at Cambridge; because, of course, no one would know better than the Master that they could pass their Little Go, which is equivalent to our Responsions, and they could spend their first year at Cambridge and could qualify for the entrance examination at Cambridge probably quite as well as at Oxford.

Mr. SHIPLEY.—I have consulted a good many people about it, and I find exactly the same feeling in Edinburgh. They say that their students would not leave the University at the end of the first year, just at the time when they are keenest, and go to another University, even for these appointments. I think that is the universal opinion at Cambridge. I do not think Oxford men, if this plan were reversed, would leave Oxford at the end of their first year and come over to Cambridge. Really, our objection is that this is the first time, as far as I know, that any public service has been handed over practically completely to one University, and we do press that very strongly. I know something about Oxford, for I have the honour to be examiner there at the present time. I know a number of men are prepared to take honours in science. We had 129 last year in the first part of the Tripos and 29 in the second part; and many of these men would be very keen. Only the day before yesterday one man came up before the Professor of Botany, knowing nothing about this discussion, and asked him how he could get into the Forestry Service. Then it is very strongly felt that the men should be selected not by a very preliminary examination such as is suggested here, but at the end of the time; and it is also very strongly felt that all those men should have a degree. The value of a degree to a man who has gone to India from Cambridge or Oxford is very considerable—far greater than it is in England. The importance attached to a degree there, by natives especially, is very considerable. We think we could arrange such a scheme in consultation with Oxford as would allow our men to have a chance of going in, instead of your getting men without degrees.

The CHAIRMAN.—As I understand, Master, with regard to Regulation 1, your objection only goes to the competitive examination being held by the University of Oxford.

The MASTER OF CAIUS COLLEGE.—And the necessary transference of Cambridge men to Oxford.

The CHAIRMAN.—That would arise on the other regulations. This is your first objection, is it not?

The MASTER OF CAIUS COLLEGE.—Yes.

The CHAIRMAN.—What would you propose instead of the examination being conducted by the authorities of the University of Oxford?

The MASTER OF CAIUS COLLEGE.—An examination by the Civil Service Commissioners. What I object to is the transference of Cambridge men in the middle of their course to another University. I should like to say, in supplement to what Mr. Shipley has just said, that it may be possible to argue that Cambridge men would go; but the universal feeling is that they would not go, and that there would be no inducement to send them at all on the part of their advisers. The question of Indian Forestry would not come forward as a possible career for Cambridge men at all. It is very difficult to put forward arguments which can prove that case, but I do maintain that we are the people who are best qualified to judge upon that probability.

The CHAIRMAN.—Of course you must be as far as Cambridge men are concerned.

The MASTER OF CAIUS COLLEGE.—That being so, we say it would be doing a great injustice to the University of Cambridge.

Dr. SCHLICH.—Do you expect that the Government of India should pay for preventing that injustice to the University of Cambridge? Do you not think the Government of India has to concern itself first with its own interest and to make such arrangement as is most in accordance with its requirements, without regard to whether four or five men go to Cambridge or not? Why should the Government of India be called upon here to go into extra expenditure because there is a certain rivalry, or whatever you may call it, between the two Universities? And there will not only be two, there will be half a dozen; others will come forward; Edinburgh is already in the field, probably Dublin will come, and the University of Wales will come, and there will be no end to it.

The CHAIRMAN.—That will arise on the question of the practical difficulty of having the school at more than one particular place.

Dr. SCHLICH.—You can only have the school at one particular place.

The CHAIRMAN.—I understand the only objection to Regulation 1 is on behalf of Cambridge, and the objection is to the examination according to this proposed regulation being held by the authorities of the University of Oxford. You say it should be held by the Civil Service Commissioners.

The MASTER OF CAIUS COLLEGE.—Yes. I should also like to say that I do not admit Dr. Schlich's contention, which he has made just now.

The CHAIRMAN.—I think we can more conveniently discuss that on the practical question when we come to it.

Mr. HOLDERNESS.—Could this objection be obviated entirely if the examination were transferred from Oxford to the Civil Service Commissioners, the general scheme of examination being the same?

The CHAIRMAN.—The Master's present objection is on Regulation 1, and, so far as I understand, that is the only objection to it.

Mr. SHIPLEY.—It is rather difficult to say that, when we have only just had the paper put into our hands. I hope it will not be taken that because we do not make an objection we have none.

The CHAIRMAN.—No.

The PRESIDENT OF MAGDALEN COLLEGE.—I understand the Master is going to object to a great deal, and perhaps to the spirit of the whole. At present I think you are confining us to Regulation 1, and to the particular point whether the examination is to be conducted by the authorities of the University of Oxford or by some other body.

The CHAIRMAN.—So far as I understand, that is so. I do not mind much where we begin, but the Master began by objecting to Regulation 1, and therefore I thought I would understand what his objection to that regulation was.

On Regulation 2 (Admission to Examination) there cannot be any objection, one way or the other, of course.

Have you any objection to Regulation 3 (Age Limits)?

The MASTER OF CAIUS COLLEGE.—I think it would be better to put them a little bit higher, but still I can quite see that whatever could be worked by Oxford could be worked by Cambridge, and I would not raise any objection on that.

The CHAIRMAN.—You see we want to get the Forest Officers out before they are too old.

The MASTER OF CAIUS COLLEGE.—We had practically the same difficulty in the case of the military candidates, and we have accepted the condition of a certain limit of age, though we do not think it is the best.

The CHAIRMAN.—Regulation 4 (Nationality, &c.). Of course, that is really for the Secretary of State.

Now we come to Regulation 5 (Qualifying Examinations). Now the main question arises.

The MASTER OF CAIUS COLLEGE.—I do not think that is serious. The Regulation says the candidate must have passed “either the examination of the University of Oxford known as Responsions or some examination which is accepted by the University as equivalent thereto.” That is practically the Cambridge Previous Examination. You might just as well put in there, for instance, “the Previous Examination in the University of Cambridge”; but there is no serious objection to Regulation 5.

The CHAIRMAN.—Then 6 (Subjects of Examination).

Mr. SHIPLEY.—We feel very strongly that the men ought to be chosen at the end of their University career and not at the beginning. You get a much better qualified man now for the India Civil Service and for Engineering and the other Departments of the Government Service because he is taken from the final examination and not from the preliminary examination. This preliminary examination which is suggested is a very simple one, and it seems to me hardly wise to choose men for a service on such a very elementary examination as this. We should urge most strongly that they should be chosen at the end of their career, when they are older men and know more about it, and when they are not mere boys who have just passed a very preliminary examination in science, but have been able to get a degree.

Mr. HOLDERNESS.—Does that not affect the age limit?

Mr. SHIPLEY.—Possibly at the upper end, but I think our men as a rule come up at 18 and leave at 21. They take their final examination in June. We have an arrangement now in Cambridge by which they can come up and take the honours examination in two years, and have the last year with absolutely nothing to do but pure technical forestry.

The CHAIRMAN.—When you suggest that the selection examination should be at the end of the course, are you including the practical instruction?

Mr. SHIPLEY.—I have put that in the third year, if necessary.

The CHAIRMAN.—Would you fix the competitive examination after the men had completed their course in Germany, for instance?

The MASTER OF CAIUS COLLEGE.—No. That is the technical course.

Mr. SHIPLEY.—What they could do in Cambridge is that they could at the end of their first year take the first part of the diploma of agriculture. That is a special examination, and enables them to get the B.A. Then in the second year they could take the second part of the Natural Science Tripos, and by keeping three more terms with no more examination they could proceed to the B.A. Then they could have the last year, and perhaps part of the next year, if we could afford them a fourth year, doing nothing but pure forestry, and in the meantime they could be doing agriculture and all the allied subjects mentioned in the documents.

Dr. SCHLICH.—Did I understand you to speak of a fourth year?

Mr. SHIPLEY.—If there is a fourth, but at any rate they could have the whole of the third year for this.

Sir CHARLES LYALL.—The third year must be spent at Cambridge?

Mr. SHIPLEY.—Yes, because of keeping terms, but they would have no other examination for their degree. If they have taken the first part of the general diploma in agriculture and the first part of natural science, they can proceed to their degree by keeping terms only; so the entire third year would be available for pure forestry.

The CHAIRMAN.—Would it be at the end of the third year that you would suggest the competitive examination ought to be held?

Mr. SHIPLEY.—I think it might be taken better at the end of the second year, when they have completed their final B.A. examination. It might be part of the Tripos. The Tripos is already used in some such way for giving certain prizes. The examiners make no difficulty about giving outside people information as to the marks and telling them this man or that man has won the prize; and they might be willing to do it for such a purpose as this.

The MASTER OF CAIUS COLLEGE.—The limit of age would settle that question. A man would say, "If I put off my Tripos to the end of the third year and then go in for the competitive examination, I may be too old." There would be every inducement to take honours at the end of the second year and to keep the third year for the technical instruction.

The CHAIRMAN.—It would depend on the age, then.

The PRESIDENT OF MAGDALEN COLLEGE.—Do I understand that there is to be no further examination for the degree at Cambridge or Oxford?

The MASTER OF CAIUS COLLEGE.—Not if we should take that course. The final examination would not be an honours degree.

The PRESIDENT OF MAGDALEN COLLEGE.—It would be a pass degree?

The MASTER OF CAIUS COLLEGE.—Yes. I do not quite know what it would be in Oxford; I suppose men at Oxford take honours in moderations and then qualify by some other way in order to get a degree at the end of the third year. It will be something like that.

The PRESIDENT OF MAGDALEN COLLEGE.—We have not anything exactly corresponding to what you have at Cambridge.

Mr. SHIPLEY.—It is simply due to the fact that the University recognises the first part of the diploma of agriculture as special. If a man in Cambridge takes the Tripos in the second year, he has then to pass the special, and, if he has passed the special before he has taken the Tripos, it counts. It is an anomalous state of things, but it seems to me to work in very well with this scheme.

The CHAIRMAN.—If it were decided by the Secretary of State in Council that a competitive examination should be held as suggested at the commencement, have you any objection to urge against the four subjects mentioned in Regulation 6?

The MASTER OF CAIUS COLLEGE.—No. (To Mr. Shipley)—Except against the standard, I think you say.

Mr. SHIPLEY.—I think the examination is a very easy one.

The CHAIRMAN.—Do you think it is not sufficient?

Mr. SHIPLEY.—I do not think it is sufficiently good for that.

The PRESIDENT OF MAGDALEN COLLEGE.—Supposing a man passes the Tripos in the second year, would you take the competitive examination then?

Mr. SHIPLEY.—Yes.

The PRESIDENT OF MAGDALEN COLLEGE.—That would be before he had begun his forestry.

Mr. SHIPLEY.—Then of course he would be provisionally allocated for that, but if his forestry turned out very badly he could stand down; he would be liable to be sent away if he did not reach a certain standard. Of course these details are very difficult for us to go into now, because we have not had the schemes very much before us. I have no doubt that if we could agree upon some broad principle, we could manage the details at Cambridge.

The MASTER OF CAIUS COLLEGE.—If I may say so, another grievance that we have is that we are, in the matter of deliberation, at least five

months behind Oxford, because we have not had the opportunity they have had of considering this. We have been fairly busy since the question has been brought before us.

Sir CHARLES LYALL.—The first form of the scheme was sent to you at the same time as to Oxford. The interval which necessarily occurred was due to the vacation. The first letter was sent to Oxford in August. That letter was not answered by Oxford until October, and until the Oxford answer was received it was impossible to frame any scheme of this sort, but when that scheme was first framed it was sent simultaneously to Cambridge and to Oxford.

The MASTER OF CAIUS COLLEGE.—If I may speak frankly I think we might have had it at the same time for consideration that Oxford had it. The date on which the letter was sent to Oxford was August 19th, and the date on which our scheme was sent to the India Office was July 9th. The long vacation is exactly the time when the experts could have been putting their heads together to see what could be done and formulating their criticisms.

Sir CHARLES LYALL.—That is an unforunate thing, no doubt; but the first form of the scheme was put before the University of Oxford and the University of Cambridge at precisely the same time.

The MASTER OF CAIUS COLLEGE.—No, Sir, it was not. We did not get it until we wrote for it.

The PRESIDENT OF MAGDALEN COLLEGE.—Was not the Cambridge scheme sent up to the India Office before the Oxford scheme?

The MASTER OF CAIUS COLLEGE.—That was not the scheme.

The PRESIDENT OF MAGDALEN COLLEGE.—I understood just now that you had sent it up.

The MASTER OF CAIUS COLLEGE.—We sent up a scheme but that was a scheme which was professedly based upon a report in a Blue Book, which was not the Coopers Hill Blue Book. I may say it was drawn up, as far as we could do it, without the expert advice of Dr Schlich or a distinguished scholar of that kind, but it was drawn up on the evidence given by Dr. Schlich and on his suggestion.

The PRESIDENT OF MAGDALEN COLLEGE.—And so far you were ahead of us.

Mr. SHIPLEY.—One moment—what we sent up was not a scheme for Indian Forestry at all; it was a scheme for teaching forestry at large, and was sent up in response to the India Office.

The PRESIDENT OF MAGDALEN COLLEGE.—I only want to clear up this little difference, as I am sure we do not want any misunderstanding. As a matter of fact you were ahead of us; the letter was sent to us in August, and could not be replied to until the University met again. Then the scheme that we have here was not sent by us, but was sent by the India Office to us, and simultaneously to you, and in the letter sent to us we were informed that it was sent to both. So I do not think there is really anything in that.

The CHAIRMAN.—Now to return to Regulation 6. Assuming that it is ultimately decided—I cannot say how it will be decided—that the competitive examination should take place at the beginning; do you suggest that it ought to be stiffened?

Mr. SHIPLEY.—I do not think it is a high enough standard to select men upon for any public service.

Mr. HOLDERNESS.—As I understand, you rather recommend an examination by the Civil Service Commissioners, with the age so arranged as to get men after they have finished their general education at the University; and that that examination should be settled first on the lines of a general education of a scientific kind, and on as high a standard as is compatible with getting the candidates at that time.

Mr. SHIPLEY.—I think you would get a better service in that way.

Mr. HOLDERNESS.—After that there would be such special training in this country, arranged by the India Office as it thinks best, and in such place as it thinks best.

Mr. SHIPLEY.—Or on the Continent.

Mr. HOLDERNESS.—It would not matter as far as the University of Cambridge was concerned where the school was located, or how the further training was done, provided the open competitive examination suited the Cambridge men as well as the Oxford men, and was at a suitable time in the career of a man at the University.

Mr. SHIPLEY.—We could not send our men away at the end of their second year to another University. I think it is an essential part of our scheme that there should be some forestry teaching in Cambridge for them to do in their third year, when they have nothing else to do.

The CHAIRMAN.—How could that be provided?

Mr. SHIPLEY.—I should like first of all to ask how much the India Office are prepared to expend on Oxford? I do not know that. If you could tell us that, I should say halve it.

Dr. SCHLICH.—I should say that a much more appropriate question is—How much is Cambridge going to spend if we fall in with their views? Why the India Office should pay for it I do not see at all.

Mr. SHIPLEY.—Then why should they pay for it at Oxford?

Dr. SCHLICH.—If we pay Cambridge, we should have to do it at half a dozen Universities.

Mr. SHIPLEY.—I think you can do it as Mr. Brodrick suggested last Thursday. You can very easily draw a line, and he saw a line that could easily be drawn between Oxford and Cambridge and the others. He said that we might make it a rule that men must come from a residential University. Dr. Schlich himself stated in evidence that if we had a Professor of Forestry at Cambridge, then we have all the appliances there for starting a school of forestry.

Dr. SCHLICH.—Yes, but please excuse me. That was with reference to forestry in this country, not in India. You have quite mistaken that. If I had given evidence with regard to the Government of India, I should have given quite different evidence.

The MASTER OF CAIUS COLLEGE.—May I draw attention to some of the evidence which Dr. Schlich gave as regards Coopers Hill? I should like to quote his words, if you will allow me. In reply to question No. 262 in the Blue Book containing the minutes of evidence taken before the Committee of Enquiry into the College at Coopers Hill (Command Paper, No. 2056 of 1904), he said: "I am inclined to think, although I may be wrong in that, that if, for instance, a contribution equal to the actual pay of a professor were made, probably the University of Cambridge would undertake the rest. At any rate, I have reason to believe that they would seriously consider the matter, because I once had a conversation with the Vice-Chancellor upon it." Then in another answer he implied that a professor would do all that was required.

Dr. SCHLICH.—For English forestry.

Sir DIETRICH BRANDIS.—Exactly so; but what we have before us is a definite practical question. Ten men are wanted every year for the Forest Department in India, and the India Office cannot possibly be expected to pay for two staffs of forestry professors—one at Oxford and one at Cambridge. The question is how to train these ten men as efficiently as possible, and that can only be done at one place without great expense; you cannot divide it between two. That seems to me the main question, although there are a great many other questions. I should like to know whether those who

would pass the examination at the end of their second year would be sufficiently numerous to afford a field for selection. There would be, perhaps, ten men or twelve men only, and so you would not have a sufficient field for selection. Whereas if you selected them at the commencement, as matters are at present, you would get a fair set of men. That is certainly not a perfect plan, as they have found in Germany, where foresters are wanted all over the country. It is an artificial arrangement. But if you select the probationers at the beginning, then you will have a large number of candidates to select from, and if you add to the competition a physical test, which has always been and which must be added, then according to the experience of the last 20 years, indeed, according to experience in France and in Germany ever since 1866, with this competitive entrance examination combined with the physical test, and, of course, a medical examination, you will find that that will give you a very fair set of men. It is much better to stick to that instead of adopting this new scheme which is proposed by the University of Cambridge, of selecting them at the end of their second year when they have passed the Natural Science Tripos. It seems to me that in a practical question like this it is much better for India to follow the experience which has been gained ever since 1866—which is a good long time ago, of course—and to go on in the same lines. Eventually, doubtless, a great demand for foresters will come. People must eventually in Canada come to the conclusion that it will not do always to cut down their firs and burn them—they must come to the conclusion that they want foresters. But that is a thing of the future and that is not the question at present. At present the question is simply this—How can these ten men be most efficiently selected and trained? There, I think, the experience which we have had ever since 1866 ought to be utilised, and we ought not all at once to launch out into a new scheme such as that which the University of Cambridge proposes. That one Professor of Forestry could do the whole thing for the men to be sent out to India is out of the question. We have three Forest Schools in Germany attached to the Universities, and in every one of these Universities there are three or four Professors of Forestry—and purely forestry. The evidence which has been given by our excellent friend, Professor Marshall Ward, whom I admire immensely—he was the representative of Cambridge when he gave evidence—shows that Cambridge does not realise that forestry in itself is a very difficult matter, and a very large business.

Mr. SHIPLEY.—I should like to point out, as regards Professor Marshall Ward, that if forestry came to Cambridge it would be in no sense of the word connected with him. Each Professor and each Department is connected with a special Board, and if the forestry came to Cambridge the forestry would almost certainly—I think I may say quite certainly—be connected with the Board of Agriculture, which is under Professor Middleton.

The CHAIRMAN.—I should like to clear the ground, first of all, by ascertaining what objections there are to the forestry course, apart from the questions where the examinations are to be held and where the first course is to be carried out. Are there any serious objections to the course that has been suggested? That comes first, and then we can consider the question whether the course of instruction could be carried out at two Universities or at one. I should therefore like to know first of all if there are any objections to our scheme as to the course of study, beginning with the subjects on which we propose that the probationers should be examined and going on with the subjects in which we propose that they should be instructed; and also considering the necessity of there being practical demonstrations by a lecturer who has had Indian experience. I think we ought to discuss that first, because unless we come to some arrangement about that we are really not in a position to consider the other.

Mr. SHIPLEY.—If we make the selection of probationers at the beginning, I think (1), (2), (3) and (4) would probably be the best subjects they can have; but we think it would be better to select them later on. The real objection to the course at Oxford to my mind is that, as I understand,

Oxford is not prepared to grant a degree in forestry, and therefore the men after they have been selected here would spend two more years—

The CHAIRMAN.—I would like to bring everyone back to the point which is now before us. That would come under the second branch. As I understand, the subjects (1) to (4) are considered to be subjects which if the competitive examination is to be held at the beginning of the young man's course, are the proper subjects in which the examination should be held.

Professor MIERS.—I think all scientists would probably confess that these should be the obvious subjects.

Mr. SHIPLEY.—Would you not put in mathematics as well?

Professor MIERS.—I think "mechanics and physics" is probably meant to include so much mathematics as is required.

Mr. HOLDERNESS.—You would find mathematics would come in there.

Professor MIERS.—I think that is what was meant there.

Sir CHARLES LYALL.—This is merely the outer skin of the rules. Appendix I. discloses the actual examination.

Mr. SHIPLEY.—I would like to emphasise again that it is an extremely elementary examination.

Sir CHARLES LYALL.—But not more elementary than the examination passed at present by the candidates for the Coopers Hill School.

Mr. SHIPLEY.—I should think not.

The CHAIRMAN.—Do you object to this—"The examination in these subjects will be the preliminary examination in the Honours School of Natural Science at Oxford"?

The MASTER OF CAIUS COLLEGE.—Yes, I should.

The CHAIRMAN.—What would you substitute for that, supposing it were to be decided that the School of Forestry should be transferred from Coopers Hill to Oxford?

The MASTER OF CAIUS COLLEGE.—Then I think we should say that that is such a fault in the whole scheme that we could not go very much farther. In one sense we could not go very much farther; in another we should.

The CHAIRMAN.—If it were decided—mind you, I am not saying what will be decided; I do not know yet—that the School of Forestry at Coopers Hill were practically to be transferred to Oxford, would it be an unreasonable thing to say the examination should be the preliminary examination in the Honours School of Natural Science at Oxford?

Mr. SHIPLEY.—I think you would get better candidates and more of them at the Civil Service examination. In Cambridge we could hardly leave it at that; we should have to take what steps are open to us to take.

The CHAIRMAN.—I do not think any question will arise on Regulation 7 (Fee, &c.)—I mean apart from the reference to Oxford.

Mr. SHIPLEY.—No, nor on the medical examination (Regulation 8).

The CHAIRMAN.—I suppose it will be the same with the period of probation (Regulation 9), wherever it was.

Mr. SHIPLEY.—On that point I do not know whether I am in order, but I should like to point out again that these men would go out from Oxford having spent their two or three years without a degree, and that that will stand very much against them. Whenever a man leaves a University having been in residence the proper time but not having had a degree, then wherever he goes in after life he has always got to explain that away.

Sir CHARLES LYALL.—May I point to the end of the Regulation 13?

Mr. SHIPLEY.—Yes, but a good many of them will not take that.

Professor MIERS.—Our feeling was that any man who took up such a subject as geology would take a degree in geology, and that a chemist would take a degree in chemistry. The syllabus contains this because a man might naturally be tempted to take an honours degree, though he would not necessarily take an honours degree.

Dr. SCHLICH.—Doctor Vines distinctly told me that the botany which he could teach them would be quite sufficient for a man to take his degree in botany at Oxford.

The CHAIRMAN.—Where is the degree in botany—at Oxford or Cambridge?

Dr. SCHLICH.—Oxford. Judging from our syllabus he said what we expect to teach would be quite sufficient for a man to take his degree with botany as the final subject; so there would be no difficulty. Moreover, I do not look at the degree as being of such importance, because I am perfectly convinced that just as Cambridge has established a degree in agriculture, so if we do go to Oxford and forestry becomes a little more known, the authorities of the University of Oxford will in another year or two give a degree.

Mr. SHIPLEY.—Oxford has been very slow in advancing.

Dr. SCHLICH.—Yes, but things are changing now, are they not?

The CHAIRMAN.—Apart from this question of degree, as to which I think there is something in what has been said, do you object to the three years' probation, wherever it is?

Mr. SHIPLEY.—No; I think we could agree that about three years was the right time.

The CHAIRMAN.—And wherever the probationers went for two years they would have to undergo a special course of study as members of the University, whichever it was?

Mr. SHIPLEY.—Yes.

The PRESIDENT OF MAGDALEN COLLEGE.—Does that mean that after their Tripos they stay on two years more at Cambridge?

Mr. SHIPLEY.—No; in our case if they took their Tripos it would be in their second year.

The PRESIDENT OF MAGDALEN COLLEGE.—But they would have to spend two more years?

Mr. SHIPLEY.—No. They might be one year possibly abroad.

The PRESIDENT OF MAGDALEN COLLEGE.—I understand there are to be two years of special training—one of those would be the year which coincides with the preparation in special forestry and the other would be the Continental training.

Mr. SHIPLEY.—Yes.

The PRESIDENT OF MAGDALEN COLLEGE.—That would be two years added after the two years before the Tripos, so that it would be four years altogether.

The MASTER OF CAIUS COLLEGE.—It would be no more than a large number of people do.

Mr. SHIPLEY.—It would be four years probably, but of course these details must be looked into again.

The PRESIDENT OF MAGDALEN COLLEGE.—I thought you said three years without realising that it really means four. I ought to say that we have not had the opportunity of considering the Cambridge suggestion, of course. It is just as difficult for us to see how it is to work at Cambridge

as it is for you to see how it is to work at Oxford. We are quite at one as to that; we are really on a par in the matter.

The CHAIRMAN.—There does not appear to be any serious objection to the three years' probation; that is really what Regulation 9 deals with.

Sir CHARLES LYALL.—Or to the one year on the Continent.

Mr. SHIPLEY.—If they do that they would not get a degree, because they must keep their terms.

Dr. SCHLICH.—If the Government falls in with the Cambridge scheme it would be five years.

Mr. SHIPLEY.—I do not think so.

Dr. SCHLICH.—Yes, unless we transfer the whole thing to Cambridge.

Mr. SHIPLEY.—Let it be just as they do at Coopers Hill, where they go abroad for three or four months.

Dr. SCHLICH.—That would, on the other hand, exclude Oxford.

Mr. SHIPLEY.—We do not want that.

The MASTER OF CAIUS COLLEGE.—We have no desire to do that at all.

The CHAIRMAN.—It is quite understood that that is your position.

Dr. SCHLICH.—But if the Government fall in with your scheme it would practically exclude Oxford.

Mr. SHIPLEY.—I think it might in the long run, and I hope it would, because I think our men might perhaps beat the Oxford men.

Dr. SCHLICH.—You are perfectly aware that I first of all thought of Cambridge, and that I decided to suggest to the Secretary of State to go to Oxford simply on practical grounds—nothing more.

The CHAIRMAN.—We are coming back to the second question; I want to get through this first. I think we may assume that Regulation 9 has no serious objection to it, except, of course, the reference to the University of Oxford.

The MASTER OF CAIUS COLLEGE.—Except that I think it is arguable in regard to many of these schemes that the stiffer the examination before the period of probation begins, the less the period of probation might be. I mention that as a question of principle.

The CHAIRMAN.—That would be assuming, of course, that the examination was held before the commencement.

Mr. HOLDERNESS.—The suggestion is that the examination should be held at the completion of the man's ordinary University education in natural science, and that it should be an open competitive examination. The man would then start with certain specialised parts of knowledge.

The MASTER OF CAIUS COLLEGE.—He would start as a better trained man, and would beat the others in time.

Mr. HOLDERNESS.—Then the question is how long probation will be necessary to fit him for the Indian Forest Service.

The MASTER OF CAIUS COLLEGE.—That is the question.

The CHAIRMAN.—That is on the assumption that the competitive examination is held at the end of the second year.

Mr. HOLDERNESS.—I suppose so—or at the end of his third year.

The CHAIRMAN.—Do you say at the end of the second year or at the end of the third year?

Mr. SHIPLEY.—If the competitive examination were on the Tripos, we should say that every man should take it in the second year, so as to leave

the third year completely free for nothing but forestry, agriculture, and so on.

Dr. SCHLICH.—Supposing we got a man well up in mechanics and physics, chemistry, zoology, or geology and botany, there would still be quite a number of things for him to be taught. If the organic chemistry is done before the probationers are chosen, we should still have forest entomology; we should have the application of botanical questions to forestry; we should have geometrical drawing; we should have surveying; we should have some elementary engineering; we should have some book-keeping, and we should have the whole of the forestry. You will want some time for that. You cannot do all that in six months, and I doubt whether it would be satisfactory if you gave up the whole year to it and nothing else were done in that year.

Mr. SHIPLEY.—We could give you one whole year. In fact, it would be really with us fifteen months, because you could include one extra long.

Dr. SCHLICH.—You do not get over the point that if we do that at Cambridge we must do it at Oxford, and, perhaps, two or three other Universities.

The CHAIRMAN.—That is coming back to the main point.

Dr. SCHLICH.—That is really the main question of the scheme. It is only on the supposition that we have to go to one particular place.

Mr. SHIPLEY.—When we get to that question I have got something I want to say.

The CHAIRMAN.—Now we get Regulation 10 (Charges). I do not think anything arises on that.

Now Regulation 11 (Course of Study).

Mr. SHIPLEY.—On that I should like to point out that we practically accept forestry, but we should probably want some lecturer in forest botany. We practically have all those subjects being taught as going concerns in Cambridge at the present time, and there would be no difficulty at all in bringing those classes into line and modifying slightly with special reference to India.

The CHAIRMAN.—Do you think these eight subjects are sufficient for the study of the probationers?

Mr. SHIPLEY.—I should have thought they were. Of course, a good many foresters, and very able ones, have been trained in France, and I do not know whether it would be better to make No. (6) "German or French" The Nancy School is a very distinguished one.

The CHAIRMAN.—German is put in for practical purposes, because a year is to be spent in Germany.

Mr. SHIPLEY.—It used to be spent in France; at least, some of the foresters were trained in France.

Mr. FISHER.—The work in Germany is much more practical. I go to France very often, and I know that the French people merely mark the trees for felling, but do no practical work.

Mr. SHIPLEY.—It is difficult to know, but I have been told that in some respects the Nancy School is very good.

Mr. FISHER.—I go to France every year, and the real point is that the French forest officer only marks the trees, and nearly all the work is done by a contractor, whereas in Germany the work is done by the Forest Department itself, and so it is better training for a man.

The CHAIRMAN.—In your view, in these first two years before a man goes up for his competitive examination, would you give any specialized instruction in forestry?

Mr. SHIPLEY.—I should say that if he was one of my pupils, I should

recommend him to take perhaps geology, chemistry, and botany. He would then have a thorough grounding in the scientific side of it, and would be able to pick up the forestry part so much more quickly.

Sir DIETRICH BRANDIS.—Forestry teaching must go *pari passu* with natural science teaching. It must begin from the beginning, and it must go on, as I say, *pari passu*. To commence the forestry teaching in one of the later years, as is proposed in this Cambridge plan, is impracticable. That is all I can say. It is not practicable; it is not reasonable.

The CHAIRMAN.—Do you mean that it should go on during the first two years, or only one year?

Sir DIETRICH BRANDIS.—It should go on the whole of the three years. The probationers will not be able to appreciate those branches of natural science which they ought to know unless they have some idea of what they are to be applied to.

The CHAIRMAN.—Cannot you have demonstrations?

Sir DIETRICH BRANDIS.—The probationers must know what the aims and objects of a forester are, and how he endeavours to accomplish them. Then they are capable of appreciating those branches of natural science which are given to them. All I can say is, why in the world not learn from experience? We have the old experience from 1866—experience which has been gained in every country where there is proper forestry teaching. We should not dream in our German forest schools of feeding them on botany and on zoology and on geology for two years, and then just giving them an encyclopædic idea of forestry. Forestry is a very difficult business. These things must be digested. In the first year a probationer begins to learn the character of the different trees. Then he gradually learns why a forest must be managed according to a regular, well-considered plan—according to what we in English call working plans—and then he gradually learns how those working plans are made. This is one of the great blots in the Cambridge plan. The first plan which I had before me, which was in January, 1904, relegated the teaching of forestry to the long vacation. That, of course, was out of the question. Now the second plan which I have before me relegates it to the last year, and that is equally impracticable.

Mr. SHIPLEY.—I think the proposal that Sir Dietrich is referring to was that practical botany should be relegated to the long vacation—not the entire range.

The CHAIRMAN.—So that you should do practical botany in the country?

Mr. SHIPLEY.—Yes. If we are allowed to prepare a scheme, we could doubtless remove some of these objections. We have made two proposals. This was not submitted as regards the India Office scheme; it was a general scheme submitted to the Board of Agriculture.

The MASTER OF CAIUS COLLEGE.—I think the reason for sending up that scheme has been entirely misunderstood. Our attention was drawn, as stated by Mr. Shipley, to the appearance of the Coopers Hill Blue Book. We sent that first scheme based upon the Agricultural Blue Book, to show the India Office that we had been thinking of these things, and we said we were ready to give further information; but there was silence till November.

Sir CHARLES LYALL.—May I point out to you, Master, that that scheme had upon its first page a statement that a school of forestry could not be established at Cambridge?

The MASTER OF CAIUS COLLEGE.—I have explained that.

Sir CHARLES LYALL.—The explanation came on the 19th January last, but it was certainly not visible upon the face of the document.

Sir DIETRICH BRANDIS.—The paper suggests that the course of study

should extend over three University years, and that the months of July, August and September in the first and second years should be spent at a forest school. The Cambridge scheme has now been altered for the better, but still it does not yet meet the case.

Mr. SHIPLEY.—We maintain that what we meant by that statement is exactly borne out by what we have learned around this table—that our men must go abroad, and that they cannot get real training in practical forestry unless they do.

Sir DIETRICH BRANDIS.—They learn from the lectures during the first two years before they go abroad, and then they are to apply their knowledge practically in the third year.

Mr. SHIPLEY.—They can do that at Cambridge as well as at Oxford.

The CHAIRMAN.—Would you approve of a course of practical training during the first two years?

Mr. SHIPLEY.—If Dr. Schlich and Sir Dietrich Brandis tell us it is essential, of course we should.

The CHAIRMAN.—That could be carried out?

Mr. SHIPLEY.—Yes, certainly we could carry out the practical teaching of forestry during the whole time the men were at Cambridge, if we had the proper professors.

Mr. HOLDERNESS.—Would that be preceding the open competition, or after?

Mr. SHIPLEY.—That, of course, is the difficulty.

Mr. HOLDERNESS.—The point I would like to ask is this: If there were an open competitive examination held by the Civil Service Commissioners with such limits of age as would tempt men who had taken the first part of the Natural Science Tripos, and in such a place as would not prejudice Cambridge men, then would the Cambridge University admit that the Secretary of State might make whatever arrangements he thought best for the future specialized training of the selected candidates?

Mr. SHIPLEY.—I should say we should welcome that.

Mr. HOLDERNESS.—That is to say, there would be no objection to the Secretary of State putting the specialized school either at Oxford or at Cambridge, wherever he liked, as long as there was the open door for Cambridge in the open competitive examination?

Mr. SHIPLEY.—We should prefer some different place, because wherever the school is, that would give a great advantage to the locality.

Mr. HOLDERNESS.—That would secure the open door for Cambridge.

Mr. SHIPLEY.—Not quite, because they would have to go over and study at Oxford. One sees that it would be an advantage to have the school on the spot and so Oxford would get more of the men than Cambridge.

Mr. HOLDERNESS.—The alternative seems to me to be this, though I do not think it is a practical one. First to have your open competitive examination in this way in general education, with certain obligatory subjects in natural science, in mathematics and in modern languages; after that to say that the candidates must have a special course of training in forestry and cognate subjects—that would be done by one or another of the specified Universities—and that the proper teaching and the progress of the candidates should be tested by periodical examinations; the Secretary of State for India would then give up the idea of having any staff specially located anywhere for teaching these candidates. That is the alternative.

Mr. SHIPLEY.—I suppose wherever it goes we should want some financial assistance, but the University of Cambridge is prepared to do what it can. If the Government are going to send professors to Oxford,

I really think that with one professor at Cambridge we could do all the forestry that is wanted.

Mr. HOLDERNESS.—And that would wholly meet your views, would it not?

Mr. SHIPLEY.—I think it would.

Mr. HOLDERNESS.—They would be partially met if the open competition was so fixed as to admit of Cambridge men taking a degree before they went in.

Mr. SHIPLEY.—They would be partly met in that way.

Mr. HOLDERNESS.—Would you still have a grievance?

Mr. SHIPLEY.—I am sorry to say that I am afraid we should have a grievance, but still that is very much better from our point of view than the present scheme.

The CHAIRMAN.—But the final course would not be at Cambridge.

Mr. HOLDERNESS.—Still the open door would be saved to Cambridge.

Dr. SCHLICH.—Did I not get it from yourself that it means five years? It must mean five years, and you cannot do it in less. Are parents prepared for that?

Mr. SHIPLEY.—I do not know whether it is in order just now, but I would like you to know how we are as regards woods at Cambridge.

The CHAIRMAN.—We will come to that in a moment; we are very close to it.

The MASTER OF CAIUS COLLEGE.—I should like to say, with reference to the question of periodical examinations which has just been raised, that the question has been considered as to how far any University or body might be allowed to work out its own salvation, providing that it came up to the standard in the end or at certain periods. We have had a considerable discussion in the matter of preparation for the Army, and the War Office have practically conceded our original view, that they may put any standard they like for our people to be tested on, and if we do not work up to it that is our own account. I think some principle of that kind might be adopted here.

The CHAIRMAN.—Do you mean if you had Professors of Forestry who had local training and local knowledge of India?

Mr. SHIPLEY.—I suppose if we had to establish a professorship we should endeavour to get someone who had been in the Indian Forest Service.

The MASTER OF CAIUS COLLEGE.—From a University point of view, and from a national point of view, you cannot help looking forward to the possible great increase of need for forestry. That appears to us very clearly from a great variety of statements in the Blue Books, and we say that any one University starting this at the public expense would have an enormous advantage with regard to developments in the future, and that would help it to become one of the foremost Natural Science Universities in the community.

Dr. SCHLICH.—We must not forget one point, and that is that if the selection is made at the end of their studies, what are the men going to do who do not get appointments? What will be the immediate result?—that the competition will be exceedingly limited. If there are ten appointments there will be perhaps 10, 11 or 12 men preparing for them, because they could not risk spending all their University career on that and then have no result. It would be absolutely nugatory.

Mr. SHIPLEY.—We have a considerable School of Agriculture now, especially for the training of land agents and also for the training, amongst others, of people who have land of their own. I feel sure that the men who fail in this would be able to pick up something there.

Dr. SCHLICH.—That is a difficulty that does exist—that there are not enough appointments open. If it was a case of engineering it would be different.

Mr. SHIPLEY.—You yourself have just been suggesting that probably in the future there will be a greater demand in Canada.

Dr. SCHLICH.—But that is for the future. A man does not want to wait for that.

Mr. SHIPLEY.—And we cannot wait.

The CHAIRMAN.—I think now we are in a position to go to the main question.

The MASTER OF CAIUS COLLEGE.—Might I make one remark on what you have said. In all these cases, the candidates as a whole at the Universities must take the risk of there being people who appear to be stranded in the end, and have to develop some other line—it does not matter what line or what department you take.

Sir DIETRICH BRANDIS.—In other branches there is a large sea they can swim in, but there is no certain employment in forestry except in India. It may come eventually, but it is not yet. You must have the open competitive examination at the beginning.

The MASTER OF CAIUS COLLEGE.—Precisely; I want the open competitive examination at the beginning, only I want all places to be treated alike.

The CHAIRMAN.—I think now we can get nearer to the great difficulty of the question before us. I suppose neither Cambridge nor Oxford would deny that for Indian purposes—that is for our purpose here in the India Office of securing men to send out to India—we must secure those men who have had, as far as possible, a practical training here in this country and a theoretical training from men who have spent their lives out in India, and who understand forestry as applied in India; and I suppose that Oxford and Cambridge would both agree that there should be professors at whatever seats of learning men were selected from, who were competent to instruct on Indian forestry and had practical experience.

The PRESIDENT OF MAGDALEN COLLEGE.—I think we should. We understand that a special training is required for that forestry.

The CHAIRMAN.—So I understand. I do not personally know anything about forestry, although I have shot through some of these forests.

The PRESIDENT OF MAGDALEN COLLEGE.—If a special training is required, then we think that special professors are required; but we take that from the experts rather than on our own knowledge.

The MASTER OF CAIUS COLLEGE.—We admit the same.

The PRESIDENT OF MAGDALEN COLLEGE.—Then may I ask one question with regard to what the Master said just now? When he proposed that persons should prepare themselves in their own way at Cambridge, he did not exclude having special professors?

The MASTER OF CAIUS COLLEGE.—No; certainly not. What I meant was that if we have a standard to work up to, even if we get no help at all other than that of working out our own salvation, we ought to be allowed to try. I do not think it is right that we should be left in this position, but still I think we ought at least to be allowed to try.

The PRESIDENT OF MAGDALEN COLLEGE.—You want to send in your own men prepared in your own way for all the examinations.

The CHAIRMAN.—Without the aid of a skilled forester who had had Indian experience?

The MASTER OF CAIUS COLLEGE.—I do not think it is at all likely we should rest content without having a skilled forester.

Mr. HOLDERNESS.—This refers to the training after the selection at the open competition, does it?

The MASTER OF MAGDALEN COLLEGE.—Partly that and partly to whatever provision might be made before. What we should conceive there probably would be is that, when this career was put before the large number of people who would come up, when their tutors were discussing what lines we should take, the energetic people who had got their minds set on this would do a considerable amount of preparation beforehand in the special subjects.

The CHAIRMAN.—What I want to arrive at is this :—Would you agree with Oxford and our skilled advisers here that for our purposes it would be necessary that the students should have been in the hands of a skilled forester who had had experience in India?

The MASTER OF CAIUS COLLEGE.—Yes, I think we should.

Mr. SHIPLEY.—Yes, we agree to that.

The CHAIRMAN.—Another question is, How could that be done?

Mr. HOLDERNESS.—Yes; that raises the question of a single forest school or of several forest schools after the open competition.

The MASTER OF CAIUS COLLEGE.—In so far as that is concerned, there would be no difficulty at all in the probationers from the two Universities, or from any other Universities, being put under one Department and under one director.

The CHAIRMAN.—Do you mean for the purpose of going abroad?

The MASTER OF CAIUS COLLEGE.—Yes.

Mr. SHIPLEY.—It would be an advantage to have that, because you want to get these men to know one another. All the men who are going from Oxford and Cambridge ought to know one another.

The CHAIRMAN.—Of course there is another point we have got to face, and that is that there would be an average of probably eight or ten men a year, or you may say twenty for each two years; if that number were divided between the two Universities would it pay?

Mr. SHIPLEY.—If we could have them alternately.

Sir DIETRICH BRANDIS.—Forest gardens must be established and museums must be established—you do not know what is required.

The CHAIRMAN.—We have to go by steps. Then there is another thing, Mr. Shipley. How could we refuse Edinburgh, for instance?

Mr. SHIPLEY.—On the ground of Mr. Brodrick's suggestion that it is a non-residential University.

The CHAIRMAN.—Take Dublin, which is my own University, although I do not speak as an advocate of Dublin. That is a residential University.

The MASTER OF CAIUS COLLEGE.—I think I should answer that we are not concerned with that question.

The CHAIRMAN.—I think it is a question we would have to face.

Dr. SCHLICH.—You would not go to each University.

The CHAIRMAN.—I do not think Edinburgh would put up with that simple answer that it was a non-residential University. I am afraid we would have the Scottish people finding fault with us. How should we shape our course if we said, Now we will divide this school between Cambridge and Oxford? How could we refuse to let Edinburgh, Dublin and Bangor come in? How could we deal with that? You might have in the course of a very few years four or five Universities working Indian Forest Schools for an average of 20 candidates to be divided amongst them in the space of every two years. Do you think the Universities would do that?

The MASTER OF CAIUS COLLEGE.—If they did not, it would be their own fault.

Sir DIETRICH BRANDIS.—Where is the staff of professors of forestry to come from? You would want at least two professors of forestry at each of these Universities.

Mr. HOLDERNESS.—I suppose the rule would be that the candidates should complete the specialised training at such University as the Secretary of State was satisfied provided the necessary teaching.

The MASTER OF CAIUS COLLEGE.—I should like to be quite clear what you mean by that.

The CHAIRMAN.—That will not be accepted as a solution, I expect, by Cambridge.

Mr. HOLDERNESS.—They could get their training at a University approved by the Secretary of State.

The MASTER OF CAIUS COLLEGE.—If we could get the forestry put on the same principles as that, we should be perfectly satisfied.

The CHAIRMAN.—Supposing we take a neutral University, Edinburgh. Should you be satisfied that the Secretary of State should say that after these men have passed their competitive examination at the end of their two years they should be transferred to Edinburgh.

Mr. SHIPLEY.—I do not think our men would go.

The CHAIRMAN.—Then it would be useless for our purposes

Mr. SHIPLEY.—Perhaps at the end of their third year they might.

The CHAIRMAN.—Would you be satisfied if they went to Oxford or would Oxford be satisfied if they went to Cambridge? You see, it has to work both ways.

Mr. SHIPLEY.—It is a very difficult question.

The MASTER OF CAIUS COLLEGE.—We do not deny that at all. I do not know whether I may put this question. The India Office is prepared to spend a certain amount of money on this whole Department of Indian Forestry. Could the question be put to the two Universities, What would you do if you had half this sum and the other University had the other half? That is a question we have had put before us to see how far we could work it out. It seems to me that that would be a fair thing to do—allow the two Universities to say what they could do as to this.

Sir DIETRICH BRANDIS.—That is on the assumption that competent professors of forestry are to be bought in the market. They are very scarce in English-speaking countries at present.

The CHAIRMAN.—Supposing you only had one competent man in the market, how could you cut him in two? What could you do?

Mr. SHIPLEY.—I think there is more than one.

The MASTER OF CAIUS COLLEGE.—Perhaps we might go to the two distinguished experts at the table.

Sir DIETRICH BRANDIS.—One is 81, and not likely to commence a new business.

Mr. SHIPLEY.—We have a distinguished Cambridge man here, a professor of forestry.

Dr. SCHLICH.—Now, gentlemen—and I call upon Sir Charles Lyall to confirm me—I am getting rather on in years, and I shall very soon retire; I only want to see this business through, and then I shall probably go. Some one will have to take my place, but there are not so many men available, even in the India Forest Department.

Mr. FISHER.—A man does not like to give up his prospects.

The CHAIRMAN.—There would be still a feeling either at Oxford or Cambridge, I suppose, against the men who had passed their competitive examination being sent on to one particular University.

Mr. SHIPLEY.—I think there would.

Mr. HOLDERNESS.—It would not apply to what you put forward, for when an examination was held, conceivably a man, before he passed the open competitive examination, would get his degree

Mr. SHIPLEY.—No, I do not think it would apply.

The CHAIRMAN.—I can see how it might affect men. A man probably would prefer to enter a University where he could go right through.

Mr. HOLDERNESS.—Yes, but he would finish according to this idea with his University by the time he had passed the open competition.

The CHAIRMAN.—A man who was plotting his life out to go into this line would probably prefer to go to Cambridge if he could do the whole thing right through there, or to go to Oxford if he could do the whole thing right through there.

The MASTER OF CAIUS COLLEGE.—Yes. If the candidates could go to any University they liked, but must subsequently enter Oxford, of course they would begin at Oxford.

The CHAIRMAN.—I should think that is possible.

The PRESIDENT OF MAGDALEN COLLEGE.—There is an example to the contrary. Student interpreters must enter at Cambridge, but many begin at Oxford.

The MASTER OF CAIUS COLLEGE.—I thought I made that matter clear.

The PRESIDENT OF MAGDALEN COLLEGE.—No. You say you do not know of any official arrangement; all we know is that it goes on. Only last year one man from my college was compelled to go to Cambridge.

The MASTER OF CAIUS COLLEGE.—Was that not a special temporary arrangement?

The PRESIDENT OF MAGDALEN COLLEGE.—It is so indicated. It has gone on for some years, but we were told that we were to have the next batch of student interpreters.

The MASTER OF CAIUS COLLEGE.—We cannot in reason say we must have it if you insist upon it. I do not think that is our case at all.

The CHAIRMAN.—I think we might consider it now on the assumption—I do not know whether that is decided—that we can only find one competent staff of men who have been trained in forests in India as lecturers—

Sir DIETRICH BRANDIS.—And competent to teach. That is the point, for everybody cannot teach. A man may be an excellent practical man and yet unable to teach.

The CHAIRMAN.—Then the question is whether the Forest School should be transferred to Cambridge or to Oxford—

The MASTER OF CAIUS COLLEGE.—Would you mind repeating the first part of your statement?

The CHAIRMAN.—I do not know whether the assumption is good or not, but assuming we can only obtain one staff competent to teach from their practical experience in India and their knowledge of science, what is to be said then on the question whether it is to go to Cambridge or to Oxford?

The MASTER OF CAIUS COLLEGE.—I should not like to concede the assumption at all. I should like to put it in this way: Supposing an arrangement were made by which the two Universities were subsidised, provided they could find proper equipment and proper professors, then, if any University were to fail in doing that, its teaching would stop.

Men would naturally go to the other University, and it would be strongly recommended. In time it is quite certain that both Universities would get what they wanted as regards an adequate staff. To go back to my question, which has not been answered, may we have an answer to it—What sum is the India Office prepared to spend? If they spend a certain sum, may it not be considered what the two Universities could do if the sum were divided between them?

The PRESIDENT OF MAGDALEN COLLEGE.—Those are two questions.

The CHAIRMAN.—They are, and they involve the further question that, even if it were divided between the two Universities, are there men in the market whom you could get to teach?

The PRESIDENT OF MAGDALEN COLLEGE.—I assume that the India Office might be prepared to spend a certain sum on one thoroughly good school, but it might not be prepared to divide it between two weak schools.

The CHAIRMAN.—That is the point I was trying to come to.

The PRESIDENT OF MAGDALEN COLLEGE.—We feel that it is for you and your experts to say whether the number of students is large enough to admit of their being divided, whether the training which they require is so special that they must have a very elaborate staff, and whether that staff can be supplied by more than one place. We feel that is for you here. We have been asked what we will do. Cambridge have, to a considerable extent, stated what they would do. I quite recognise that they have not had it in exactly the same form as we have, but still they have had opportunities which we have not had.

The MASTER OF CAIUS COLLEGE.—No. I may say that, until a very few days ago—until last week—we had not been put in any kind of position, and we are not put in a position even yet to consider this matter as a University. What we should do if we were invited to consider what was the best scheme would be to appoint a Scientific Committee and ask for a conference with experts.

The CHAIRMAN.—You see, Master, there is a primary difficulty, apparently, to my mind, in the whole matter. So far as we know, we can only get a competent staff for one body at present, whatever it is.

Mr. SHIPLEY.—Just temporarily, but there must be some successors.

The CHAIRMAN.—As far as we can ascertain from our inquiries, we can only get one competent staff. So there is the difficulty that, even if we were to subsidise each University, one University would have to go to the wall on the question of not having a competent staff.

Mr. SHIPLEY.—I think we would be prepared to take the risk. We have so strong a feeling for the success of science and agriculture and so on in Cambridge that we are prepared to do the very best we can, even if we do not get absolutely the best Professor of Indian Forestry. Dr. Schlich tells us that he is proposing to retire sooner or later, and when he goes someone will have to succeed him. If we can persuade him to stay on for a year or two longer, we might have the advantage of his assistance.

The CHAIRMAN.—We have got to make the provision at once, you see—that is the difficulty—and the men will have to be selected in this year.

Mr. SHIPLEY.—Would it not be possible to select them this year in the same way that they were selected last year? Could not the college be kept open for the engineers for another year?

The CHAIRMAN.—No, the college must be closed next year, I think.

Sir CHARLES LYALL.—Yes, in 1906.

Mr. SHIPLEY.—Then these men could be selected in August and go on until 1906 at Coopers Hill. That would give one time to develop a scheme.

The MASTER OF CAIUS COLLEGE.—Unless you made special arrangements, which you are empowered to do, I suppose, that candidates who take their degrees in natural science at Oxford and Cambridge this year and will therefore be more mature than the candidates you have got hitherto, should be selected. Then they might have their two years of probation. My point is this, that in an emergency where it is obviously desirable in the interests of a great public service that all possible advice should be considered, a temporary arrangement might be to offer your ten posts to men who are confessedly more mature than those which you have got at present from the two Universities, who will be taking their degrees in the course of this year, and then give them as an experiment the two years' training.

Sir CHARLES LYALL.—The two years' training being one year in England and one on the Continent.

Mr. SHIPLEY.—Yes.

The PRESIDENT OF MAGDALEN COLLEGE.—Where would the one year in England be given?

Mr. SHIPLEY.—At Coopers Hill.

Sir DIETRICH BRANDIS.—That overlooks the state of the actual facts of the case. The facts of the case are these—that if a change is to be made, as it has been decided to abolish Coopers Hill, it must be made as soon as possible. You have Dr. Schlich, with 20 years' experience in Coopers Hill, and he may not care to commence such a difficult business, because to organize it, whether it is at Oxford or Cambridge, will be a difficult business,—it must be altogether organized afresh, and he may not care to undertake that two years hence. It must be done at once. If Cambridge will not take the more dignified course now, and for the public good, for the good of the country, for the good of India, withdraw for the moment the objection and wait a little until more demand for foresters arises, then the whole thing will go smash. That is what I say.

The CHAIRMAN.—I hope it will not go smash.

Sir DIETRICH BRANDIS.—Yes, it will.

The MASTER OF CAIUS COLLEGE.—I have greater confidence in the science teaching of the whole kingdom than to anticipate that. Moreover, I contend—I am sorry to differ from Sir Dietrich—that the line he suggests is not the dignified line for our University to take up, and is not in the public interest. That is my contention, for what it is worth.

The CHAIRMAN.—As I understand your suggestion, it is, I suppose, that we should select this year men who have passed their two years at Oxford or at Cambridge.

The MASTER OF CAIUS COLLEGE.—And taken honours in natural science.

The CHAIRMAN.—And that we should train them, presumably for a year, at Coopers Hill, until it is closed.

The MASTER OF CAIUS COLLEGE.—And then take them abroad.

Dr. SCHLICH.—They should be taken when?

The MASTER OF CAIUS COLLEGE.—They should be taken this year.

The CHAIRMAN.—And that they should have one year at Coopers Hill, which will be until July next year, and then go abroad.

Dr. SCHLICH.—Then we should have two lots in the same year—we should have twenty men in the one year.

The CHAIRMAN.—That is the Master's proposition.

Mr. SHIPLEY.—Would you?

Dr. SCHLICH.—Yes, we should have two sets of men under training.

Mr. HOLDERNESS.—Is there room at Coopers Hill for an extra batch?

Dr. SCHLICH.—There is plenty of room.

Mr. HOLDERNESS.—You could not confine it to Oxford and Cambridge.

Dr. SCHLICH.—If the Master would allow me, I would help him a little. If the Master's proposal were adopted we should not want any men this year; we should only want them next year, because we have three lots in hand—we have one lot going out in 1905, another going out in 1906, and the other in 1907, and the men you are going to choose now would have to go out in 1908.

Mr. SHIPLEY.—So that we can slip over a year?

Mr. HOLDERNESS.—But then where would you train them?

Dr. SCHLICH.—Do you mean to select them as we have done in the past?

Mr. SHIPLEY.—No; there are ten men to be chosen according to the paper this year, and they are to have the three years from August, so it seems to me that this ten would go out in 1908; there again we skip over a year.

Dr. SCHLICH.—I say that whatever men we take now they will not go out till 1908.

Mr. SHIPLEY.—If you take our men in 1905 and give them a year in England and a year's probation in Germany that brings them to 1907.

Dr. SCHLICH.—We do not want the men. We have got men in training.

Mr. SHIPLEY.—Put it off for a year.

Dr. SCHLICH.—That means, in other words, to adopt the plan which Cambridge puts forward, and which we have been fighting against.

The MASTER OF CAIUS COLLEGE.—No, not at all. It is a temporary arrangement, whatever may happen afterwards. You say something must be done this year; what I say is that it ought not to be beyond the bounds of possibility to make some temporary arrangement, which I say is almost necessary whenever you have to change a scheme; it is the most common thing in the world when you have to radically change a scheme in the University.

Sir DIETRICH BRANDIS.—That means delay, and in this particular case delays are disastrous. It must be done at once.

The CHAIRMAN.—I think it really means this—if we accept the Master's proposal that the men we select this year would be lying fallow for one year before we sent them out.

Mr. HOLDERNESS.—You would have to send out twenty in one year and in another ten; you could not keep people doing nothing at all.

The CHAIRMAN.—We should have them in 1907 when we do not want them.

The MASTER OF CAIUS COLLEGE.—How about the Colonies?

The CHAIRMAN.—There are advantages in the Colonies.

The MASTER OF CAIUS COLLEGE.—With regard to the general question of delay, I should like to urge as a point of principle that a certain amount of delay is desirable. I think that we might hope to get the best scheme in the end, and the disadvantage to the public service at the moment is far outweighed by securing a proper scheme.

Sir DIETRICH BRANDIS.—The efficiency in preparing men for India will not be improved by more talking; it will be improved by going to work, and that must be done as soon as possible. This organization, if it is not done now, may never come to any satisfactory end, and therefore any half measures or any temporary measures are evil.

Dr. SCHLICH.—I may, perhaps, be allowed to state that the Government of India, as a matter of fact, were opposed to our going either to Cambridge or to Oxford. They wanted the whole thing to go back to the Continent. I considered that a mistake, and my only alternative was to make such an arrangement as would keep the thing in the country and not make us go back to the Continent.

The CHAIRMAN.—I think it may be assumed that it will not go back to the Continent, but that it will be kept here. The difficulty, as yet insoluble, is how we are to get two staffs of professors. What are the facilities afforded respectively by Oxford and by Cambridge as a centre for a forest school?

Dr. SCHLICH.—Is it not quite monstrous to keep two full-power professors with four students each?

Mr. SHIPLEY.—It will not be four students.

Dr. SCHLICH.—If there will be more, why should they not pay for it?

Mr. SHIPLEY.—It would mean 15 men, and many of our classes are smaller than 15.

The CHAIRMAN.—I do not think I would be a party myself, individually, to advising the Secretary of State to spend the Indian revenues on two schools of forestry. To pass to the other question—Which affords the greatest facilities for practical demonstration in forestry?

The PRESIDENT OF MAGDALEN COLLEGE.—We think that is for the experts to say.

The CHAIRMAN.—It is entirely for the experts.

The PRESIDENT OF MAGDALEN COLLEGE.—On the whole, I think Oxford.

Sir DIETRICH BRANDIS.—There are possibilities there.

The PRESIDENT OF MAGDALEN COLLEGE.—Dr. Schlich has really gone over the ground in both places.

The CHAIRMAN (to Mr. Fisher).—You know Cambridge?

Mr. FISHER.—Yes, I know Cambridge very well.

The CHAIRMAN.—You are a Cambridge man?

Mr. FISHER.—I lived for 20 years in Cambridge when I was a young man, and I took my degree at the University before going to the Forest Department.

The CHAIRMAN.—Do you know the neighbourhood of Oxford?

Mr. FISHER.—I have been to Oxford several times, but I do not know Oxford so well as Cambridge.

The CHAIRMAN.—What are the facilities at Cambridge for practical teaching in forestry?

Mr. FISHER.—One of the great difficulties is the soil, which is a regular heavy marl or else gravel. It is not adapted to growing conifers. The conifers there are very poor.

The MASTER OF CAIUS COLLEGE.—There is a very grand collection not very far off.

Mr. FISHER.—Yes, I believe they manage to keep them alive; as specimens of botany they can just get them to grow, but for forestry the soil is poor. It is quite true that if you go some distance from Cambridge, to Woburn, for instance, you can find woods. I was looking at a map the other day, and apparently Blenheim is close by Oxford, and there are several large landed properties there within quite easy range.

The CHAIRMAN.—Is Woburn being conducted on scientific principles of forestry?

Mr. FISHER.—At present I do most of the sylviculture teaching at

Coopers Hill, and I spend five or six hours every week in Windsor Forest with the students. To commence teaching sylviculture one must have a wood to go to quite handy, because the men who come up are quite ignorant and no amount of study in the class-room could possibly compensate for not going about and seeing the trees. I think even if you have natural woods of some kind growing up, the bad management will perhaps enable the professor to teach better than in a well-managed wood.

The CHAIRMAN.—Because he can point out the mistakes?

Mr. FISHER.—Yes. I find a great advantage in teaching sylviculture in the presence of Windsor Forest, and I could not possibly teach it without. At Cambridge I do not think I could get anything nearer than Woburn.

The CHAIRMAN.—How far is Woburn from Cambridge?

Mr. SHIPLEY.—It is about an hour or so from Cambridge.

Dr. SCHLICH (producing a map and explaining same).—This shows Cambridge and Oxford and the forests within reach of both.

Mr. SHIPLEY.—We should like to put in a map.

The CHAIRMAN.—Certainly.

Dr. SCHLICH.—This map is prepared quite irrespective of the woods in the immediate vicinity. I am perfectly certain, from what I have seen, that they are better at Oxford in the immediate vicinity. Moreover, Oxford is practically situated in the middle of those six blocks of more distant woods. *Here*, for instance, is the Dean Forest, which was made by an Indian forester, the late Mr. Hill. *These* are woods belonging to Lord Bathurst, which, as far as management goes in this country, are as good as any in the country. *Here* is the New Forest, and *there* are the Beech Woods on the Chiltern Hills. There is a railway going direct to it, so that you can very easily in an afternoon go and spend four or five hours in the woods and come back. Take even the Duke of Bedford's woods; you can get to them from Cambridge in from 50 minutes to an hour, and it takes from Oxford an hour and 20 minutes or 25 minutes.

Mr. SHIPLEY.—We can put in a map showing a lot of woods.

Dr. SCHLICH.—These are all woods which are marked for special purposes, because most of these are now managed according to some systematic plan. I know there are lots of woods at an easy distance from Cambridge, but I do not know one, with the exception of the Duke of Bedford's, which is managed in any reasonable way.

Mr. SHIPLEY.—Those woods are not so accessible as they look on your map. If you look it up in "Bradshaw," you will find that it takes a long time and several changes to get to them.

Dr. SCHLICH.—I only want to explain why I, from a practical point of view, formed the idea that Oxford was more favourably situated than Cambridge. I really started in favour of Cambridge.

The CHAIRMAN.—You are dealing here with large forest areas; what do you say with regard to the smaller woods around Oxford and Cambridge?

Dr. SCHLICH.—I cannot claim an intimate knowledge of those around Cambridge, but I have been there, and I certainly have seen nothing in the immediate vicinity of Cambridge which could be of any appreciable advantage to us; whereas in regard to Oxford there are these natural woods in the Chiltern Hills, and there is a very nice wood within $2\frac{1}{2}$ miles of Oxford called Bagley Wood, and I think that some day, unless we turn out to be quite barbarians, they will allow us to manage that wood for them.

Mr. SHIPLEY.—The soil around Cambridge is much more varied.

The MASTER OF CAIUS COLLEGE.—I suppose no man knows more about the varieties of soil and the varieties of trees that do grow upon it and have in past ages grown upon it than Professor Hughes.

Dr. SCHLICH.—Here is a map showing the woods of Oxford (producing another map).

The CHAIRMAN.—Do you consider that it is absolutely necessary for the School of Forestry to have woods close to the seat of the school?

Sir DIETRICH BRANDIS.—The closer they are the better. Wherever the school is located, the first thing which Dr. Schlich will have or hope at least to get, will be a small area of 100 acres as close as possible to the place where the lectures will be given, so that the students can go across within a few minutes or within an hour or so.

Mr. SHIPLEY.—We have all that.

Sir DIETRICH BRANDIS.—Then there must be larger woods for demonstration. I need not explain the particulars, but in 1883 I considered the whole question. I went to Oxford and with the help of Sir William Markby I made the acquaintance of persons connected with the colleges, and I ascertained that there was a very great deal of woodland which is the property of the colleges. That is a great thing, because they could be made over to Dr. Schlich to manage, and then, as soon as he has an area of forest to manage, the forest school will live.

The CHAIRMAN (to Mr. Shipley).—You say you have got some woods?

Mr. SHIPLEY.—We have got already an agricultural farm very close of considerable size, which would be a place that you could get to in 20 minutes on a bicycle.

Dr. SCHLICH.—There are no existing woods?

Mr. SHIPLEY.—We are a much more going concern in this line than they are at Oxford.

Dr. SCHLICH.—But you want existing woods?

Mr. SHIPLEY.—We have an agricultural school as a going concern there, and much that is new will have to be built up at Oxford, I fancy, whereas we are already teaching it.

The PRESIDENT OF MAGDALEN COLLEGE.—We have a professor of forestry, and we are prepared to spend £800 a year. Have you one?

The MASTER OF CAIUS COLLEGE.—You have not put any of those things before our University.

Mr. SHIPLEY.—May I ask who he is?

The PRESIDENT OF MAGDALEN COLLEGE.—He is not appointed at the moment.

Mr. SHIPLEY.—There has been a professor of agriculture at Oxford for very many years, but I cannot remember that he has done very much.

The PRESIDENT OF MAGDALEN COLLEGE.—No; he has had very little pay, but now the University is going to give a little more. Is Cambridge prepared to pay £800 a year.

Mr. SHIPLEY.—We have a professor of agriculture, and we are spending money on it. You have simply added "forestry" to the title of your professor of agriculture.

The PRESIDENT OF MAGDALEN COLLEGE.—No, the forestry was there. Professor of rural economy, not agriculture, is his real title.

The MASTER OF CAIUS COLLEGE.—With regard to the possibilities of what we might do in the matter of money, I may say that we have not had an opportunity of fairly considering it. The whole question has not been

in a state in which it could be brought before the University to be considered seriously.

Sir DIETRICH BRANDIS.—Save your money until the time comes when Canada wants it.

The MASTER OF CAIUS COLLEGE.—We want to come in now.

Sir DIETRICH BRANDIS.—Then you can have a school of forestry which will beat anything else.

Mr. SHIPLEY.—But it will all have gone to Oxford in the meantime.

Sir DIETRICH BRANDIS.—No. There are twelve forest schools in Germany, and so there is room for two in England.

The CHAIRMAN.—Is there any other subject that either Oxford or Cambridge would like to bring before the Conference?

The MASTER OF CAIUS COLLEGE.—I should like to know, as soon as possible, in what position matters are now.

The CHAIRMAN.—I shall make a report to the Secretary of State, and I suppose it will be considered in Council. I do not know; I presume you will hear in due course.

Sir CHARLES LYALL.—That is the usual course.

The CHAIRMAN.—That is all I can say. Of course, I have got no power.

The MASTER OF CAIUS COLLEGE.—I should like to state our position. I think I might fairly do so. We do not concede a very large number of the arguments that have been used to-day, and we cannot be content with anything short of absolute equality in this matter, which is a matter that touches our honour very seriously, it seems to me. Moreover, I think we should urge very strongly again—I say in the interests of the public service—that we should have the opportunity of putting the whole matter before our University in order to consider what can be done. I confess I do think it fair and reasonable that that proposition which I put before you might be considered, namely, What could the two Universities do, provided they were given equal opportunities financially?

The PRESIDENT OF MAGDALEN COLLEGE.—I should expect the two Universities to do exactly the same thing if they had the same financial opportunities. It is for you to consider what financial opportunities you can give them. I have always held that, roughly speaking, Oxford and Cambridge are far more parallel than they are dissimilar, and I am sorry indeed to differ or to fight with Cambridge in the matter. I do not wish to go back on the whole history of it, but when we first thought of it we understood that Coopers Hill was likely to be closed, and we thought that the engineering students would go to Cambridge—where they naturally would go—and we thought we should do our duty and of course help ourselves by having the forestry students. I think our starting point was the professorship of rural economy; we thought we might augment that professorship. We thought that if Cambridge had the engineering students they would be having the lion's share, and that we were not in any way doing what was unfair to them. Then we made our representations, and we understood—it has been mentioned here—that on the whole the Blue Book inclined to Cambridge and probably the India Office was looking to Cambridge. Then we felt that if we were to have nothing at all it was rather hard on us. We felt very much, I think, as Cambridge feels too; and so we then asked to have our views considered. But we understood that Cambridge was quite willing to acquiesce in having all the forestry students, and therefore I think Cambridge could hardly say it was inherently unfair that they should all go to one University if they were prepared to accept that. I do not think there is very much more to be said. Both Lord George Hamilton and Mr. Brodrick have found it a very complicated and difficult question, and there has naturally been a good deal

of delay. I think we have both had to wait, and sometimes Cambridge has had the advantage and sometimes we have. I do not say there is very much in that one way or the other.

The MASTER OF CAIUS COLLEGE.—Would you mind explaining—the advantage in what?

The PRESIDENT OF MAGDALEN COLLEGE.—The advantage in being ahead Cambridge were ahead to begin with, and perhaps we are a little ahead now; but when this scheme was sent down, it was sent simultaneously to both. We did not see Dr. Schlich before we knew the scheme was going to Cambridge. The scheme came down, and we sent for Dr. Schlich, and at that time we were told in the covering letter that the scheme had been sent to Cambridge. The scheme did not come from us as suggested. We have not offered a scheme. We offered a statement of what we should do. Cambridge seems to have offered a scheme and—not perhaps to the same extent—stated what they could do. I do not think we need battle about that. As it seems to us, the question really is for the India Office to say whether these students can be divided—whether they are enough to be divided with profit or advantage—whether they would not be in too small numbers if they were divided—and also whether they require special training. That seems to me the chief point. If they require a special training with a special staff, then they must be kept together, and that special staff must in some way be provided. For that special staff we offer to give a professor at the rate of £800 a year. I understand there would have to be a special staff and a museum; you could hardly send those to both places; you could, no doubt, divide any funds that there are, but would that supply a sufficient special staff? Those seem to us questions for your Office and for your experts to decide, and not for us to pronounce upon. I think that is how it appears to us. The other points that we had in our mind, I think, have been dealt with. There is the question of the open door. Of course, we quite recognise that if the school was at Oxford, Cambridge would not be so near the door as Oxford would; Oxford would undoubtedly have some advantage then. We come back to the question, can they be divided? If they must be sent to one or the other, then the advantage will be seen.

The CHAIRMAN—That is the real question, I think.

Mr. SHIPLEY—May I add one word? Nobody has ever come to us at Cambridge and said, we will give you the engineers; we have started that absolutely on our own initiative at a great sacrifice to the University; and if some of our boys have succeeded in getting into the Service it has been with no help from any Government Department at all. So it is not on all fours with the forestry; it is won purely in the open market. This proposal is by a big Government Department, and if the State needs some teaching done in this subject in one of the Universities, it is not on all fours with the case of the engineers.

The CHAIRMAN—This is not a permanent arrangement; it is only temporary.

Mr. SHIPLEY.—That Mr. Brodrick assured us. It was recommended by, I think, three different Blue Book Commissions, who went carefully into the matter, that the school should come to Cambridge. But Cambridge never acquiesced in this scheme, and I hope it will at any rate try to keep the open door in forestry.

The MASTER OF CAIUS COLLEGE.—The Cambridge scheme did not refer to this scheme, and Cambridge said it would be willing to give further information.

Mr. SHIPLEY.—Our claim really did not refer to India.

The MASTER OF CAIUS COLLEGE.—May I say one word more? At that time we had no idea at the University that Oxford would not have a scheme, and there was no question of our setting up ourselves against Oxford, that

is to say, once Oxford put in a scheme they had just exactly the same right to be on all fours as we had.

The CHAIRMAN.—I am quite certain the Secretary of State, when he sees the notes, will be very much indebted to you all for the assistance you have given.

The MASTER OF CAIUS COLLEGE.—We are very much indebted to you, Sir.

No. 20.

*Report, dated 8th February, 1905, on the Forestry Conference of
2nd February, 1905.*

We have to report, for the information of the Secretary of State, the result of the Conference which took place, at his desire, on the 2nd instant, to discuss the selection and training of Probationers for the Indian Forest Service.

The following were present at the Conference:—

Sir John Edge, K.C., Chairman.

The President of Magdalen College, Oxford.

Professor H. A. Miers, D.Sc., F.R.S., Magdalen College, Oxford.

The Master of Gonville and Caius College, Cambridge.

Mr. A. E. Shipley, Christ's College, Cambridge.

Sir C. J. Lyall, K.C.S.I., C.I.E.

Mr. T. W. Holderness, C.S.I.

Sir D. Brandis, K.C.I.E., Ph.D., F.R.S., formerly Inspector-General of Forests in India.

Dr. W. Schlich, C.I.E., Ph.D., F.R.S., Principal Professor of Forestry at the R.I.E. College.

Mr. W. R. Fisher, Assistant Professor of Forestry at the R.I.E. College.

A report of the proceedings of the Conference is annexed.

It will be seen from this report that no resolution was passed at the Conference, but an interchange of views took place between the representatives of the respective Universities of Oxford and Cambridge and the advisers of the Secretary of State in Council, which has, we think, placed matters in a clearer light, although not many new arguments were brought forward on either side.

It was, indeed, evident throughout the discussion that the representatives of the University of Cambridge and the advisers of the Secretary of State in Council approached the subject from different points of view.

In the view of the latter the closure of the Royal Indian Engineering College at Coopers Hill should be effected with the least possible disturbance of the existing arrangements for the supply of Probationers for the Indian Forest Service. It is generally recognised that the School of Forestry at Coopers Hill is the only institution at present in existence in the United Kingdom which provides efficient training in *Indian* Forestry. Therefore, it is argued—we think rightly—that the closure of the college at Coopers Hill involves the transfer of the School of Forestry to some new centre, a transfer which was, in fact, recommended by the Committee, which reported in 1903 in favour of closing the college.

The argument becomes plainer if we consider the purpose which the college has served with regard to engineering education. It was originally founded thirty-four years ago for the training of engineers for the Indian Public Works Department, at a time when such training was not obtainable elsewhere. The growth of efficient institutions for the teaching of engineering in the United Kingdom appeared to the Secretary of State in Council to render the maintenance of the college as an engineering institution unnecessary, and it was accordingly decided to close it. The same cannot be said with regard to the School of Forestry, and the existing organisation must therefore be maintained at some new centre, instead of at Coopers Hill.

It seemed to us that the representatives of Cambridge University were disposed to under-value somewhat the important results which are obtained by the systematised course of three years' continuous training in Indian Forestry, which is now provided at Coopers Hill, and which it is proposed to continue at Oxford University; or, to put the matter in another way, they seemed to contemplate as of no special difficulty the establishment at comparatively short notice of a second and equally efficient course at their own University. They suggested, in particular, that the expenditure which it is proposed to incur at Oxford out of Indian revenues might not unreasonably be apportioned between the two Universities. We cannot but think that, were this done, the result would be to establish two Schools of Indian Forestry, of which either would be less efficient than that which at present exists. We do not, of course, question the ability of either University to supply scientific teaching of the highest order, but the practical experience of many years which is now being utilised in the School of Indian Forestry at Coopers Hill cannot be made available at more than one new centre. The supply of first-rate teachers of forestry with Indian experience is very limited.

In suggesting that the Probationers for the Indian Forest Service should be chosen at the end, rather than at the beginning of their University career, the representatives of Cambridge University appear to us to have been to some extent misled by the analogy of the selection of candidates for the Indian Civil Service. That analogy does not appear to hold good, because the Probationers for the Indian Forest Service are required to possess special knowledge of a highly technical kind when they leave this country for India, while the Indian civilians are young men of good education and proved general ability, who are sent out to undertake the general administration of the country, with only such familiarity with Indian law, languages, &c., as can be acquired in a single year of probation at a University.

The proposal that those who are to enter the Indian Forest Service should be trained, broadly speaking, for the first part of their course in general science, and for the last part in the special branch of forestry, appears to be open to serious objection in view of the statement of the technical advisers of the Secretary of State that the study of scientific subjects and the study of forestry should proceed *pari passu* throughout the entire course, and we do not think that any variation from the three years' course of probation as now followed at Coopers Hill could be permitted without some risk to Indian interests.

Our opinion is that the transfer of the School of Indian Forestry at Coopers Hill to a new centre is a step which it is absolutely necessary to take, in the existing condition of the study of forestry in the United Kingdom. The University of Cambridge asks for delay before a final decision is arrived at, to enable the University to consider its own arrangements with regard to the teaching of forestry, but we think that in limiting the proposed arrangements with the University of Oxford to a period of five years the Secretary of State in Council has had sufficient regard to the claims of other Universities. If, at the end of that period, they are able to provide efficient teaching in forestry, their claim to train candidates

in situ for the Indian Forest Service will doubtless be given the fullest consideration.

We do not think that any sufficient reason was shown at the Conference for departing from the scheme at present under consideration, that the new centre of training for the Forest Probationers should be at Oxford.

With regard to the method of selection of the Probationers for the Indian Forest Service, we think that, although the selection might be made at an examination conducted by the Civil Service Commissioners, on practical grounds it can be made more conveniently and cheaply under the regulations of which a draft has been prepared, *i.e.*, at the preliminary examination of the Honours School of Natural Science at Oxford. That examination is already in being; to organise a separate examination for the comparatively small number of candidates who compete for the Indian Forest Service—in 1904, twenty-one only—would occasion unnecessary labour and expense, the latter of which must be defrayed either by the candidates themselves or from Indian revenues.

Our recommendations, therefore, are:—

- (1) That the draft letter to the President of Magdalen College be now sent;
- (2) That the draft letter to the Vice-Chancellor of Cambridge University, with one or two slight alterations, be sent also.

JOHN EDGE.

C. J. LYALL.

T. W. HOLDERNESS.

India Office,
8th February, 1905.

Appendix to No. 20.

Minute, dated 8th February, 1905, of Mr. T. W. Holderness, C.S.I.

I have signed the report, as I consider that the scheme which it is proposed to lay before the University of Oxford will secure suitable candidates for the Indian Forest Department, and will provide for their technical training in Indian Forestry. These are the two matters with which my Department is concerned. I am satisfied that, for the present, special instruction in Indian Forestry must be provided, and that it ought not to be provided at more than one place at the cost of Indian revenues.

I defer to the opinion of Dr. Schlich and Sir D. Brandis that the special training will necessarily occupy three years, including one year spent on the Continent. Accepting that opinion, I agree that the proposed age limit of 21 is sufficiently high, and that the competitive entrance examination should be one which undergraduates of one year's standing who have started work in the Natural Science School may be expected to satisfy. Had it been possible, I should prefer to see the technical course compressed into two years in all (including the Continental work), the limit of age raised to 22, and the candidates selected by a more advanced examination, conducted by the Civil Service Commissioners and framed so as to require proficiency in most of the subjects recommended by Dr. Schlich for the study of the Forest Probationers. If this could have been arranged, the main grievance of the Cambridge authorities would have been met, as the higher age limit would suit Cambridge men who have taken Part I. of the Natural Science Tripos at the end of their second year, and might even admit men who have done a third year's course in

the School of Agriculture. The weak point in the present scheme is that it may practically exclude Cambridge men, who have commenced reading for the Natural Science Tripos at that University; and these men are more numerous than the men pursuing the same studies at Oxford.

(Signed) T. W. HOLDERNESS.

No. 21.

Letter from the Vice-Chancellor of the University of Cambridge to the India Office, dated the 11th March, 1905.

The Committee appointed by the Council of the Senate to deal with the question of instruction in Forestry have noted with satisfaction that, in answer to the question put by Sir John Gorst in the House of Commons on Tuesday, February 28th, you replied to the effect that the details of the scheme for providing a supply of candidates for the Indian Forestry Service were still under consideration.

They gather also from the statement made by the Marquis of Bath in the House of Lords last Tuesday, March 7th, that you had under consideration the possibility of certain modifications of the scheme as originally submitted to us for criticism:—

- (1) The competitive examination was to be conducted by the Civil Service Commission;
- (2) The temporary nature of the scheme was emphasized;
- (3) The experimental period of five years originally proposed was to be reduced to three;
- (4) The Marquis of Bath (as reported) said he would undertake that an inquiry, which should include outside authorities, would be held before the close of three years, to consider and report upon the experiment.

On behalf of my Committee, I desire again to press upon you a suggestion which was made in the conference held at the India Office on Thursday, February 2nd, namely, that for the present year, pending a full and immediate consideration of a scheme for admitting to the competition Graduates of all British Universities, a selection should be made in June from Graduates in Natural Sciences at such Universities; and that in their case the period of probation should be two years instead of three, one of these years to be spent at Coopers Hill, during the time for which the College is to remain open, and the other in Continental forests. The difficulty in the way of carrying out this proposal which was pointed out by Dr. Schlich, namely, that the students would be ready a year too soon, seems to be one which is of little account compared with the grave disadvantage to the Public Service of a limited competition and the creation of what the Earl of Lytton (as reported) justly called a "protected interest." A similar difficulty must necessarily arise whenever it is determined to change the period of probation for a Public Service.

I am, &c.,

(Signed) EDWARD A. BECK,
Vice-Chancellor.

No. 22.

Letter from the India Office to the Secretary, Civil Service Commission, dated the 17th March, 1905.

I am directed by the Secretary of State for India in Council to acknowledge the receipt of your letter* of the 3rd February last, enquiring whether it is intended to hold this year an Examination of Candidates for the Indian Forest Service, and to express regret that the necessity for prolonged consideration of the future arrangements for the selection and training of the Probationers for this Service has hitherto prevented him from making any communication to the Commissioners on the subject.

The Secretary of State in Council now directs me to enquire whether the Commissioners would be so good as to arrange to conduct a Competitive Examination, under the Regulations of which a proof* is enclosed herein, at such date as may be convenient to the Commissioners and likely to be suitable to students engaged in the study of Natural Science in the teaching institutions of the United Kingdom.

It will be observed that the Syllabus of the Examination is left blank, and the Secretary of State in Council would be glad if the Civil Service Commissioners will fill it in at their discretion.

The Secretary of State would much appreciate the assistance of the Civil Service Commissioners in this matter.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 23.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated the 17th March, 1905.

I am directed by the Secretary of State for India in Council to acknowledge the receipt of your letter of the 11th instant on the subject of the recruitment and training of candidates for the Indian Forest Service.

Mr. Secretary Brodrick has, as you are aware, given to this matter his most careful attention, and has received a deputation from your University; and has further caused the matter, in compliance with the request put forward by that deputation, to be discussed at a conference, at which representatives of Oxford, of Cambridge, and of this Office were present.

In consequence of these deliberations, the Secretary of State in Council has on some points modified the decision at which he had previously arrived.

The recruitment will be absolutely open to all qualified candidates, wherever they may have been educated, and it will be conducted, not as originally suggested, at Oxford, but by the Civil Service Commissioners, who will at their discretion draw up the syllabus for the examination.

The Secretary of State in Council, after very careful consideration, has decided that he cannot ignore the unanimous opinion of his expert advisers, and that he must maintain, in its general outline, the present

* Not printed.

system of training after selection, viz., two years, at some one place in this country, under teachers possessing practical experience of Indian Forestry, and one year in Germany; and that the most suitable place for the two years' training, regard being had more especially to the necessity for easy access to woodlands and forests, is Oxford.

He, therefore, considers himself bound to adhere to his decision to send the students, when selected by open competition, to be trained for two years at Oxford; but he has decided, further, that this arrangement, which he regards as experimental, shall be adopted for three years certain, instead of five years; and that before the expiry of that period an inquiry shall be held, with the view of assisting the Secretary of State to determine what the system shall be in subsequent years.

I am to inclose, for your information, copies of letters which he has caused to be addressed to the Civil Service Commissioners and to the University of Oxford.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 24.

Letter from the India Office to the President of Magdalen College, Oxford, dated the 17th March, 1905.

I am directed by the Secretary of State for India in Council to address you, in continuation of previous correspondence, on the subject of the selection and training of Probationers for the Indian Forest Service.

Mr. Brodrick much regrets the delay which has taken place in the disposal of this matter, but the representations which have been made to him from different quarters appeared to necessitate to some extent a re-examination of the question.

After mature consideration, therefore, the Secretary of State in Council desires now, while still availing himself of the assistance of the University of Oxford in the location at Oxford of the Indian School of Forestry, to introduce certain modifications in the arrangements previously contemplated.

These modifications are as follows:—

- (1) The Competitive Examination for the selection of the Probationers to be carried out by the Civil Service Commissioners, instead of by the authorities of Oxford University.
- (2) The Syllabus of the Examination to be drawn up by the Civil Service Commissioners, at their discretion, in the four subjects of:—
 - (I.) Mechanics and Physics;
 - (II.) Chemistry;
 - (III.) Zoology; and
 - (IV.) Botany.
- (3) The period at the end of which the arrangements for training the Probationers at Oxford are to be subject to reconsideration, to be three years, instead of five, as stated in the letter from this Office of the 19th August last.

It is intended to hold within this period of three years an enquiry with the view of assisting him to determine the manner of the selection and training of the Probationers for the Indian Forest Service in subsequent years.

Mr. Brodrick trusts that in these circumstances he may still rely on the assistance of the University in the training of the Probationers in the immediate future.

A proof of the Regulations, in their amended form, is enclosed herewith, and the Civil Service Commissioners have been addressed with a view to the holding of the Competitive Examination at such date as may be convenient to them and likely to be suitable to students engaged in the study of Natural Science in the teaching institutions of the United Kingdom.

They have been requested to prepare the Syllabus of the Examination.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 25.

Letter from the India Office to the Secretary to the Court of the University of Edinburgh, dated the 23rd March, 1905. -

I am directed by the Secretary of State for India in Council to reply to your letter of the 16th December last, the receipt of which was acknowledged on the 19th of that month, and in which you enquire whether the Court of the University of Edinburgh may be supplied with an outline of the new scheme proposed for the recruitment and training of candidates for the Indian Forest Service.

Mr. Secretary Brodrick regrets that, in consequence of representations which led him to give further consideration to this question, and to postpone a final decision, his answer has been unavoidably delayed.

I am now to explain that Mr. Secretary Brodrick, having given to the matter his most careful attention in Council, has decided that the recruitment shall continue to be, as at present, by open competitive examination, conducted by the Civil Service Commissioners; and has further decided, in accordance with the unanimous opinion of his expert advisers, to maintain, in its general outline, the present system of training after selection by open competition, viz., two years, at some one place in this country, under teachers possessing practical experience of Indian Forestry, and one year in Germany; and that the most suitable and convenient place for the two years' training is Oxford.

He has decided, further, that this arrangement, which he regards as experimental, shall be adopted for a period of three years, and that before the expiry of that period an inquiry shall be held, with the view of assisting the Secretary of State to determine what the system shall be in subsequent years.

I am to inclose, for your information, a copy of a letter which he has caused to be addressed to the Civil Service Commissioners, and to add that he notes the action which has been taken in the University of Edinburgh for imparting instruction in Forestry and the further intention of the University to arrange for the grant of a Degree in this subject.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 26.

Letter from Vice-Chancellor of the University of Cambridge to India Office, dated 20th March, 1905.

I am requested by the Council of the Senate, which met to-day, to further acknowledge the receipt of your letter, dated 17th March, 1905, in which you inform me of the decision of the Secretary of State for India in Council to transfer for a period of three years the training of Indian forestry students from Coopers Hill College to the University of Oxford.

While recognising the great courtesy with which the Secretary of State has received and considered their representations, the Council of the Senate desire, with all respect, to place on record their profound dissatisfaction with the adoption, even temporarily, of a scheme which they still hold to be such as to involve the exclusion of members of this University from any share in the Forestry Department of the Public Service.

They wish me to add that they propose to publish the correspondence which has passed between the University and the India Office. They assume that no objection to this course will be raised by the Secretary of State.

I have, &c.,

(Signed) EDWARD A. BECK,
Vice-Chancellor.

No. 27.

Letter from the India Office to the Vice-Chancellor of the University of Cambridge, dated 29th March, 1905.

I am directed by the Secretary of State for India to acknowledge the receipt of your letter of the 20th March, on the subject of the transfer for a period of three years of the School of Indian Forestry from the Royal Indian Engineering College to Oxford.

In reply to the last paragraph of your letter, I am to explain that Mr. Secretary Brodrick proposes very shortly to present papers to Parliament explaining the grounds of the decision on the subject of the selection and training of Probationers for the Indian Forest Service, and to include in them the correspondence between the Vice-Chancellor of the University of Cambridge and this Office.

The necessity for the separate publication of the correspondence by the University authorities appears, therefore, to be obviated; but Mr. Secretary Brodrick has no objection to such publication, should it be desired, in which case he requests that this letter may be included.

I am, &c.,

(Signed) HORACE WALPOLE.

No. 28.

Letter from the Civil Service Commission to the India Office, dated the 25th April, 1905.

With reference to previous correspondence relative to the revision of the scheme of examination for the Indian Forest Service.

I am directed by the Civil Service Commissioners to transmit, for the consideration of the Secretary of State for India in Council, the accompanying draft syllabus* which they have caused to be prepared on the lines suggested by your Department.

I am also to state that if the Secretary of State concurs in the proposed syllabus the Commissioners will be prepared to hold an examination of candidates for the Forest Service on the 29th August of this year.

The Commissioners would be obliged by receiving copies of the revised Regulations in due course.

I have, &c.,
(Signed) R. HOWLETT.

No. 29.

Letter from the India Office to the Civil Service Commission, dated the 11th May, 1905.

I am directed by the Secretary of State for India in Council to acknowledge the receipt of your letter of the 25th April, and to convey his thanks to the Civil Service Commissioners for their willingness to conduct an examination in August next for the admission of candidates to the Indian Forest Service.

The Secretary of State in Council has now finally approved the Regulations, of which a copy is enclosed.

A further supply of copies will be forwarded to you, as soon as the Regulations are actually issued.

I am, &c.,
(Signed) HORACE WALPOLE.

Enclosure in No. 29.

Indian Forest Service.—Regulations as to the Appointment of Probationers, 1905.

1. *Appointments.*—The Secretary of State for India in Council will, in the summer of 1905, make not less than nine appointments of Probationers for the Indian Forest Service, provided that so many

* Printed as Enclosure in No. 29.

candidates are in all respects qualified under the conditions hereinafter set forth, upon the results of a competitive examination to be held in London on the 29th August, 1905, by the Civil Service Commissioners.

2. *Admission to Examination.*—Applications for admission to the examination must be made on a printed form to be obtained from the Secretary, Judicial and Public Department, India Office, Whitehall, London, S.W., and to be returned to him not later than Saturday, the 1st July, 1905.

No applications received after that date will be considered.

3. *Age Limits.*—The age of candidates must not be less than 18, or more than 21, years on the 1st January, 1905.

4. *Nationality, &c.*—Every candidate must be a natural-born British subject. He must be unmarried, and if he marries before reaching India, he will forfeit his appointment.

5. *Qualifying Examinations.*—A candidate must have passed the Examination of the University of Oxford known as Responsions or the Previous Examination of the University of Cambridge, or some one of the other examinations held (1) by these Universities or (2) by the Universities of London or Dublin or (3) by the Joint Board of Examiners for the Scottish Universities or the Scotch Education Department or (4) by the College Entrance Examination Board of the United States of America, and recognised by the Universities of Oxford and Cambridge as equivalent to the Examination in Responsions or to the Previous Examination, or must have passed an Examination at some Foreign University which, in the opinion of the Secretary of State in Council, is at least equivalent to any one of the Examinations above-mentioned.

6. *Subjects of Examination.*—The subjects of the competitive examination mentioned in paragraph 1 are as follows:—

- (1.) Mechanics and Physics.
- (2.) Chemistry.
- (3.) Zoology.
- (4.) Botany.

Equal weight will be attached to each of the four subjects, and candidates must qualify in each.

The Syllabus of the Examination forms Appendix I.

7. *Fee, &c.*—A fee of 2*l.* is required from every candidate, and instructions as to the manner of payment of this fee, the time and place of the examination, and any other necessary information, will be sent to candidates on application by the Civil Service Commissioners.

8. *Medical Examination.*—Those candidates who are provisionally successful in the competitive examination will be required, shortly after the result of the examination is declared, to undergo a strict examination by a Medical Board at the India Office, at which particular stress will be laid on good vision and hearing.

On passing this medical examination candidates will be deemed to be Probationers for the Indian Forest Service.

9. *Period of Probation.*—The period of probation will extend over about three years. For the first two years the Probationers will be required to undergo a special course of study at Oxford and to become members of the University if not so already. During the third year of their probation

they will receive practical instruction, visiting under suitable supervision such Continental forests as may be selected for the purpose. Excursions may also be made for purposes of study during the first two years, both in term time and in the vacations.

10. *Charges*.—The Probationers will be required to defray all expenses for lodging, board, tuition, and excursions which they may incur during the period of their probation at Oxford. During the third year of practical instruction on the Continent, which will consist of three terms, each Probationer will be required to pay in advance a charge of 60*l.* a term, for which the Secretary of State for India will provide (1) board, lodging, and washing; (2) travelling expenses; and (3) fees to local forest officers, &c.

11. *Course of Study*.—The prescribed course of study for the Probationers comprises the following subjects:—

I.—*Subjects auxiliary to Forestry.*

- (1.) Elementary Organic Chemistry and the Chemistry of soils.
- (2.) Geology.
- (3.) Forest Entomology.
- (4.) Forest Botany.
- (5.) Geometrical Drawing, Mathematics up to and including Plane Trigonometry and Surveying.
- (6.) German.
- (7.) Engineering (elementary).
- (8.) Book-keeping, in reference to Indian Forest Accounts.

II.—*Forestry, Theoretical and Practical, in all its Branches.*

12. *Conduct and Medical Requirements*.—Every Probationer will be required to conduct himself during the period of probation in a manner satisfactory to the Secretary of State, and to give evidence of satisfactory progress in his studies in such manner as may be required, failing which, or in the event of serious misconduct, he will be liable to have his name removed from the list of the Probationers.

A Probationer may also, at the discretion of the Secretary of State, be required from time to time to appear before the Medical Board, and, should the result be unsatisfactory, he will be liable to have his name removed from the list of Probationers.

13. *Diploma of Forestry, &c.*—During the period of probation, the proficiency of the Probationers will be tested by periodical examinations.

The Probationers who satisfy the Examiners in all these examinations, and complete satisfactorily the practical course in Forestry on the Continent, will receive the Diploma of Forestry of the University of Oxford. It is desirable that they should, if possible, also obtain a degree in the Honour School of Natural Science at the University.

14. *Appointment and Seniority*.—Probationers who obtain the Diploma of Forestry, and are of sound constitution and free from physical defects which would render them unsuitable for employment in the Indian Forest Service, will be appointed Assistant Conservators in the Indian Forest Department. Their seniority will be determined by the results of

the examinations held during their two years' residence as Probationers at Oxford and the manner in which they have completed the practical course on the Continent.

They will be allowed at the end of the period of probation to state their preference in respect to the Provinces to which they desire to be allotted; but the distribution will be made to the several Provinces according to the needs of the Public Service, at the discretion of the Secretary of State for India. Officers are, however, at all times liable to be transferred from one Province to another at the pleasure of the Government of India.

15. *Riding*.—Every Probationer, before proceeding to India, will be required to satisfy the Secretary of State, in such manner as may be determined, of his ability to ride. It is desirable that this evidence should be forthcoming before the Probationer proceeds to the Continent for his final period of study.

16. *Articles of Agreement, &c.*—Within a month of his nomination as Assistant Conservator, each nominee must sign articles of agreement describing the terms and conditions of his appointment; he must embark for India when required to do so by the Secretary of State, and must engage his own passage. Failure to embark at the stated time will, in the absence of satisfactory explanation, lead to forfeiture of appointment.

17. *Allowance*.—An allowance will be granted to each Probationer on signature of his agreement, varying from 50*l.* to 100*l.*, according to the degree of proficiency and diligence shown by him during his practical course upon the Continent.

18. *Salary*.—An Assistant Conservator of Forests will draw pay at the rate of Rs. 350 a month from the date of his reporting his arrival in India.

19. *Promotion, Leave, Pension, and Provident Fund*.—Promotion, leave, and pension will be governed by the Regulations laid down by the Government of India, and made applicable to Forest officers, such regulations being subject to any modifications or alterations which may be made in them from time to time by the Government of India, and their interpretation in case of any doubt arising being left to that Government. A copy of the existing regulations can be seen on application at the India Office.

Certain information regarding appointments in the upper controlling staff of the Indian Forest Service will be found in Appendix II.; a summary of information regarding leave is contained in Appendix III., regarding Pensions and Provident Fund in Appendix IV.

India Office,
11th May, 1905.

NOTE.—It is probable that candidates for the Indian Forest Service in subsequent years will be required to have passed a qualifying examination in German.

APPENDIX I.

(Referred to in paragraph 6.)

SYLLABUS OF THE COMPETITIVE EXAMINATION.

I.—MECHANICS AND PHYSICS.

Mechanics.

The principles of the lever, the inclined plane, the composition of forces, and virtual work, their experimental investigation and application to machines and other simple cases of equilibrium. Centre of gravity, couple, torque, velocity ratio, mechanical advantage, efficiency. Application to liquids and gases. Density. Boyle's law. Pump, siphon, barometer, manometer. Body moving in a straight line so that its velocity changes proportionally with the time. Body moving uniformly in a circle. Motion of pendulum-bob. Momentum, force, impulse of a force, energy, conservation of energy.

Heat.

Simple thermometry. Simple methods of determining latent heats; specific heats; expansion of gases, liquids and solids; vapour pressures. Change of state. Simple experiments on conduction, convection and radiation. Mechanical equivalent of heat.

Sound.

Direct determination of the velocity of sound in air and in water; the effect of change of temperature on the velocity of sound in air; mode of propagation of sound in air. Simple methods of determining the pitch of a note. Characteristics of musical sounds.

Light.

Laws of reflection and refraction. Simple methods of determining refractive indices, and the focal lengths of mirrors and lenses. The simplest form of the compound microscope and of the astronomical telescope. Dispersion, the spectroscope, spectra of different kinds. Simple photometry. Elementary notions of the determination of the velocity of light.

Electricity and Magnetism.

Properties of electrified bodies. Methods of electrification. Electric induction. The gold leaf electroscope. Elementary quantitative notions of electrical quantity, capacity, potential and specific inductive capacity. Condensers. Properties of magnets. Methods of magnetization. Magnetic induction. Simple methods of determining the declination and dip at a place and of comparing magnetic fields and moments. The construction of the batteries of Volta, Daniell, and Leclanché, and their theory. The secondary battery. The physical and chemical action due to a current. Simple galvanometers, ammeters, and voltmeters. Measurement of current-strength, electromotive force and resistance. The production of currents by electro-magnetic induction. The broad principles of the induction-coil and dynamo.

PRACTICAL EXAMINATION.

Simple experiments illustrating the principles stated above.

II.—CHEMISTRY.

The simpler chemical and physical properties of common substances, such as lime, salt, sugar, water, air.

The preparation (excluding details of technical processes) and properties of the following substances:—

The metals, tin, lead, iron, copper, zinc, magnesium, calcium, potassium, sodium; their simpler and more important compounds, especially such as occur naturally, and such compounds and alloys as are used in the Arts.

Hydrogen, oxygen, water, ozone, hydrogen-peroxide.

Nitrogen, ammonia, ammonium salts, nitrous oxide, nitric oxide, nitrogen peroxide, nitrates.

Carbon, carbon dioxide, carbonates, carbon monoxide.

Chlorine, bromine, iodine, chlorides, bromides, iodides, chlorates, hypochlorites.

Sulphur, sulphuretted hydrogen, sulphides, sulphur dioxide, sulphur trioxide, sulphites, sulphates.

Phosphorous, phosphoretted hydrogen, phosphorus trioxide, phosphorus pentoxide, orthophosphates, phosphorus trichloride, phosphorus pentachloride.

Silica.

The principles of chemical change; oxidation and reduction; combustion; flame. Allotropy. Methods of purifying bodies. Methods of determining the composition of air and of water. Laws of chemical combination. Diffusion of gases. The atomic and molecular hypotheses. The simpler methods of determining equivalents. General considerations used in determining molecular weights and atomic weights. Chemical notation.

Alcohol, ethane, and the simpler ethylic compounds, considered in detail as typical bodies. Methylic alcohol and methane, and benzylic alcohol and toluene, considered briefly as analogues of alcohol and ethane. Characters of primary normal alcohols in general, and of their corresponding hydro-carbons.

Acetic acid, aldehyd and the simpler acetic compounds, considered in detail as typical bodies. Benzoic acid and benz-aldehyd, and formic acid and form-aldehyd, considered briefly as analogues of acetic acid and aldehyd. Characters of normal mon-acids in general and of their corresponding aldehyds.

Oxalic acid and the simpler oxalic compounds. Characters of normal di-acids in general.

Processes (i.) for the detection of carbon, hydrogen, nitrogen, sulphur in organic compounds; (ii.) for the estimation of carbon, hydrogen, nitrogen in organic compounds; (iii.) for the production and analysis of the silver-salts of organic acids and the platinum-salts of organic bases; (iv.) for the determination of vapour densities by the V. Meyer method.

The determination of the formula of an organic compound.

PRACTICAL EXAMINATION.

The Practical examination may include:—

Simple experiments and preparations illustrating the properties of the inorganic substances named above.

Simple quantitative experiments, such as, the determination of the loss of weight on heating a body, the determination of the volume of gas evolved on the solution of zinc in acid. The volumetric estimation of acids and alkalies.

The qualitative analysis of simple salts containing not more than one of the following metals, and one of the following acid radicals:—Sodium, potassium, ammonium, calcium, magnesium, zinc, copper, iron, lead, tin, oxide, carbonate, chloride, sulphate, nitrate, sulphide.

III.—ZOOLOGY.

A general knowledge of the structure and life history of the Rabbit, the Frog, the Dogfish, the freshwater Crayfish, the common Earthworm, *Obelia*, *Hydra*, a Gregarine, *Paramoecium*, *Amoeba*. The simpler physiological properties of the various systems of organs, such as the circulatory, digestive, &c., which are met with in these animals. An elementary knowledge of the structures and properties of the cell and of the tissues (epithelia, muscular, connective, bone, cartilage, fat, blood, and lymph) built up of cells in the Rabbit or Frog. An elementary acquaintance with the formation of the ova and the spermatozoa in Vertebrates, and with the phenomena of fertilization and of cleavage of the ovum, and with the formation of the primary embryonic layers and the origin of the amnion, allantois, and placenta.

PRACTICAL EXAMINATION.

In the practical examination candidates will be required to demonstrate by dissection or otherwise the structure of some one or more of the animals named above.

IV.—BOTANY.

The following plants as exhibiting the life-history of plants; the relation of the plant to external conditions; the processes and mechanisms of nutrition, growth, and reproduction; the structure and functions of the parts of the plant:—

Angiosperms: helianthus, tilia, zea. *Gymnosperms: pinus. Pteridophyta: aspidium, equisetum. Bryophyta: funaria, peltia. Algæ: vaucheria, chlorococcus. Fungi: bacterium, a lichen, a parasitic fungus.

PRACTICAL EXAMINATION.

Candidates will be expected to show an adequate acquaintance with the microscopical examination of the chief plant tissues, and to describe typical specimens and preparations.

APPENDIX II.

LISTS OF APPOINTMENTS IN THE UPPER CONTROLLING STAFF OF THE INDIAN FOREST SERVICE.

NOTE.—These lists show only the existing sanctioned scale, which is liable to alteration at any time. Forty-three of the appointments shown below in the various grades of Deputy and Assistant Conservators are being gradually transferred to the Provincial Forest Services, which are recruited in India. The rest of the appointments named are held by members of the Imperial Forest Service, which is recruited under these regulations. The lowest grade here mentioned, namely Assistant Conservator, 2nd grade, on Rs. 350 a month, is that to which probationers are ordinarily appointed if they have acquitted themselves creditably during their course of instruction.

Number according to existing sanctioned scale	Appointment.	Salary.
INDIA.		
1	Inspector-General of Forests	Rs. 2,000 a month, rising by annual increments of Rs. 100 a month to Rs. 2,500 a month.
1	Assistant Inspector-General of Forests	Pay of grade.
Conservators (excluding the Conservators on the Bombay and Madras lists below) —		
4	1st grade	Rs. 1,600 a month.
5	2nd „	„ 1,400 „
4	3rd „	„ 1,200 „
Imperial Forest School :—		
1	Deputy Director	} Pay of grade.
2	Instructors	
9 (4 temporary).	Foreign Service appointments	
BENGAL, WITH ANDAMANS.		
2	Deputy Conservators, 1st grade	Rs. 900 a month.
2	„ „ 2nd „	„ 800 „
3	„ „ 3rd „	„ 650 „
4	„ „ 4th „	„ 550 „
3	Assistant Conservators, 1st grade	„ 450 „
3	„ „ 2nd „	„ 350 „
ASSAM.		
1	Deputy Conservators, 1st grade	} As above.
1	„ „ 2nd „	
1	„ „ 3rd „	
3	„ „ 4th „	
2	Assistant Conservators, 1st grade	
1	„ „ 2nd „	

Number according to existing sanctioned scale.	Appointment.	Salary.
UNITED PROVINCES		
2	Deputy Conservators, 1st grade	Rs. 900 a month.
2	" " 2nd "	" 800 "
2	" " 3rd "	" 650 "
3	" " 4th "	" 550 "
3	Assistant Conservators, 1st grade	" 450 "
4	" " 2nd "	" 350 "
PUNJAB (WITH NORTH-WESTERN FRONTIER PROVINCE AND BALUCHISTAN) AND CENTRAL PROVINCES.		
4	Deputy Conservators, 1st grade	} As above.
5	" " 2nd "	
5	" " 3rd "	
7	" " 4th "	
8	Assistant Conservators, 1st grade	
7	" " 2nd "	
BURMA.		
5	Deputy Conservators, 1st grade	} As above.
5	" " 2nd "	
12	" " 3rd "	
14	" " 4th "	
8	Assistant Conservators, 1st grade	
6	" " 2nd "	
MADRAS.		
1	Conservator, 1st grade	Rs. 1,600 a month.
1	" 2nd "	" 1,400 "
1	" 3rd "	" 1,200 "
3	Deputy Conservators, 1st grade	} As above.
4	" " 2nd "	
7	" " 3rd "	
8	" " 4th "	
5	Assistant Conservators, 1st grade	
6	" " 2nd "	
BOMBAY AND SIND.		
1	Conservator, 1st grade	} As above.
1	" 2nd "	
1	" 3rd "	
2	Deputy Conservators, 1st grade	
4	" " 2nd "	
7	" " 3rd "	
6	" " 4rd "	
5	Assistant Conservators, 1st grade	
4	" " 2nd "	

APPENDIX III.

LEAVE.

1. The following is a summary of the principal regulations relating to the leave admissible to officers appointed to the Indian Forest Service by the Secretary of State from the United Kingdom.

Long Leave.

2. Furlough is admissible to an aggregate amount of six years during the service. The amount "earned" is one-fourth of an officer's active service, and the amount "due" is that amount less any enjoyed.

3. Furlough without medical certificate can, if due, be generally taken after eight years' active service, and again after three years' continuous service. It is limited to two years at a time.

4. Furlough with medical certificate is limited to one year if an officer has not served three years continuously; otherwise he may have leave up to two years, and it may be extended to a third year.

5. The allowances admissible during furlough are :—

- (1.) During the first two years of furlough without medical certificate and during so much of furlough with medical certificate as may be "due"—half average salary, subject to certain maximum and minimum limits.
- (2.) After the expiration of the period for which the foregoing allowances are admissible—one quarter of average salary, subject to certain maximum and minimum limits.

Short Leave.

6. Privilege Leave is a holiday which may be granted to the extent of one-eleventh part of the time that an officer has been on duty without interruption; and it may be accumulated up to three months, earned by 33 months' service. During privilege leave, the officer retains a lien on his appointment, and receives the salary which he would have received if on duty. An interval of not less than six months must elapse between two periods of absence on privilege leave.

Privilege Leave may be prefixed to furlough, special leave, or extraordinary leave without allowances. The whole period of leave thus taken in combination is known as combined leave. Combined leave may not be of less duration than six months, nor, except on medical certificate, may it be extended beyond two years.

7. Special Leave may be granted at any time for not more than six months, with intervals of six years' service; allowances, calculated as during furlough, are given during the first six months only, whether taken in one or more instalments. This leave is included in the aggregate of six years' furlough admissible.

8. Extraordinary Leave without allowances may be granted in case of necessity, and, except in certain specified cases, only when no other kind of leave is by rule admissible. It may be granted in continuation of other leave.

9. Subsidiary Leave in India for a minimum of 10 days, usually with half average salary, is granted to an officer proceeding on or returning from leave out of India, or on retirement, to enable him to reach the port of embarkation or to rejoin his appointment. It is admissible only at the end and not at the beginning of combined leave. If the officer is entitled to privilege leave, he can draw pay at privilege leave rates for as many days as he is entitled to such leave.

10. Short Leave is also granted to enable officers to appear at examinations, &c.

General Rules.

11. Leave of absence, whether on furlough or on privilege leave, can never be claimed as of right, and is given or refused at the discretion of Government.

12. After five years' continuous absence from duty, an officer is considered to be out of the employment of Government.

13. When leave allowances are paid at the Home Treasury, or in a Colony where the standard of currency is gold, rupees are converted into sterling at the rate of exchange fixed for the time being for the adjustment of financial transactions between the Imperial and Indian Treasuries, unless any other rate has been exceptionally authorised. But for the present the rate of conversion is subject to a minimum of 1s. 6d. to the rupee.

APPENDIX IV.

PENSIONS AND PROVIDENT FUND.

1. The following is a summary of the principal pension rules applicable to officers of the Indian Forest Service appointed by the Secretary of State from the United Kingdom.

An officer of the Indian Forest Service is eligible for a pension on voluntary retirement after completing 20 years' qualifying service or attaining the age of 55 years. If at an earlier date he is compelled to retire from the service through ill-health not occasioned by irregular or intemperate habits, he becomes eligible for an invalid pension or a gratuity according to the length of his service.

The amount of pension or gratuity is regulated as follows :—

After a service of less than 10 years, an invalid gratuity not exceeding one month's emoluments for each completed year of service.

After a service of not less than 10 years an invalid pension not exceeding the following amounts :—

Years of Completed Service.	Scale of Pension.		Maximum Limit of Pension.
	Sixtieths of Average Emoluments.		
10	20		Rs. 1,000 a year or Rs. 83½ a month.
11	21		1,400 " " 116½ "
12	22		1,800 " " 150 "
13	23		2,200 " " 183½ "
14	24		2,600 " " 216½ "
15	25		} 3,000 " " 250 "
16	26		
17	27		
18	28		
19	29		

After a service of not less than 20 years, a retiring pension not exceeding the following amounts :—

Years of Completed Service.	Scale of Pension.		Maximum Limit of Pension.
	Sixtieths of Average Emoluments.		
20 to 24	} 30	{	Rs. 4,000 a year or Rs. 333½ a month.
25 and above			5,000 " " 416½ "

Officers who have shown special energy and efficiency during an effective service of three years as Inspector-General of Forests or Conservator (First Grade) may, at the discretion of the Government of India, be allowed an additional pension of Rs. 1,000 a year.

Subject to certain prescribed conditions, rupee pensions are now issued to pensioners residing in gold standard countries at the rate of exchange of 1s. 9d. the rupee.

2. A Provident Fund has also been established on the following basis :—

- (a) The contribution is compulsory up to 5 per cent. on salaries, with voluntary contributions of a further 5 per cent. ; while on leave, an officer may subscribe any sum he pleases, subject to a minimum of 5 per cent. on his leave allowances and a maximum of 10 per cent. on his salary.
- (b) Compound interest on such payments is annually credited by Government to each officer subscribing, the rate being at present 4 per cent. per annum.
- (c) Receipts and payments are made in rupees only.
- (d) The sum which will thus accumulate to the credit of an officer to be his absolute property, to be handed over to him unconditionally on quitting the service ; or, in the event of his death before retirement, to his legal representatives.

EAST INDIA (STATE TECHNICAL SCHOLARSHIPS).

~~R 2013~~

S1431

R E P O R T

OF A

COMMITTEE APPOINTED BY THE SECRETARY
OF STATE FOR INDIA

TO INQUIRE INTO

THE SYSTEM OF STATE TECHNICAL
SCHOLARSHIPS ESTABLISHED BY THE GOVERNMENT
OF INDIA IN 1904.

2

WITH APPENDICES.

Presented to Parliament by Command of His Majesty.



LONDON:

PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C., and 32, ABINGDON STREET, S.W.,
and 54, ST. MARY STREET, CARDIFF; or
H.M. STATIONERY OFFICE (SCOTTISH BRANCH), 23, FORTH STREET, EDINBURGH; or
E. PONSONBY, LTD., 116, GRAFTON STREET, DUBLIN;
or from the Agencies in the British Colonies and Dependencies,
the United States of America, the Continent of Europe and Abroad of
T. FISHER UNWIN, LONDON, W.C.

PRINTED BY

EYRE AND SPOTTISWOODE, LTD., EAST HARDING STREET, E.C.,
PRINTERS TO THE KING'S MOST EXCELLENT MAJESTY,
1913.

T9(A).812.2.N1
E3

CONTENTS.

	Pages
I.—REPORT	1-59
INTRODUCTION	
Constitution and work of the Committee; list of places visited and witnesses examined	1-6
CHAPTER I	
History of the Technical Scholarship System	7-11
CHAPTER II :	
Review of the Working of the Scholarship System.—	12-26
Three questions considered —	
(i) How do Indian students acquit themselves at British universities and technological schools? (paragraphs 21-34).	
(ii) Is practical experience in workshops and manufacturing concerns an essential part of industrial training? If so, are Indian students able to get it? (paragraphs 35-39)	
(iii) Do Indian technological students succeed in finding employment on their return to India? (paragraphs 40-46)	
CHAPTER III.	
General Recommendations for improving the Scholarship System -	27-33
CHAPTER IV.	
Recommendations regarding particular industries—	
Engineering.—	34-40
General Summary (paragraphs 63-66)	
Mechanical Engineering (paragraph 67).	
Electrical Engineering (paragraph 68).	
Civil (including Sanitary and Municipal) Engineering (paragraph 69).	
Mining (paragraphs 70-78) —	40-44
Geology (paragraph 79)	44
Metallurgy (paragraph 80)	44-46
Textile Industries:—	46-54
Spinning and Weaving (paragraphs 83-95).	
Bleaching and Finishing (paragraphs 96-99)	
Dyeing (paragraphs 100-104).	
Tanning	54-57
Chemical Manufactures	57-58
CONCLUSION	59
II.—APPENDICES	61-130
1. Selection of correspondence between the Secretary of State and the Government of India	61-78
2. Extracts from the Fifth Quinquennial Review of the Progress of Education in India, 1902-7	79-82
3. Statement showing subjects of study of Government Technical Scholars and Institutions attended	83
4. Statement of Expenditure	84
5. Statement relating to Government of India Technical Scholars, 1904-12	85-117
6. Extract from 1912 Report of the Association for the Advancement of Scientific and Industrial Education of Indians	118-124
7. Written evidence submitted to the Committee by Professor J. Cadman, D.Sc., and Sir T. H. Holland, K.C.I.E., F.R.S.	125-130
8. List of Reports and papers laid before the Committee	131
9. "The Training of Engineers in the United States," a paper read before the Institution of Naval Architects, in 1903, by Professor W. E. Dalby, M.A., B.Sc., with discussion thereon	132-164
10. Synopsis of Committee's conclusions and recommendations	165

REPORT
OF THE
**INDIAN TECHNICAL STUDENTS
COMMITTEE.**

INTRODUCTION.

CONSTITUTION AND WORK OF THE COMMITTEE.

Constitution of the Committee.

1. On the 27th March 1912 the Secretary of State appointed a Committee "to inquire and report as to the facilities available for Indian students for industrial and technological training in this country, with special reference to the system of State Technical Scholarships established by the Government of India in 1904." The Committee was constituted as follows:—

Sir Theodore Morison, K.C.I.E. (*Chairman*).
Sir K. G. Gupta, K.C.S.I.
Mr. J. H. Reynolds, M.Sc.
Professor W. E. Dalby, M.A.
Mr. P. H. Dumbell (*Secretary*).
Mr. R. E. Field (*Assistant Secretary*).

2. The Committee held its first meeting at the India Office on 9th May 1912, for the purpose of discussing the itinerary, and considering questions of procedure.

Proceedings at Glasgow.

3. On the 7th June 1912 the Committee proceeded to Glasgow, where meetings were held in the Court Room of the University, for the purpose of taking evidence, on the 10th and 11th June. The following witnesses were examined:—

Sir Donald MacAlister, K.C.B., LL.D. (*Vice-Chancellor*).

Professor A. Barr, D.Sc. (*Civil Engineering and Mechanics*).

Dr. C. H. Desch, D.Sc. Ph.D. (*Metallurgical Chemistry*).

Mr. H. Bamford, M.Sc. (*Engineering-Drawing, and Design*).

Mr. J. S. Nicholson, B.Sc. (*Electrical Engineering*).

Mr. D. Home Morton, M.Inst.C.E. (*of Messrs. D. and A. Home Morton, Civil Engineers*).

Mr. W. A. Baird Laing (*of Messrs. Kyle, Dennison, and Laing, Civil Engineers*).

Professor Chas. Latham, M.Inst.M.E. (*Mining*).

Dr. Wm. Lorimer, LL.D., Member of the University Court and Chairman of the North British Locomotive Co., Ltd.

Dr. G. T. Beilby, F.R.S. (*Chairman of the Board of Governors of the Royal Technical College*).

Mr. H. F. Stockdale, F.R.S.E. (Director of the Royal Technical College).

Dr. T. Gray, D.Sc., Ph.D. (Applied Chemistry, Royal Technical College).

Mr. T. A. Boyd, of Shettleston Iron Works.

Mr. N. Martin (of Messrs. Warren and Stuart, Civil Engineers).

Mr. C. P. Hogg, M.Inst.C.E. (of Messrs. Crouch and Hogg, Civil Engineers), and

Mr. H. A. Mavor, M.Inst.C.E., M.Inst.E.E. (of Messrs. Mavor and Coulson, Ltd., Electrical Engineers).

Evidence was also taken from the following Indian students:—

Mr. Iqbal Hussain.

Mr. P. Saxena.

Mr. J. N. Bhattacharji.

Mr. Nand Lall.

Mr. Amarnath Puri.

On the 8th June the Committee paid a visit to the ship-building yard of Messrs. Yarrow & Co., and on the morning of the 12th inspected the laboratories, &c., of the Royal Technical College.

We desire to express our deep appreciation of the kindness and hospitality extended to us during our stay in Glasgow by Sir Donald MacAlister, the staff of the University and the Royal Technical College, and Mr. A. F. Yarrow. We owe a special debt of gratitude to Professor Barr for the invaluable assistance which he rendered to us throughout.

4. In the afternoon of the 12th June the Committee proceeded to Leeds, where further evidence was taken, in the Court Room of University House, on the 13th, 14th, 15th, and 17th; the following witnesses were examined:—

Proceedings at Leeds.

Professor J. B. Cohen, B.Sc. (Organic Chemistry).

Professor A. Green, M.Sc. (Tinctorial Chemistry and Dyeing).

Professor J. Goodman, M.Sc. (Engineering).

Professor Roberts Beaumont, M.Sc. (Textiles).

Mr. C. James (of Messrs. J. Buckton & Co.) (Engineering).

Professor H. R. Procter, M.Sc. (Leather).

Dr. J. G. Parker (Principal of the Leathersellers' Company's College, Bermondsey).

Mr. J. A. Brooke (Textiles).

Mr. John McLaren (Engineering).

Professor A. Smithells, F.R.S. (Chemistry).

Mr. W. H. Perkins, M.Sc. (Assistant Lecturer in Chemistry and Supervisor of Students' Lodgings).

Alderman B. Broadbent, M.A., J.P. (Textiles).

Mr. H. Kitchen (Dyeing).

Mr. John Rhodes (of Messrs. J. Peate & Co.) (Textiles).

Mr. A. Meysey Thompson, M.Inst.C.E. (of Messrs. Hathorn, Davey, & Co., Ltd.) (Engineering).

Mr. Walter Ellis (of Messrs. Ellis, Crowther, & Co.) (Textiles).

Mr. A. G. Lupton (Textiles).

Mr. J. Lowden, J.P. (Director of the Leeds and District Dyers' and Finishers' Association);

and the following Indian students :—

Mr. K. C. Mookerjee.
 Mr. S. Faiz-ud-din (Government Technical Scholar).
 Mr. P. K. Dutt.
 Mr. K. Menon.
 Mr. Raj Krishna.

During our stay in Leeds we visited the various laboratories and inspected the leather and textile departments of the University.

We wish to record our appreciation of the kindness of the University authorities in placing the Court Room at our disposal, and our indebtedness for the assistance we received in the task of securing the attendance of representative witnesses.

Proceedings at Manchester.

5. On the evening of the 17th June the Committee left Leeds for Manchester, where we held meetings on the 18th, 19th, 20th, and 21st in the Council Chamber of the Victoria University which had been kindly placed at our disposal by the authorities. The following gentlemen gave us the benefit of their advice and experience :—

Professor E. Knecht, Ph.D., M.Sc.(Tech.) (Department of Pure and Applied Chemistry, Municipal School of Technology).

Professor J. E. Petavel, D.Sc. (Department of Civil and Mechanical Engineering, Victoria University of Manchester).

Professor H. B. Dixon, F.R.S. (Department of Inorganic Chemistry, Victoria University of Manchester).

Professor W. H. Perkin, Ph.D. (Department of Organic Chemistry, Victoria University of Manchester).

Mr. E. G. Hiller (Manager of the Boiler Accident and General Insurance Company).

Dr. G. J. Fowler (Consulting Chemist to the Rivers Committee of the Manchester Corporation).

Professor W. W. Haldane Gee, B.Sc., M.Sc.Tech. (Physics, Municipal School of Technology).

Mr. F. Garnett, of the Manchester Chamber of Commerce.

Professor T. W. Fox, M.Sc.Tech. (Department of Textile Manufacture, Municipal School of Technology).

Mr. Hans Renold (of Messrs. Hans Renold, Ltd.), Engineering.

The Rt. Hon. Sir William Mather, LL.D. (Chairman of Messrs. Mather and Platt, Ltd.), Engineering.

Mr. Ivan Levinstein, M.Sc.Tech. (Aniline Colour Manufacturer).

Professor J. Radcliffe, M.Sc.Tech. (Sanitary Engineering, Municipal School of Technology).

Sir F. Forbes Adam (of Messrs. Wm. Graham & Co.), Merchant.

Dr. Alfred Rée (Member of Chemistry Sectional Committee, Municipal School of Technology).

Sir T. H. Holland, K.C.I.E., F.R.S. (Professor of Geology, and Director of the Department of Geology and Mining, Victoria University of Manchester).

Mr. J. C. Maxwell Garnett, M.A. (Principal, Municipal School of Technology).

Mr. J. Hubner M.Sc.Tech. (Director of the Department for Bleaching, Dyeing, Printing and Finishing, and Paper Manufacture, Municipal School of Technology).

Mr. T. Butterworth (of Messrs. Butterworth and Dickinson), Textile Machinery.

Mr. A. K. Davies (Managing Director of the Cotton Bleachers' Association, Ltd.).

We also took evidence from the following Indian students :—

Mr. I. B. Damania (Malvi Technical Scholar).

Mr. A. Guha (Government Technical Scholar).

Mr. D. Nagarkatti (Bombay University Scholar).

Mr. R. V. Gurjar (Government Technical Scholar).

Mr. B. B. Pradhan (Government Technical Scholar).

On Thursday, 20th June, the Committee visited the bleaching, dyeing, finishing, and paper-making departments of the School of Technology, and on the following day inspected the textile and engineering workshops.

The Committee are especially indebted to the Vice-Chancellor, Sir Alfred Hopkinson, and Mr. Maxwell Garnett, Principal of the School of Technology, for their kind hospitality and assistance.

6. On Monday, 24th June, the Committee re-assembled at Birmingham, at the new University buildings, Bournbrook, where we held meetings on the 24th and 25th, in the Court Room, which had been very kindly lent to us by the University authorities. Evidence was taken from the following professors :—

Professor R. S. Heath, D.Sc. (Vice-Principal).

Professor T. Turner, M.Sc. (Metallurgy).

Professor J. Cadman, D.Sc. (Mining).

Professor Cadman was accompanied during a portion of his evidence by three Indian students :— Messrs. G. C. Bardaloye, M. N. Sen-Gupta, and M. Obaidulla, all Government Technical Scholars. On the afternoon of the 24th the Committee attended an informal conference at Mason College, which Professor Ashley, Dean of the Faculty of Commerce, had kindly arranged with some of the leading manufacturers of the district. The following gentlemen attended this conference, and gave the Committee the benefit of their advice and experience :—

Sir George Kenrick, J.P. (Hardware).

Mr. J. A. Kenrick (Hardware).

Mr. R. K. Morcom, of Messrs. Belliss and Morcom (Engineering).

Mr. R. H. Krause, of Messrs. Stewarts and Lloyds, Heavy Metal Manufacturers.

Mr. G. H. Boeddicker, of Muntz's Metal Company.

Mr. J. S. Taylor, of Messrs. Taylor and Challen and the Rudge-Whitworth Cycle Company, and ex-Chairman of the Birmingham Chamber of Commerce.

Mr. Edward Hickman (Ironmaster).

Professor Martineau, of Messrs. Avery's, Limited, Weight and Scale Manufacturers.

Proceedings at Birmingham.

Mr. Edward Cadbury, of Messrs. Cadbury, Ltd.,
Cocoa Manufacturers.

Professor W. J. Ashley, Dean of the Faculty
of Commerce, Birmingham University.

Professor A. W. Kirkaldy, of the Faculty of
Commerce, Birmingham University.

On the 25th June the Committee visited the
new Mining Laboratories of the University and
inspected the miniature mine which has been
constructed for the use of mining students.

Our thanks are specially due to Sir Oliver Lodge
and Professor Cadman for the kindness and hospi-
tality extended to us, and we also wish to record
our grateful recognition of the assistance rendered
to us by Dr. R. S. Heath and Professor Ashley,
in procuring suitable witnesses and generally
contributing to the success of our visit.

Summary of provincial inquiries.

7. Altogether during the provincial meetings
the Committee took evidence from 75 witnesses, of
whom 29 were professors and other representatives
of the universities and technical colleges, 28
gentlemen intimately connected with various
industries as owners and managers of works,
&c., and 18 Indian technical students.

Proceedings in London.

8. Further meetings of the Committee for the
purpose of taking evidence were held at the India
Office on 10th, 11th, and 12th July, when the ten
following witnesses were examined :—

Mr. J. M. Champion, M.Inst.C.E. (Engineering
Correspondent to the Educational Adviser for
Indian Students).

Mr. A. Brereton, C.S.I. (Government Director
of Indian Railways).

Sir R. N. Mukherji, K.C.I.E.

Sir D. J. Tata.

Sir D. M. Hamilton.

Mr. Ambalal Sarabhai (Mill-owner of Ahmeda-
bad).

Dr. Morris Travers, F.R.S. (Director of the
Indian Institute of Science, Bangalore).

Mr. R. A. S. Redmayne, C.B., M.Sc. (His
Majesty's Chief Inspector of Mines).

Dr. A. D. Denning, M.A., Ph.D. (Superintendent
of Industries, Bengal).

Lieut.-Colonel J. Clibborn, C.I.E. (lately Prin-
cipal of the Thomason Civil Engineering College,
Rurki).

Further investigation necessary.

9. We are aware that in this preliminary
tour to four provincial centres—Glasgow, Leeds,
Manchester, and Birmingham—we have by no
means made an exhaustive survey of the facilities
available for technical instruction in this country,
but owing to the imminence of the long vacation
it was impossible to extend the tour, and it was
considered advisable to visit first of all those
centres at which the greatest number of Indian
technical students, and especially Government
of India scholars, have received their training.
The information laid before the Committee at these
four centres has been sufficient to enable us to

prepare a Report which will indicate the main lines of the policy which in our opinion should be followed hereafter, but the inquiry as to the facilities available for Indian students for industrial and technological training is by no means exhausted, and it will, we think, be necessary—if possible, early next session—for some representative of the Secretary of State to visit such centres as Sheffield, Liverpool, Bradford, and Newcastle, where, from evidence given before us, it appears probable that special facilities exist for the study of particular subjects.

CHAPTER I.

HISTORY OF THE TECHNICAL SCHOLARSHIP SYSTEM.

Origin of the State Scholarship system.

The Simla Conference of 1901.

10. The policy of sending home picked Indian students for technical instruction in this country may be said to have first taken shape at the Simla Conference in 1901 when Lord Curzon as Viceroy summoned all the Directors of Public Instruction and other educational experts to Simla, and presided in person over the proceedings. The conclusions reached were embodied in a series of resolutions, of which the following relates to the system now under consideration.

“Resolution of Simla Conference, VI.—State Scholarships :—

“That it is desirable that the Government of India should institute a number of State technical scholarships, perhaps 10 in number, with an approximate allowance of 100*l.* a year in addition to travelling expenses and fees, to be awarded annually in fixed proportions by the Local Governments, subject to the sanction of the Government of India, to selected candidates who should be sent abroad to undergo definite courses of study in subjects connected with industrial science or research; that these scholarships might be held for an average duration of two years.”

The Government of India's scheme of 1902

11. In pursuance of this Resolution the Government of India addressed the Secretary of State in a despatch dated 9th October 1902. This despatch is given *in extenso* in Appendix I., p. 61.

The main points in it may be summarised as follows :—

The scholarships were to be granted only to natives of India, their chief object being to provide the higher technical education which would qualify the holders, on returning to India, to assist in promoting the improvement of existing native industries and the development of new industries, wherever possible. Agriculture was not included within the scope of the scheme, nor were the professions of law, medicine, engineering, forestry and veterinary science. The Government of India considered that the industries for which the scholarships were most suitable were those which were already, or might in the future be, organised on a considerable scale, and those in which native capital was or might be embarked. Subject to these main principles the industries to which the scholarships were to be applied were to be chosen by the Local Governments in consultation with the mercantile and industrial public. The number of scholarships to be awarded annually was to depend upon the extent to which suitable candidates were forthcoming. Certain general

principles were laid down by the Government of India as to the choice of persons to whom the scholarships were to be awarded; in particular it was recognised as specially important that the scholars, in addition to being intelligent, should have a practical interest in the industries that they were appointed to study, and a real intention of returning to India and devoting themselves to the practice of what they had learned. Competitive examination was considered inappropriate for the testing of qualifications such as these, and no age limit was fixed. It was laid down that when it had been determined to offer a scholarship in connexion with a particular industry, the Local Government should give the widest possible publicity to this intention, and invite applications which it should judge with the help of persons cognisant of the industry, and of the officers concerned with technical education; and it was stated to be desirable that the scholar should not only have a competent knowledge of English or of the language of any other country to which he was to be sent, but that he should have had the best technical education available in the province in the particular industry which he was to study. The scholarships were to be tenable for two years in the first instance, an extension for a third year to be granted if the student should be well reported upon. The annual allowance originally proposed was 100*l.* The Government of India considered it undesirable to bind the scholars by actual agreement to serve either Government or private employers on their return, but their prospects of obtaining employment on the completion of their studies were to be well weighed at the time of selection.

12. The Secretary of State in his Public Despatch No. 65, dated 29th May 1903 (*see* Appendix I., p. 72), approved of the institution of technical scholarships, but entered a caveat. In the first place he intimated that the scheme must be developed gradually, as it was of the nature of an experiment, and appropriate courses of training would have to be carefully thought out in consultation with experts; secondly, he expressed the opinion that the allowance of 100*l.* per annum proposed by the Government of India might with advantage be increased to 150*l.* per annum, and it would be most desirable that the selected candidates should have some private means as well. It was not intended that the scholars should look to Government for the payment of all their expenses.

13. The Government of India readily accepted the modifications suggested by the Secretary of State, and made known their intention of offering scholarships by means of letters to Local Governments (*vide* circular letter to Local Governments Nos. 565-570, dated 21st September 1903, printed in Appendix I., p. 75).

14. Some further points of general application have been settled from time to time in despatches that passed between the Secretary of State and the

History of the Scholarship system —cont.

Despatch from the Secretary of State
(Lord G. Hamilton) in 1903.

Subsequent modifications of the scheme

History of the Scholarship System —cont.

Government of India, of which a selection is printed in Appendix I.

Initiation of the scheme in India.

15. The Fifth Quinquennial Review of the Progress of Education in India, 1902-7, gives in a convenient form the opinions of the local authorities on the Government of India's scheme, and shows the steps taken for its initiation. The more important passages from the Review are printed as Appendix II., p. 79.

Subjects studied by State technical scholars and institutions which they have attended.

16. Since the scheme came into operation in 1904, 66 men had, up to 31st March 1912, been granted scholarships by the Indian Government for the study of technical subjects covering a wide field of industry. The following list shows the industries to which the scholarships have been applied and the institutions at which the students have obtained the theoretical part of their training :—

Textile industries 24, all of whom have been sent to the Manchester School of Technology.

Mining and mining engineering 19; 16 of whom have attended Birmingham University, 2 Manchester University, and 1 the London School of Mines.

Electrical and mechanical engineering 7, of whom 2 were sent to the Manchester School of Technology, 1 to Birmingham University, 1 to the City and Guilds (Engineering) College, and 3 to Faraday House.

Leather industry 5; 3 to the Leathersellers' Company's College, Bermondsey, and 2 to Leeds University.

Metallurgy 3; 2 to Birmingham University and 1 to Berlin University.

Soap making and the chemistry of oils and fats, 2; one to the Battersea Polytechnic and the other to the private laboratory of Dr. Lewkowitsch.

Sugar industry 2; one sent to the Manchester School of Technology and the other to the West Indies.

Alkali manufacture 1, sent to Liverpool University.

Pottery 1, placed with the Pilkington Tile and Pottery Company, Ltd., Clifton Junction, near Manchester.

Engineering and sanitary science 1, sent to Liverpool University, and afterwards for an additional year to London University.

(The above particulars are given in tabular form as Appendix III., p. 83).

Summary of expenditure.

17. The annual expenditure has grown steadily, from 31*l.* 3*s.* 9*d.* for four students in 1904-05 to 6,120*l.* 3*s.* 5*d.* for 39 students in 1911-12.

Full particulars of the expenditure from the institution of the system in 1904 till 31st March 1912, are shown in Appendix IV., p. 84.

Working of the system summarised.

18. The detailed working of the system as applied to the 66 men who have held Government scholarships can only be shown by analysis of the

individual cases. The records hitherto kept are not as complete as could be desired, but the statement found in Appendix V. (pages 85-117), based on such information as is available, gives the salient facts.

This statement shows that out of the 66 men who had been granted scholarships up to 31st March 1912, 20 were graduates of Indian Universities, 2 had graduated at English Universities before receiving the scholarship, and 27 had received some technical instruction in India, while 30 were stated by the Government of India to have had practical experience of the industry which they were sent home to study.

19. The movement towards technical education which has taken place in India since 1904 has not been by any means confined to Government. It has been a general movement affecting the whole of India. For instance, in Bengal there was established in 1904 "the Association for the Advancement of Scientific and Industrial Education of Indians," one object of which was "to enable properly qualified students to visit Europe, America, Japan or other foreign countries for studying Arts and Industries," and it appears from the latest Report of the Association that up to 1912 no less than 222 students in all have been granted scholarships, or financial assistance in some other form, to enable them to pursue their studies abroad. We received evidence of the existence also of two other agencies for the promotion of technical education, viz., the South Indian Industrial Association and the Malvi Technical Scholarship Fund. Technical scholarships appear also to be given occasionally by the Bombay University, the Calcutta University, the State of Hyderabad, and the State of Baroda. A not inconsiderable number of students have come from India at their own expense and initiative. The result of the general movement of which the institution of the Government scholarship system and the formation of the Calcutta Association are the two most important developments, has been a great influx of Indian students since 1904 into the centres of technical education in this country. The effect, so far as the United Kingdom is concerned, may be illustrated by statistics furnished to the Committee from the registers of some of the more important Technological Colleges and Universities. It is sufficient to quote three cases :—

At Glasgow University there were no Indian scholars on the technical side previous to the 1905-06 session, when two Indian students enrolled themselves for a course of engineering. Since then the numbers have increased rapidly, until at present there are no less than 45 Indian technical students in attendance, and the total number of Indians whose names appear in the register as having enrolled for technical subjects since 1905 is approximately 60.

Again, at the Manchester School of Technology, up to the end of 1903 the number of Indian students who had joined that Institution was very small indeed ; since then the number has steadily

History of the Scholarship System —cont.

Recent development of technical education in India: influx of Indian students to centres of technical instruction in the United Kingdom.

History of the Scholarship System
—cont.

grown until at the present time there are 19 students in attendance, and in all 78 Indian scholars have enrolled in the day departments of the School since the end of 1903.

At Birmingham University the first Indian technical scholars arrived in 1904, when five Government scholars were sent there to study mining; the total number of enrolments since 1904 is 23, and there are five technical students in attendance at the present time.

CHAPTER II.

REVIEW OF THE WORKING OF THE SCHOLARSHIP SYSTEM.

20. In order to ascertain what success had attended the practice of sending Indian students to this country to study the application of science to industry, we directed our inquiry so as to elicit answers to the three following questions :—

- (I.) How do Indian students acquit themselves at British universities and technological schools ?
- (II.) Is practical experience in workshops and manufacturing concerns an essential part of industrial training? If so, are Indian students able to get it ?
- (III.) Do Indian technological students succeed in finding employment on their return to India ?

We give the conclusions at which we have arrived, after taking evidence, in the order of the questions above.

21.—(I.) As a class Indian students were well spoken of at the educational centres which we visited. Testimony was very generally borne to their industry and good behaviour. Exceptions there have been, of course, but the general opinion of Vice-Chancellors and professors was summed up in the phrase, "As a class Indians work hard and give no trouble." The report upon their ability was also favourable. Some of them have been men of very marked ability and earned from their professors very high praise indeed; these were men of the type that is easily recognisable by university teachers as fit for a first class in the honours list. One such Indian, a Government scholar, was described to us not only as the ablest Indian student who had ever entered the textile department of the Manchester School, but as "easily the first in his year." Another at Leeds was said to have been "extremely good, quite as good a student as we have had of any kind here." Men of this class are of course exceptions in all countries, and it must not be inferred that the bulk of Indian students attain this high standard. The average Indian scholars appear, however, to be quite the equals of their British fellow-students in capacity; in so far as it is possible to generalise they are rather above the average at book work and in the class room; they are less good at experimental work in the laboratory and are said to be somewhat deficient in initiative. To this rule, however, there were certain notable exceptions, and on the whole the general opinion expressed to us was that Indian students were well able to keep abreast of their work in the universities and technological schools, and were in intelligence quite up

Working of the Scholarship System.

Three main questions for consideration.

(I.) Indian students at British universities and technological institutions generally successful.

Working of the Scholarship System
—*cont.*

Some failures, and the harm they do.

to the average of their class. This is not to say that we did not hear of particular Indian students who had proved highly unsatisfactory; they were men such as every educational institution has experience of, men with whom nothing could be done; their failings were of the ordinary kind, they were either stupid and indolent, or their moral character was bad. It is to be regretted that any men of this class should have been allowed to come from India. As an illustration of the harm they do, we may mention that one professor told us that he had succeeded in getting an opening for practical experience for two Indian students (who, it should be stated, were not Government scholars), but that they had behaved so badly that the firms which had offered them these advantages absolutely declined to take any more Indian students at all. Such students do harm altogether out of proportion to their number, and the greatest care should be taken, not only by the Government of India but by all philanthropic and patriotic agencies which send Indian students to this country, to avoid sending persons who may impair the chances of their fellow-countrymen in the United Kingdom.

Creditable record of the Government of India scholars, and of other picked students.

22. It is satisfactory to record that the scholars sent by the Government of India have on the whole been a credit to their country. They are picked men, and on the whole have proved themselves to be above the average of Indian students. One professor, ranging all the Indian students of whom he had had personal experience in classes as if awarding honours in an examination, placed five in the first class, and of these five, four proved on a scrutiny to have been holders of Government scholarships. Another scholar was described by Mr. Redmayne (now His Majesty's Chief Inspector of Mines), whose student he had been, as "an extremely brilliant man, one of the most brilliant students I have come across." It is only fair to add that in certain cases a high opinion was expressed of students who had not held Government of India scholarships. In particular, some of the scholars selected by the Universities and Native States, and by societies such as the Association for the Advancement of Scientific and Industrial Education of Indians stand out as eminently well fitted to benefit by the advanced training which they have received in this country.

Question of the sufficiency of Indian students' preliminary training in India.

23. We made special inquiries with a view to finding out whether, apart altogether from their natural abilities, Indian students had received an education in their own country sufficient to enable them to take full advantage of the instruction given them in the United Kingdom. The evidence upon this head was somewhat conflicting, but our conclusion is as follows:—Those who had read up to the standard of the B.Sc., or B.A. with Science, were adequately equipped on the side of pure science, and entered upon their course in this country rather better prepared than their British class-fellows, who come, as a rule, direct from secondary schools. Indians who had read up to the First

Arts or Intermediate were able to keep up with their classes in this country only if they had taken the group of scientific subjects for the Indian examination, and even then their preparation was hardly adequate. Those who had only passed the Matriculation examination or read for the Arts side of the Intermediate were incapable of following the lectures here, and should in the opinion of the University authorities have been kept for another two years in India before attempting to get admitted to a University or Technological school in the United Kingdom.

24. One other point is sufficiently important to deserve special mention. Complaints were very frequently made to us of the inadequacy of the teaching of drawing in Indian schools. There is no doubt that Indian students of engineering have been very seriously handicapped by their backwardness in this respect. We were told by representatives of the Faculty of Engineering at Glasgow that Indian students appear to have had no experience of drawing before they came to this country and some of them had not even seen a pair of compasses. This deficiency they are not able to overcome in the course of their college career, and they remain permanently behind their Scotch and English fellow-students in the more practical parts of the course. Professor Barr illustrated this by a reference to the list of prize winners in the previous year. In the lecture classes Indians had secured three first prizes and two second prizes. But no Indians had secured prizes for engineering-drawing and design. As far as Indians are concerned, said Professor Barr, "there is a blank altogether in the drawing and design department." We understand that attempts have been made recently to improve the teaching of drawing in India, but so far the results of these attempts have not been visible in the engineering schools of this country, and Indian students still remain at a serious disadvantage in this respect.

25. Natural capacity and sufficiency of general knowledge, however, are not the only factors to be taken into account in technological education; in addition to these two there is another factor essential to success, and that, is a preliminary acquaintance with the industry to be studied. It is conceded on all hands that, unless a student is familiar with the practical side of industry before he begins the study of the theory, he is unable to get the full advantage of the teaching in a university. This is altogether distinct from the practical training which he receives after he has been through the college, and which forms the subject of our second question. The practical experience to which we now refer is needed to enable him to understand what his university teachers are talking about, and it may, therefore, like a sufficient general education, be considered one of the necessary qualifications for his course of reading. It is so considered in the best organised institutions of this kind in the world. We under-

Working of the Scholarship System —cont.

Need for improving the teaching drawing in Indian schools and colleges.

Paramount importance of previous works experience.

Working of the Scholarship System
—cont.

Views of the engineering profession, as formulated by the Institution of Civil Engineers (1903-5).

stand, for example, that in the German Technical High Schools—notably Charlottenburg—a student is now required to have had at least a year's experience in a works before entering upon his technological studies.

26. With regard to engineering, the great advantage of previous familiarity with a workshop was emphasised by almost all our witnesses. After he has actually grasped the things with his own hands, has swung a hammer and worked a lathe, after he has seen what a ton of steel actually looks like, then and only then is the student in a position to understand the bearing of what he learns in books and what his professor tells him. It is not necessary for us to deal at length with this point, because it has already been authoritatively settled by the Institution of Civil Engineers. In 1903 the Institution appointed a committee to inquire into the subject of the training of engineers. The report of that Committee (to which reference will be made again later), was endorsed by the Institution of Mechanical Engineers, the Institution of Naval Architects, the Iron and Steel Institute, the Institution of Electrical Engineers, the Institution of Gas Engineers, the Institution of Engineers and Shipbuilders of Scotland, the Institution of Mining Engineers, and the North East Coast Institution of Engineers and Shipbuilders, and it may therefore be accepted as an authoritative expression of professional opinion. The Committee, among other things, recommended an introductory workshop course of at least one year in mechanical engineering workshops for all students of engineering, including those who intend ultimately to specialise in mining, electrical engineering, and civil engineering.

The same principle recognised in metallurgical and textile industries, and in tanning, dyeing, and mining.

27. In all other industries with regard to which we inquired we found that very similar views prevailed, although professional opinion had not in most cases been codified with the same precision as in engineering. Representatives of the metallurgical, tanning, textile, and dyeing industries, all united in recommending that a young man should have at least a year's practical experience of the industry he was going to study, before coming up to the University. With regard to no industry was the importance of previous familiarity so much emphasised as with regard to mining: Professor Latham of Glasgow said with reference to the Indian student "What I would recommend the Indian Government to do is to send these men to their own mines for, say, a year, and after they had proved their ability to send them over here." At Manchester, Sir Thomas Holland laid very great stress upon the desirability of preliminary acquaintance with mines, and the Professor of Mining at Birmingham, Professor Cadman, in describing the ideal training of a miner, recommended that after matriculation the student should go for two years actually down a mine. It is interesting to note that the Indian students whom we consulted were not less emphatic in asserting the value of obtaining practical experience before undertaking

a university course of study. A strong confirmation of the soundness of this view is to be found in the fact that those Indian students who were familiar with the industry in India have done uniformly well and that those who had not such experience have often turned out badly.

28. The Indian students who as a class have done best are the textile students, and among these the Government technical scholars have done particularly well and have established a record of which any country might be proud. By a reference to the statement printed as Appendix V., it will be seen that these scholars had all had very considerable experience of their industry in India. Numbers 1, 2, 3, 12, 29, 34, 35, 37, 39 and 52 (or ten in all) had had several years' practical acquaintance with the industry which they came here to study, and in one case this had extended to as much as eight years' experience of the Bombay mills as jobber, sizer, and finisher.

29. In marked contrast with the textile students stand those who have come to England to study mining. In very few cases have they had even the most rudimentary acquaintance with the conditions of practical mining; and the mining students as a class have not done well. They are the only class of Indians upon whom we have to report unfavourably. At none of the Universities which we visited were the Professors satisfied with their Indian pupils who had studied mining. Professor Latham, at Glasgow, though recognising that they attended well at lectures and usually knew enough science to follow the classes, said that they "did badly"; he admitted that there were some exceptions, but declared that "90 per cent. of them were useless." Sir Thomas Holland, Professor of Geology in the Manchester University, was of opinion that only a very small number of the students who have received technical scholarships in mining have been a success, and believed that in the great majority of cases the money spent on their education had been thrown away. Professor Cadman at Birmingham was also of opinion that the money spent upon the students of whom he had had experience had been wasted in the majority of cases; of the 13 students who have studied mining at Birmingham since he took over control of the department, he declared that nine of them were "absolutely no good in mining." All these witnesses concurred in saying that the failure of this particular class of students was due to their being absolutely unfamiliar with the industry before they began to study it in the universities. The point was brought out with special clearness by Professor Cadman in a detailed analysis of the record of the 13 Indian students whom he had had under him. "My experience of these scholars" he wrote, "leads me to state emphatically that, with few exceptions, the men are very badly selected for the profession they are undertaking. The above list will show that out of 13 students only three had had previous experience

Working of the Scholarship System —cont.

Success of Indian textile students.

Failure of Indian mining students

Working of the Scholarship System
—cont.

“ of mining, or indeed had any intention or ambition “ to follow the profession of mining engineer, prior “ to obtaining the scholarship.” Professor Cadman brought to the notice of the Committee the case of three mining scholars then studying at the University whom he regarded as typical; we examined the students in his presence, and think that their evidence completely corroborated Professor Cadman’s contentions. “ These ” said Professor Cadman, “ are typical cases of the majority “ of Indian scholars, and are intended to illustrate to “ the Committee that such students sent to follow a “ course of mining cannot possibly benefit to the “ full, on account of their lack of preliminary “ knowledge of the subject of mining.” In a note written for the Committee, Sir Thomas Holland emphasised the same point. “ Unless,” he said, “ a student is apprenticed at a mine for some “ years he is unable to take full advantage “ of training similar to that given in English “ Universities; it is possible for him to obtain a “ certain amount of familiarity with mining terms “ and with the machinery employed, but no “ university training can take the place of “ actual familiarity with the special conditions “ underground. A raw student, therefore, does not “ form a true mental appreciation of the principles “ of mining taught at a university, and after ob- “ taining his degree he is too old and is otherwise “ generally unfitted to go through the heavy “ drudgery required of the ordinary apprentice.”

Contrast between textile and mining scholars illustrates the signal importance of previous familiarity with the industry.

30. Of the 66 scholarships given by Government up to 31st March 1912, 24 have been awarded to students of textiles and 19 to students of mining; it is therefore in these two branches that we have the most extensive experience upon which to base our conclusions. The textile students all had previous experience of the industry, and they have been very markedly successful; the mining students were in nearly all cases unfamiliar with the conditions that prevail down a mine, and they have with few exceptions proved signal failures. This is a forcible corroboration of the contention that previous familiarity with the industry to be studied is essential to success in technological education.

The leather industry—two distinct types of student.

31. Mining and textile manufacture are the two industries in India which have attained a considerable development upon modern lines, and selection of the right sort of scholar ought in them to be a comparatively easy task. Where the industry is not so well developed selection is more difficult. It is interesting, however, to find that familiarity with an industry conducted in an old-fashioned and more or less primitive way is of great value to the student. One of the Government scholars who came over here to learn tanning belonged to a family of hereditary tanners; he had had only a small amount of education in India, but he had an instinctive knowledge of leather; he had, as Dr. Parker of the Leathersellers’ College said, “ tanner’s blood in him.” Of this man Dr. Parker formed

a very favourable opinion; the following is his evidence upon this point:—

“He was a very good student, I thought. He was the class I should like to have some more of. His scientific training was not good, but he was actually gaining advantage because he knew something of the trade beforehand. His relations were in the trade, and therefore he was able to see where Indian skins could be used to advantage in this country. I took a great deal of trouble with him, and I sent him over to America, and gave him letters of introduction to many of my friends over in different yards. When he came back, from the letters he had with him and from letters I received, I think he did good business over there. In fact he actually started business relations with some firms, and he also learnt some of the purposes which the Indian-tanned goat skins were put to in America, and which he thought he could introduce into India, because they were buying them back in India. If he goes on as he went on with me—I wish he could have stayed another year as he was just beginning to get good—I think he will make money. That man, unless something happens, will undoubtedly benefit by his training to an enormous extent.”

32. Another student of tanning sent by the Government of India happens to be, in respect of scientific training and hereditary connexion with the industry, the antithesis of the man last mentioned. This is Mr. M. A. R. Paniker, member of a well-to-do family of good social position in Madras, and a Nair by caste; he had a brilliant career as a chemist at Leeds University. Dr. Parker, who happened to know his work, said of him, “He has a thinking mind, and has really carried out some most excellent research work; he is a man who can use his brain; he can work out problems and apply them too.” But when the Committee asked Dr. Parker which of these two types would, in his opinion, be most useful for the industrial development of India, he replied concisely, “I should back the tanner.” The point is of importance, because in the present state of education in India the two types may constantly be found in contrast to one another. On the one hand is the intelligent and well-educated graduate who belongs to one of the communities in which intellectual culture is a tradition. On the other is the descendant of the old craftsmen of India, who has probably very little university education, but an intimate, though unconscious, knowledge of the materials and processes which pertain to his hereditary “mystery.” It is to be desired that the latter type should also acquire a good education, and in time, no doubt, the desire for knowledge will filter down to his class; but for some time to come representatives of the old craftsmen will generally be very imperfectly educated. It is interesting to have the opinion of so competent an authority as the head of the Leathersellers’ College that he prefers the hereditary craftsman, even with his educational deficiencies, to the University man.

Working of the Scholarship System —cont.

The man “with tanning in the blood

The research chemist in the leather industry.

Working of the Scholarship System —cont.

Good relations between Indian students and their British class-fellows

Summary of conclusions on the question, "How do Indian students acquit themselves at British universities and technological schools?"

33. Little else remains to be said about the position of Indian technological students at the universities except to add that in the four cities which we visited they got on very well with their British class-fellows. We detected no signs of racial prejudice in the people among whom they are thrown. Indians do not form a class apart but are merged in the general body of students, and they seemed generally to live quiet, industrious, and happy lives.

34. We may therefore now formulate the answer to our first question. It is as follows: Indian students generally get on well at the universities and technological schools in which they pursue their industrial education. They are quite up to the average capacity of their classes; if they have read science in India up to the standard of the B.A. or B.Sc. they are rather better equipped than most of their class-fellows on the theoretical side; if they have read up to the Intermediate on the Science side they can with hard work keep up with their classes; those who have only passed the Intermediate on the Arts side or the Matriculation of an Indian University are unable to take full advantage of the instruction given. Students who have had practical experience of the industry are able to derive great benefit from the teaching given in England and do capitally. Those who, like most of the mining students hitherto sent, have had no previous acquaintance with the industry they propose to follow, do very badly, and the money spent upon their education has, for the most part, been thrown away. Indian students of engineering are handicapped by their general ignorance of machinery and the inadequacy of the training in drawing which they have received in India.

II. "Is practical experience in workshops and manufacturing concerns an essential part of industrial training?" Professors and men of business unanimous that it is.

35.—(II.) Our second question relates to the practical training which Indian students are able to secure in this country either during or after their university education. Of the imperative need for such practical training to supplement the theoretical education of the class-room we received abundant evidence. All the professors whom we consulted assured us that the teaching they gave was no substitute for practical experience, and that the university alone could not make an engineer, a tanner, a dyer, a bleacher, or a miner. The verdict of business men, who in this country are still somewhat sceptical of the value of a university education, was even more emphatic. A distinguished engineer at Glasgow said to us that a person who had had a university education in engineering but no practical experience "was not in his opinion an engineer at all." The Committee appointed in 1903 by the Institution of Civil Engineers, to which reference has been made already (page 15, paragraph 26), recommended that a student after finishing his college course should have three years practical training in workshops, or on works or in mines, and in offices, and this view was endorsed by practically

all the engineering witnesses whom we examined. With regard to tanning Professor Procter said that to make a complete tanner it was absolutely necessary that he should have other experience besides that of the university. "We can teach him" he said "a great deal in the university which is extremely useful, but we cannot give the practical experience that a man only gains by handling large quantities of stuff." In the textile industries the evidence was to the same effect. The manager of a woollen cloth firm in Yorkshire said "the student when he leaves the university is practically of no use at all if he enters business." Mr. Ambalal Sarabhai, the owner of cotton mills in Ahmedabad, gave it as his opinion that Indian students should, if possible, receive a practical training lasting two years with an English firm after completing their course at the university or school of technology. In the chemical industries the force of circumstances is compelling business men to recognise the value of science, but even those who insist most strongly upon the importance of a good scientific education do not believe that the university alone can qualify a man for the direction of a chemical industry. Mr. J. Lowden, a Director of the Leeds and District Dyers' and Finishers' Association said "A man might spend three or four years at the university and have a very good scientific training and yet be unfit to take an active part in the work of a dye-house." As this witness had said in an address delivered to the students of the Textile Department of Leeds University: "It was a mistake to suppose that the scientific and technical training, however good, took the place of the old apprenticeship system or rendered a practical training unnecessary. A combination of the two produced the best results, and a man who could unite the two would undoubtedly outpace the man who had not had the advantages of a scientific and technical education. The value of a scientific and technical training could not be overestimated, but unless it was combined with, or was supplementary to, a practical training, it would not have that marketable value which it was desirable it should have, and employers would continue to prefer the practically trained man to the technically trained student."

36. We were interested to find that Indian students, who have been accused of an excessive desire to obtain degrees, diplomas, and "letters after their names," placed as high a value upon practical training as any British employer. This was especially true of the textile students who were the most competent and successful students we met. One of these at Manchester, who had had three years' experience in a cotton mill in India, declared to us that his chances of getting employment on his return depended principally upon his acquiring practical experience, and that a mill manager in England would assign 75 per cent. to his practical experience and 25 to his theoretical training.

Indian students recognise importance of work experience

Working of the Scholarship System
—cont.

Extension of scholarship period necessary so as to allow for whole-time apprenticeship.

37. We are satisfied that in devising the scheme for technical scholarships sufficient attention was not paid to the importance of practical training. The scholarships are tenable for a period of two years, which may be extended to three. In most cases this is only sufficient to enable a student to complete a course at a university or technological school, and it makes no provision for a period of apprenticeship. In the Scotch Universities, as at Glasgow, the summer vacation lasts for six months, and the greater part of this time is ordinarily spent by industrious students in acquiring some sort of practical experience. Useful as this sandwich system is for keeping a student in touch with the actualities of industry, it does not serve the purpose of a whole-time apprenticeship. In order to give a student a complete industrial training, he should, in our opinion, after completing his university course, be apprenticed for a period ranging from one to three years, according to the industry, with a business firm. The system of Government scholarships does not make provision for so prolonged a stay in the United Kingdom as such an apprenticeship would necessitate, and, in consequence, very few Indian students have had as much practical experience as we think desirable. One or two have obtained salaried employment in business firms and have been allowed by Government to stay on in this country because it was hoped that they would gain experience which would be valuable to them in India, but such cases are altogether exceptional and outside the scheme as devised by the Government of India; the great majority are obliged to return with very slight experience of the practical conduct of industry in this country.

Works experience for Indian students generally obtainable by organised effort, and the co-operation of broad-minded employers.

38. But here a very important question arises. Are British manufacturers willing to give Indian students the opportunity of studying the actual conduct of their business? This we have felt to be the kernel of our inquiry; it is to obtain an answer to this question that we have devoted the best portion of our time. We have found that no uniform answer can be given, as conditions vary in different industries; in some, there is an insuperable objection to admitting Indian or any foreign students inside the factory, in others they are admitted freely, in others again there is no regular system of apprenticeship, but some employers are willing, if properly approached, to admit a few Indians upon the broad patriotic ground that they are fellow-subjects. We propose to deal later on in separate sections with the different industries which Indian students have come here to study, describing the conditions that prevail, and making special recommendations with regard to each one. Meanwhile it is possible to make a few general observations. We find that in those industries in which a system of apprenticeship or pupilage is in force Indians get the benefit of it with little trouble. Where no such system exists, even British students find it very hard to acquire practical experience unless they have some private

influence. We found on the whole very little evidence of a racial prejudice against Indians. The Indian students, who upon this point must be reckoned the best witnesses, assured us that they had nothing to complain of in this respect, and particularly mentioned that they experienced very friendly treatment from the working men and operatives with whom they were thrown in contact. Commercial jealousy there undoubtedly is, but it is not directed against Indians so much as against possible competitors. We observed one encouraging symptom; even where the reluctance to admit Indians inside the factory is strongest we generally found that there were a few broad-minded men who rose superior to the common opinion, and who were willing to offer or procure facilities for Indian apprentices. It is a pleasure to record what Sir Frank Forbes Adam, for instance, has done in Manchester. By his personal influence he has succeeded in getting Indian students, who were recommended to him by friends in Bombay, into dye works, into printworks, several into mills, and one or two into engineering works, and he added that in no case where he succeeded in getting students placed in the last ten years had he any business connexion with the owner of the works. We believe we have good grounds for thinking that if a patient inquiry were made in each industry in detail it would be possible, as Sir Frank himself thought, to draw up a list of firms who would be prepared to take in a certain number of recommended Indian students every year. The time at our disposal was altogether too short to carry out a complete research upon these lines, but we made such inquiries as were possible from the representatives of different industries who came before us, and we have been able to secure from certain firms promises of co-operation which we have transmitted to the India Office. In order to make the list adequate to the demands that are likely to be made upon it, more extensive research is, however, necessary, and one of our recommendations (which will be found later—page 29, paragraph 53) has reference to the preparation of a list of such firms.

39. The answer to our second question is therefore that practical experience in works is indispensable for a complete industrial training; that the period for which Indian students stay in this country is usually too short to permit them to take advantage of such practical training as is open to them; that there are industries to which they are unable to get admission as apprentices by their own unaided efforts, even if their length of stay in England were prolonged for that purpose; that a careful inquiry conducted by the India Office would probably disclose the names of some firms in almost every industry who would be ready to offer a certain number of selected Indian students facilities for obtaining practical experience. In those industries in which apprenticeship or pupilage is the custom Indian students are accepted, along with British students.

Working of the Scholarship System

—cont.

Summary of conclusions on the question
 "Is practical experience in workshops and manufacturing concerns an essential part of industrial training? and, if so, can Indian students get it?"

Working of the Scholarship System
—cont.

III. Employment of scholars on their return to India: immediate results not the true test of success.

A detailed examination of the conditions prevailing in the different industries which Indian students have up to the present desired to learn will be found in chapter iv. of our report.

40.—(III.) The third question which we set out to answer was "How far have Indian technical students found employment upon their return to India?" It is obvious that the materials for a complete answer to this question can only be found in India itself. We have been able, at most, to piece together a provisional answer; this we have done by examining the information supplied to us by the Government of India with regard to its technical scholars, by consulting the report of the Association for the Advancement of Scientific and Industrial Education of Indians, by hearing the opinion of such English professors and teachers as keep in touch with their old students after their return, and by learning the views of Indian students themselves. We would, however, deprecate drawing any very definite conclusion from the experience of a few years. In education generally, and not least in this branch of it, quick returns do not form a sound criterion of success, and it would be unreasonable to expect individual scholars, however carefully selected and thoroughly trained, to make their influence felt immediately. In all industries and professions a man must work in a subordinate position before he proves his worth and commands a high salary; a technical scholar whom after years may prove to be a splendid success, amply justifying the system, must at the present time, from the nature of the case, still be in the lower grades of his profession; something like ten or fifteen years must elapse before even the first batch of scholars can become managers of large firms and captains of industry.

After-careers of returned Government scholars.

41. With this caution we may now formulate our provisional answer. On the whole we see no reason to think that technical students fail to find adequate employment upon their return to India. Out of the 66 Government scholars who have come to this country since the system was first instituted in 1904, up to 31st March 1912 only 31 had returned to India. Of these, 26 are known already to have obtained employment falling within the scope of the scheme as originally drafted by the Government of India. Of the remaining five, one is dead, one has joined the Bar, and no definite information is available as regards the other three. Of the 26 scholars who are known to have obtained employment 18 are actually engaged in industries, one is in the service of the Mysore State, and seven are holding posts under Government, two of them being members of the Geological Survey of India. It is perhaps necessary to recall that those who have entered the service of Government are not outside the scope of the scheme as originally framed. In their Despatch of 9th October 1902 the Government of India remarked: "We think that the services of the returned scholars are sure to be in good demand, and that, failing

“ private employment, Government will be glad to “ turn their abilities to account as teachers in “ industrial schools or in other capacities connected “ with the improvement of local industries.” Those who have joined the Geological Survey of India may certainly be regarded as fulfilling a definite and practical function in the development of Indian industries, for the activity of the Department is not confined to geological surveys, strictly so called, but embraces inquiries of direct economic importance, such as gold prospecting, the examination of copper ores and coal seams, and generally the investigation of the mineral resources of India, and members of the Department (until recently under the direction of Sir Thomas Holland, K.C.I.E., now Professor of Geology at the Victoria University of Manchester) have accomplished a great deal of practical work in the development of a very important branch of Indian industry.

Working of the Scholarship System —cont.

42. Five scholars have not yet returned to India though the period of their scholarships has expired; they are either carrying further their studies by research work or by investigation in specialised lines, or they are occupying salaried positions with British or Continental firms and are thus acquiring experience which should prove of value on their return to India. At the same time, if their absence from India be unduly prolonged there is a risk that the ultimate object of the scheme—“ the improvement of existing “ native industries and the development of new “ industries wherever possible”—may be defeated. It appears, then, that out of 66 scholars one only, as far as can be judged at present, has been a complete failure (No. 7 in Appendix V.); he undoubtedly perverted to other uses the money which was intended for the industrial development of India, and his case constitutes the one serious blemish in the record of the Government scholars.

Government scholars who stay on in Europe or America; a contingency to be provided for

43. Of the Indian students who came to this country otherwise than under the auspices of the Indian Government we necessarily possess less information. In the report of the Association for the Advancement of Scientific and Industrial Education of Indians for 1912, there is a statement showing what the students of the Association who have returned to India are doing. That statement will be found in Appendix VI. (pp. 118–124). From this it would appear that 80 students sent by the Association abroad for industrial training had returned to India by the time of the publication of the Report for 1912. Of these, 28 had found employment in industrial enterprises, 9 had started works on their own account and 19 had entered the service of the Government of India or municipalities or Native States or were engaged in teaching; 24, the great majority of whom had just returned, did not appear to have yet found employment. In certain cases, presumably the most satisfactory, the Association publishes the salaries upon which the students were

After-careers of scholars of the Calcutta “ Association for the Advancement of Scientific and Industrial Education of Indians.”

Working of the Scholarship System
—cont.

Difficulties of the trained man on his return to India; some signs of progress.

employed; these work out to an average of Rs. 196 a month. Even allowing for the possibly optimistic views of the Association regarding its students, we have here a record of successful achievement which is very encouraging.

44. On the other hand, several competent witnesses assured us that the difficulties awaiting the Indian scholar on his return were very great. The prejudices of race and class which complicate so many Indian problems are not absent from industry. A large number of the most successful business concerns in India are in the hands of Europeans, and we were told that they were, as a rule, reluctant to offer employment to Indians; but even to this rule there are exceptions, and Sir R. N. Mookerjee told us that there were English firms in India now who were willing to take in an Indian if they could get a really good one with practical experience, and that this particular difficulty was in process of being overcome. We learned that on the Bombay side other lines of division were manifest. A Brahman from the Deccan told us that the mills in that Presidency were generally owned by Parsees or Gujeratis and that they usually gave a preference to their own people or to Englishmen. A pleasing exception to this narrow practice is that prevailing in the mills controlled by Sir Dorabji J. Tata and his family. In those mills a system of apprenticeship has been in existence for 30 or 40 years, of which more than 100 Indian lads have had the advantage; it is not confined to Parsees, and though Sir Dorabji told us that his people were rather anxious to encourage the Parsees more than others, he had always struggled against this tendency and asked, "Why should you make it only open to Parsees?" We found that a Government scholar, a Bengali Hindu from Dacca, of whom we formed a very favourable opinion, had had the benefit of one of these apprenticeships before coming to Manchester, and when we showed his record to Sir Dorabji and asked him whether such a man was likely to find employment in India on his return, he replied, "Personally, if this man came to me, I would write to my manager and say, 'This is the type of 'man I like; see if you can find something for 'him to do.'"

Views of students now under training; prospects on the whole not bad.

45. The Indian students now in England have of course some information as to how their class fellows and countrymen have succeeded upon their return to India. That information appears to show that the majority of them do secure employment; they have no doubt to wait for a while and do not always get into very satisfactory concerns at first, but yet they do make a start. A Bengali student at Leeds, for instance, told us that out of seven or eight Indians who had studied tanning with him, five or six had found employment in some sort of tan-yard in India, and the same kind of evidence was given us with regard to dye works and textiles. There appears to be a very considerable number of small industrial concerns springing up in India

which are not of sufficient importance to be tabulated in any official returns; they are concerns with a capital of Rs. 25,000 or Rs. 50,000 which employ one skilled manager and 20 or 30 unskilled labourers working under his direction. These humble concerns would no doubt bring a smile to the lips of the directors of the well-equipped and well-officered industries of this country, but we are of opinion that they perform a very useful function in the industrial development of India. The manager is himself intimately associated with his workers, and he has to supervise personally all the processes of the industry; it is he who has to see to the marketing of his finished product, and he who has to look after the accounts; he therefore learns all branches of his industry in a very direct and practical way. Though there must necessarily be many failures, a certain proportion of these small concerns will probably thrive and expand, and a few of them may become important businesses. It is only in this very modest way that the technical scholars can hope to pioneer new industries at all. To expect a young man who has just quitted a technological school to set up a new industry on a large scale is palpably absurd. Such a man has usually no capital of his own and he is very unlikely to find anyone to lend it him. If he were to find a group of misguided enthusiasts so foolish as to finance him he would most probably lose all the money entrusted to him in a year. All that he has learnt in England is a certain amount of science and its application to industry; he has had no experience in handling men; no commercial training; he has not acquired the habit of "thinking in terms of money" which is instinctive in men of business. These reflections are so obvious that they would not be worth making were they not frequently forgotten; they help to indicate, too, the kind of industries for which scholarships may be given and those for which they should not be given. There are certain industries which can only be conducted successfully on a large scale. If a particular industry of this class does not already exist in India it is obviously unwise to give a young Indian a scholarship to study the technology of it in England. But if an industry is already developed, or if it can be conducted on a small scale with fair chance of success, its expansion in India may be helped by the grant of a technical scholarship.

46. Our answer to the third question is therefore as follows:—Judging from the somewhat scanty and imperfect evidence before us we think that Indian technical students, provided they are properly selected and trained, usually find employment upon their return to India. We make later on certain recommendations with regard to their selection and training, which will, we hope, improve their prospects of employment, and we make other recommendations with a view to increasing their opportunities of securing a place in the established industries of India.

Working of the Scholarship System —cont.

Small concerns afford opportunities.

"Pioneering" of vast industries by returned scholars an impossibility.

Summary as regards prospects of employment for returned scholars.

CHAPTER III.

GENERAL RECOMMENDATIONS FOR IMPROVING THE SCHOLARSHIP SYSTEM

General Recommendations.

47. We pass now to the recommendations which are suggested by the review of the existing system in the last chapter. Our recommendations with regard to each particular industry which we have inquired into, will be found in the separate sections of which the next chapter is composed; some observations of a general character can, however, with advantage be made here.

A standard of general education on the science side laid down.

48. Students sent to this country should ordinarily have read in India up to the standard of the B.Sc. or B.A. with Science, or have obtained an equivalent Diploma. Exceptions may, however, be made in favour of students who have an hereditary connexion with the industry which they propose to study, provided that they know enough English to follow lectures in this country.

Preliminary practical experience important in all industries, essential in mining.

49. Wherever possible, students should be familiar in India with the industry which they are sent here to study. In mining, this condition must in the future be strictly enforced, and no student be sent to the United Kingdom to study mining unless he has had at least a year's experience down an Indian mine. In all industries the presumption is that some previous practical experience is necessary, and the rule should be relaxed only when this presumption can be rebutted. Where such experience cannot be had in India, the question should be referred home, before the scholar is sent, with a view to inquiry being made as to the possibility of obtaining it in this country.

Elasticity in the system of selection desirable; the principle of choosing the man rather than the industry.

50. There is another direction in which the selection of technical scholars needs to be improved. We understand that the present practice is that the Local Government, which has a scholarship to give, makes a survey of the industries of the Province and then decides for what industry the scholarship shall be given. One consequence of this system is, as we have already noted (page 16, paragraph 29), that candidates present themselves who have no previous familiarity with the industry; they are tempted by the scholarship, and they undertake to study the industry specified as they would undertake to abide by any other condition upon which the scholarship is granted. Another untoward consequence is that the student frequently fails to find employment upon his return to India. The Local Government appears sometimes to be influenced in its selection of an industry by the fact that the Province contains great natural resources for that particular industry still awaiting development. It is perhaps not unreasonable to assume that the grant of a technical

scholarship would be one method of forwarding the industrial development desired, but, unless it is accompanied by other measures, the effect of this system of selection upon the technical scholar himself is often unfortunate. When he returns to India he finds the industry in which he hoped to secure employment still undeveloped; there is no firm in which he can get an appointment, and, as we have previously pointed out (page 26, paragraph 45), the creation of a new industry is altogether beyond the capacity of a young man without capital and without commercial experience. We recommend that the Local Governments should from time to time adopt the alternative principle of selecting the man rather than the industry to encourage. This principle was very strongly commended to us by Sir Thomas Holland and Dr. A. D. Denning, Superintendent of Industries in Bengal; they pointed out that officials in charge of technical schools, superintendents of industries, officers of the Geological Survey, and other public servants, frequently come across young men who have given proof of mechanical aptitude and an industrial bent of mind which they have followed in spite of severe discouragement. Such men can of course only be found in industries already started or in course of development; but they are the men who would make the best use of the opportunities offered by a technical scholarship, and who would be best able to find employment upon their return; in so far as it is possible to make any forecast of the subsequent careers of young men they appear also to be more likely than any others to do creative work in the development of Indian industries.

51. We further recommend that Local Governments should, in making selections, consult the business men and directors of industry in the Province to a greater extent than appears to have been the practice hitherto. Business men are often likely to know of a promising lad who would make excellent use of a technical scholarship; they could also advise the Local Government as to the type of man whom the industries of the Province need, and to whom they would readily offer employment. It should, we think, be possible for the Local Government to approach the Chamber of Commerce, the Millowners' Association, or other body representative of an industrial interest in the Province, and say to them "if you will indicate to us the kind of man whom you want and whom you find difficulty in getting, we are prepared to spend money on training him up, on condition that you offer him a chance of employment upon his return."

52. After making the above recommendations with regard to the selection of technical scholars in India, we pass on to our recommendations with regard to their training in this country. As will have been gathered from the review in the previous chapter, we have no suggestions to make with regard to the theoretical education they receive in universities and technological schools; the modifications

General Recommendations—*cont.*

Scholarships to be awarded after consultation with business men and Employers' Associations in India.

Training after selection: period to be extended so as to include works experience.

General Recommendations—cont.

which we suggest have reference solely to their practical training. We recommend that practical training in a business firm be considered an integral part of the technical scholar's education, and consequently that the period for which the scholarship is tenable should be extended so as to cover the time spent in undergoing such training. As to the length of the extension that will be necessary, it is impossible to lay down a rule of universal application; in some industries the time that can be usefully spent in practical training is shorter than in others; it may also sometimes occur that in consideration of the work done in an Indian University a student is excused a year of his academic training, and to that extent the duration of his stay in the United Kingdom may be curtailed. In our opinion a technical scholarship should not, except in rare cases, be tenable for more than five years, and in very few cases should it be granted for less than three; whatever duration is assigned to the scholarship it should be long enough to include a spell of continuous practical training. In the next chapter we make recommendations with regard to the training required in different industries.

Method of securing works experience for Indian scholars: a matter of organisation, and dependent on the continued co-operation of British employers.

53. Our next recommendation has reference to the way in which practical training can be secured, and this, we recognise, is the most difficult part of the task entrusted to us. We consider that, wherever possible, this training should be given in the United Kingdom. We have given elsewhere (page 21, paragraph 38) our reasons for thinking that in almost every industry some manufacturers may be found who will be prepared to receive Indian apprentices. The time at our disposal has been too short to enable us to secure promises of help from a sufficient number of firms to meet all the requirements of the scholarship system, but we believe that by patient inquiry the number can be very greatly extended, and we therefore recommend that an officer or department of the India Office be specially entrusted with the task of securing, at least for Government technical scholars, facilities for acquiring practical experience. We have already submitted to the India Office the names of certain employers who have expressed their readiness upon patriotic grounds to co-operate with the Government in giving an industrial training to Indians. We think that the officer who is entrusted with the continuation of our work will find that in almost all industries there are men who will co-operate with him upon this broad ground. In Manchester and other places, where trade jealousy is strong, the obligation to help India was generously recognised by individuals. Mr. Levinstein, for instance, said "We do not want Indians, but there is a certain amount of patriotism, and we will help England to help India." Sir William Mather was of opinion that there is no hope of success except by an appeal to patriotism, "I do not think," he said, "it is possible to meet the case except by the Council of India in London making it a matter of patriotic duty on

“ the part of employers in certain industries to contribute to the welfare of India by affording opportunities for some of these well selected young fellows.” We believe that by careful and continued inquiry it may be possible to frame for every industry of importance a list of broad-minded employers who will undertake to receive Indian scholars in their works and who will take a pride in turning out well-trained and accomplished men. The spirit in which Mr Levinstein approached the subject may well be quoted as a model for wider imitation. “ If,” he said, “ I know an Indian is coming to me who means afterwards to go to a dye house or print works, I would give him the kind of research work which would be in harmony with the future of the man, viz., research work connected with dyeing, printing, bleaching I am not going to put him to work which is useless to him afterwards.”

54 We have hope that by sustained inquiry and by the help of the gentlemen who have already promised to co-operate with the India Office it may be possible to draw up a list of firms willing to admit Indian students, and that this list may be large enough to provide facilities for all Government scholars. Should the appeal to the patriotism of British manufacturers meet with less response than we expect, it may prove possible to exercise influence through the Stores Department of the India Office. It must be remembered that the India Office purchases goods from the United Kingdom to the value of about 3,500,000*l.* per annum for the Indian Government, and has therefore a right to expect that those who benefit by this valuable custom should give its suggestions very friendly consideration. We recognise that it is the duty of the Stores Department to obtain for India the best goods at the lowest possible price, and that in accepting or rejecting a tender the only questions to be taken into account are quality and price; but when the contract has been settled, it would not, we understand, be an unwonted departure from business habits for the purchaser to say that he desired to obtain practical training for one or two young men, and that he would be glad if the manufacturer would take them into his works.

55 In view of the fact that facilities for practical training can only be secured by negotiation with individual firms, we recommend that the Government of India should give the India Office notice at as early a date as possible of the Technical Scholarships which they propose to award. Cases have occurred of students being sent home to pursue a course of study for which, it was afterwards found, neither the Universities nor Technological schools make any adequate provision; even when academic instruction can be given, manufacturers may not be willing to offer facilities for practical training, but this cannot be ascertained without an investigation into the custom that prevails in the particular industry, and such an investigation may often require considerable time.

General Recommendations—*cont*

Responsibilities of firms holding contracts from the India Office

Due notice to be given by the authorities in India of the grant of scholarships

General Recommendations—cont

When therefore the Government of India desire to give a scholarship for an industry in which no Indian student has yet been trained, we recommend that inquiries should be addressed to the India Office, and that the scholarship be not awarded until it is ascertained that facilities exist for giving an Indian student a complete training in that branch of industry. Previous inquiry and early notice are of course less necessary in the primary industries, for these have already evolved something akin to a system of professional training.

Question of reducing the scholarship allowance

56. We recognise that the allowance of 150*l.* a year, which Government technical scholars receive, places them in a somewhat better financial position than the majority of their class-fellows, but as the expenses of living are inevitably somewhat greater for a foreigner than for a native of this country, we do not recommend any reduction, nor will it, we think, be possible ordinarily to reduce the allowance during the years of apprenticeship or pupilage. As, however, some employers hold the opinion that it is a disadvantage to an apprentice to have so large an allowance as 3*l.* a week, we recommend that power should be taken to reduce the scholarship when necessary, and the scholar be warned that this may be done. In each case we recommend that the amount of the allowance be settled in consultation with the employer.

Revision of the Rules for Government scholars obedience to the India Office, and to employers and foremen during works training, to be strictly enforced

57. We think that the rules laid down by the India Office for the guidance of Government technical scholars stand in need of revision, and we recommend that a new set of rules be issued, in which, among other things, the duties of the scholar towards the employer with whom he is apprenticed should be clearly stated. When a firm has undertaken to receive a technical scholar in its works, it is of paramount importance that it should have full control over him; it must be in a position to direct the young man to do what work it thinks best, and to exact absolute obedience to all orders and unfailing punctuality. Students from the technological schools and universities are apt to think that they are in a position to judge what sort of work will give them the most valuable experience and to resent being set to do menial work. It is important that they should get these notions knocked out of them, and understand that they are, for the time being, in all respects workmen. If Indians are to have practical training they must take it upon these terms, and be prepared to clean the machinery and the tools they have to use, and in every respect to carry out the instructions of the foreman to whom they are immediately responsible. We recommend that the revised rules should make it clear that the technical scholar must do work of this kind if so directed, and that the employer to whom he is apprenticed may exercise over him for the time being all the powers of the India Office, failure to give satisfaction to the employer will expose him to the risk of forfeiting his scholarship and his return passage to India.

58. The present rules are further defective in that they do not provide any guarantee that the scholar shall return to India after his industrial training has been completed. One case has already occurred of a student refusing to return to India unless he was provided with a Government appointment; we heard in the course of evidence that another is doing so well in America that he is unlikely to go back to India; a third is making a comfortable living in Europe, which he may not care to exchange for the uncertainties of an Indian career. We recognise that salaried employment in a European or American firm may supply valuable experience to an Indian, and we would not insist that a scholar should always return to India immediately upon the expiration of his scholarship, but there is a danger that he may stay too long, and even that India may lose altogether the advantage from having trained him. We therefore recommend that all Government technical scholars should execute a bond undertaking to repay the value of their scholarship if they fail to return to India within three years after its expiration.

59. We have recognised in the last chapter (page 25, paragraph 44) that Indian technological students do find some difficulty in securing employment upon their return. We suggest that the Government of India might bring this fact to the notice of the Indian mercantile community, and appeal to them to co-operate with Government by giving friendly consideration to the claims of trained men. An Indian student suggested that such an appeal should be directed to the Bombay Millowners' Association, and added, "If people do care for technical education, it is their duty to find something for their own people whom the Government is trying to educate"; and this argument seems to us to have great force. We understand that the suggestion has been made that the Provincial Advisory Committees in India should take up the duty of Appointments Boards, and should help to find employment for the Indian students whom they originally recommended for education in Europe. We think it desirable that some local manufacturers and employers should be appointed to the Provincial Advisory Committees and be asked to co-operate in finding employment for those technical scholars who return to India with good credentials.

60. We have had some difficulty in obtaining information about the subsequent careers of the technical students who have returned to India; no systematic effort appears to be made to keep a record of their doings. Our final recommendation therefore is that the Government of India should send to the India Office regular reports upon the technical scholars who have returned to their own country, showing how they are employed and what salaries they are drawing.

61. The general effect of our recommendations will, we recognise, be to increase the cost to Govern-

General Recommendations—cont.

Return to India within a specified period to be required, security being taken before the scholarship is awarded.

Measures for assisting returned scholars to secure employment: existing Advisory Committees might act as Appointments Boards in India.

Record to be kept of the after careers of Government scholars, and regular reports to be sent to the India Office.

Financial effect of recommendations.

General Recommendations—cont.

Only the *elite* to be trained at the public expense.

ment of the system of State technical scholarships. This additional expenditure will however be amply justified if in consequence of the changes we propose the men are better selected and better equipped for the work they have to do. Indeed the expense of technical scholarships cannot be defended at all unless they give the best preparation possible for the highest kind of industrial work. The ideal training for an industrial career is both lengthy and costly, and for this reason it should only be given, at public expense, to men of quite exceptional capacity. The average man, who can never be expected to do more than carry on well-known industries by well-known methods, can be trained in India ; if he is trained in England it should be at private expense. But when the best men, as far as human foresight can discriminate, have been selected, it is false economy to give them any but the very best training.

CHAPTER IV.

RECOMMENDATIONS REGARDING PARTICULAR INDUSTRIES.

62. We now proceed to deal with particular industries falling within the scope of our inquiry.

Particular Industries.

ENGINEERING.

63. Of all the industries which we have examined, engineering is the only one that possesses the rudiments of a professional system of training; even this, however, is far from uniform; every engineer and every works have rules which are individual, although conforming in general to an ill-defined system. Twenty years ago there was no recognition, on the part of the profession, of college courses; in fact, there were few college courses in existence as we know them to-day. But concurrently with the development of the great engineering schools and colleges which has taken place in recent years, there has been a gradual change of attitude on the part of professional engineers to the value of a college training, and it is in part due to the growth side by side of the means of teaching and the readjustment of ideas of the newer generation of employers that there are so many different apprenticeship rules in existence. The more conservative members of the profession cling to the old methods and incline to a prolonged period of practical training with a relatively short college course. The more advanced members give greater weight to a college training, and it is more and more being recognized that competition with our neighbours can only be met by combining a college training in engineering science of the highest possible type with a practical training either in the works of a manufacturing concern or on the works being carried out by a civil engineer. Many leading civil engineers demand a year or more in a manufacturing concern before they will take young men on to their constructive work to begin their practical training as civil engineers.

Engineering—General Summary.

64. The Committee appointed by the Institution of Civil Engineers in 1903 (to which reference has already been made in Chapter II. page 15, paragraph 26) to inquire into the subject of the training of Engineers, reported in 1906, and the Report is printed in full in the Minutes of Proceedings of the Institution of Civil Engineers, Vol. CLXVI., 1905-06, Part V. This Report may be accepted as an authoritative expression of the opinion of all branches of the Engineering profession. The recommendations contained in it may be summarised as follows :—

The ideal training for an engineer.

- (1.) An introductory workshop course of at least one year in mechanical engineering workshops for all students, including those who

Particular Industries—Engineering
—cont.

intend ultimately to specialise in mining, electrical engineering, civil engineering, and, in fact, every branch of engineering; during this introductory course the student should be treated as an ordinary apprentice and should keep regular hours, be subject to discipline and be paid wages.

(2.) A college course of normally three sessions; stress being laid upon the necessity of a sound and extensive knowledge of mathematics in all branches of engineering.

(3.) Two or three years' practical training, subsequent to the college course, in workshops, or on works, or in mines; it being particularly desirable that part of the time should be spent in the drawing office.

Training of Indian scholars must follow the approved practice of the profession in the United Kingdom.

65. The evidence given before us in the course of our inquiry was almost without exception in harmony with these recommendations; different individuals, whether representative of mechanical, civil, or electrical engineering, successively outlined to us ideal schemes of training, which were in essentials identical with the course recommended by the Institution of Civil Engineers.

66. In order, therefore, to provide Indian students with the best possible course of engineering training the India Office must base its regulations upon the general trend of professional opinion as it has been authoritatively codified by the Institution of Civil Engineers.

Preliminary workshop course in India recommended.

(i.) The preliminary workshop training is probably more important for Indians than for Englishmen, seeing that very few Indian lads have the opportunity of becoming so intimately familiar with machinery as residents in the manufacturing towns of England generally are; the former rarely see any engine but a passing locomotive, the latter are surrounded by machinery of every description from their childhood. We recommend therefore that all scholars in engineering of whatever branch should receive a year's preliminary workshop course in a mechanical engineer's shop in India. If such facilities cannot be obtained from a private firm, they should be given, at least for Government scholars, in the workshops attached to the railways owned by Government.

The college course. a higher standard maintained in English and Scotch Universities as compared with colleges in India.

(ii.) The second question is where the Indian student shall take his college course. We were given to understand by English and Scotch professors of engineering who had had under them students from Rurki and Sibpur, that the standard of engineering instruction in India, especially in mechanical and electrical engineering, is not at the present time as high as the corresponding standard in this country, and therefore for some time to come it may be necessary for the Indian student, who desires to get the highest possible training, to come to this country and enter one or other of our colleges. Before he comes he should have received a training in mathematics, physics, chemistry, and engineering-drawing, of a sufficiently advanced character to enable him to join the second year

class at once. The Indian universities could greatly facilitate the careers of these men by supplying them with authoritative certificates showing in what subjects they have passed the B.A. and intermediate examinations. The head of an English College has no means of ascertaining, from the certificates now given, whether a student has passed in science, and is therefore qualified to attend a course of engineering, or whether he has passed in philosophy and an Oriental classic, and is therefore totally unqualified. All Indian students who wish to attend an engineering college in the United Kingdom should receive special instruction in mechanical drawing and descriptive geometry in India.

(iii.) The part of the course which requires special organisation is the two or three years' practical training after college. In order to understand the system into which Indian students have to be fitted, some description of the manner in which practical training is usually acquired in this country seems desirable. The practice differs to a slight extent in different branches of engineering.

The young men receiving practical training in the workshops of the mechanical and electrical engineering firms of this country may be classified in three divisions, namely :—

1. Apprentices.
2. Premium apprentices.
3. Pupils.

Class 1.—In some cases there is a sharp division between these classes. For instance, in one large works employing about 7,000 men, the sons of the workmen are apprenticed to specified trades in the works, and during the whole period of their apprenticeship, from the age of 14 to 21 or 16 to 21, as the case may be, the apprentice of this class is kept at one trade. Thus he may learn to be a fitter, or a turner, or a boilermaker, or a copper-smith, or a pattern maker, or a moulder, or a smith, in fact, he becomes a craftsman in one particular trade. He pays no premium on entry and receives a commencing wage of about 5s. per week, increasing annually to about 21s. when he is out of his time. After this he may leave and obtain employment in another firm where he would probably receive the trade rate ruling in this particular craft, which would range between 36s. and 45s. per week for the crafts mentioned above, according to the district in which the works happen to be situated.

Class 2.—The premium apprentice in the works under review pays a premium of 60*l.* to the firm. He enters at 16 and is put to work in the machine shops, and later in the fitting shop and the erecting shop. He thus learns how the parts of an engine are machined, in fact he is put to work at all kinds of machines whilst he is in the machining department, and later he learns how to fit the parts together, and later still how to erect these fitted and machined parts into an engine. The premium apprentice gets a small wage to begin with and the rate increases to

Particular Industries—Engineering

—cont.

A thorough grounding in specified subjects to be given before the scholar leaves India.

Works experience as an integral part of an engineer's training: the practice in this country.

Mechanical and electrical engineering three classes distinguished, (1) apprentices, (2) premium apprentices, (3) pupils.

Particular Industries—Engineering
—cont.

about 21s. per week when he is 21. No guarantee of employment is given to him and usually he would leave to find employment with another firm. A good man might of course be kept on. He is subject to the same discipline and keeps exactly the same hours as the workmen.

The difference between apprentices of these two classes is that the premium apprentice is put through more than one department, and as a rule comes from a different social class. A premium apprentice nowadays sometimes gets a college education before he goes to the works, and sometimes after, but more often he relies upon evening study.

Class 3.—Some firms take a limited number of pupils, and this privilege is generally extended to the Chief Engineers of Public Companies. Pupils stand in a direct personal relation with the firm or the engineer. They receive no wages, but pay to the firm or engineer an annual fee of from 100 to 150 guineas. They are employed for a few months in each of the important departments of the works, and they are sent to the drawing office as a matter of course. With Class 2 apprentices, it is a matter of luck or influence or some special determining factor that gains them admittance into the drawing office. Drawing office experience is fundamentally important because it is in this Department that the actual designing of the engines and machinery is carried out. It is the brain of the whole works.

The distinctions described above are not universally recognised. There is always the workman apprentice. But in some workshops Classes 2 and 3 merge into one another. The rules in many firms now begin to show recognition of college training. In one firm whose rules were specially brought to our notice there are no premium apprentices or pupils, but admission to the works is based on educational qualifications alone, and we understand that there are many firms of repute that make similar provision in their rules.

Civil engineering—the “pupil system.”

For practical training in civil engineering there is only one system in vogue, namely the pupil system. The pupil is employed partly in the drawing office and partly on the works, and aims eventually at securing a post of “Resident Engineer” on a works. For instance, if a dock is being built the design is made by a civil engineer for the Dock Company, and the engineer acting for the Company arranges the necessary specifications and makes the necessary drawings, and then tenders are invited. The successful contractor then proceeds to build the dock under the supervision of the engineer. The contractor is paid, as the work proceeds, only upon the signed certificate of the engineer. During the whole progress of the work the engineer will have one of his staff on the works, the “Resident Engineer,” who acts for the engineer in everything. The engineer’s pupils are down on the works with the Resident, and thus become familiar with the contractor’s way of carrying out the work. There are many cases where young men go direct from college

into an engineer's office, and at once begin work on designs, or at once begin with the preliminary surveys on the ground, but as a rule a good deal of influence is required to get a youth into a good office without a premium.

67. We now proceed to discuss how far this system of training can be made available for Indian students.

Mechanical Engineering.

We find that in this branch of engineering Indian students have in the past frequently had opportunities for practical training given to them. This has especially been the case in Glasgow where the Engineering Faculty of the University has ever since its creation been in close touch with the engineering firms on the Clyde; the consequence has been that the professors have been in the habit of giving to their pupils letters of recommendation which enable them to get admission to workshops during the six months' vacation. Indian students have had the benefit of these recommendations along with their Scotch and English class-fellows. We were warned that it is growing more difficult to get all students into works because of the great rapidity with which the engineering classes of the Glasgow University have increased of recent years; obviously the manufacturers of Glasgow cannot provide training for an unlimited number of students, and we gather that they have now rather more applications than they can satisfy. It appears that it is more easy to become an apprentice for two or three continuous years than for short spells of a few months, and Indian students have occasionally failed to secure admission to works because they were unwilling to undertake to stay for the full term for which the employer was prepared to take them. We were assured that the India Office would find no difficulty in securing admission for a limited number of scholars as apprentices for two or three years, and we have obtained from several firms, both in England and Scotland, definite promises to give Indian students facilities for practical experience. It should be understood, however, that no firm surrenders its right to accept or reject a candidate for apprenticeship; the candidate will be sent by the India Office to the firm, and this introduction will secure for his claim favourable consideration, but he is engaged on his personal merits alone and not on the strength of an official recommendation; as to his suitability for admission the firm decides after personal inspection.

We have received some evidence to the effect that it is best for a student to be apprenticed to a firm immediately on arrival in England; in this case the firm will decide whether or not it is desirable for its apprentice to take a University course; after a short experience the firm may decide that this particular apprentice would profit by a course of scientific study, and would send him to a university or technological school; in this case, being on the books of the firm, he would

Particular Industries—Engineering
—cont.

Application of the system to Indian students.

Mechanical engineering: list to be kept by India Office of firms willing to train Indian students as apprentices and to arrange, if necessary, for their college courses.

Particular Industries—Engineering
—cont

return to it during the vacation, and, on the completion of his academic course, for the remaining two or three years; and he would be looked upon throughout as an apprentice and not as a student. We recommend that where a manufacturing engineer is prepared to assume the whole responsibility for the education of his apprentice, this course should be followed.

Electrical Engineering.

Electrical engineering: the same system applicable, but advanced knowledge of mathematics essential.

68. The remarks that we have just made regarding mechanical engineering may be applied with but little modification to electrical engineering. No Indian student should attempt to study electrical engineering unless he has read up to the B.A. standard in mathematics. We have had from one manufacturer of electrical plant in Scotland an offer to take two Indian students a year. The course sketched would usually be somewhat as follows:—After being personally selected by the firm they would sign on for five years, they would start work with the firm in summer and go on to the University in the winter, returning to the firm in the summer, and continue such alternations of theory and practice until the University course was completed, after which they would work continuously in the several departments of the firm for two years. We believe that other firms of electrical engineers would be willing to take well recommended Indian apprentices upon the same terms, for we find that Indian students have either by themselves or with the assistance of their professors been successful in obtaining short spells of practical experience in the past. As far as we have been able to ascertain, the premium usually asked is 150*l.* for the whole period of apprenticeship; but there are firms of repute that do not demand a premium. We are of opinion that the system of apprenticeship to a firm which allows the apprentice to take a University course offers the best education in electrical engineering available in this country, and we recommend that it be adopted for Government scholars, and the scholarship extended so as to be tenable for five years or such other period as the apprenticeship lasts.

Civil Engineering.

Civil engineering. better opportunities for practical training exist in India, especially on State railways.

69. Civil Engineering was specifically excluded from the system of Government Technical Scholarships, but we find that many Indian students have come to this country on their own account to be trained as Civil Engineers. They find it very hard to get practical training, not because there is any prejudice against them but because there is very little new work to be done in England; the railways, roads, bridges, docks, and harbours of the country have all been built, and only a comparatively small staff is needed to keep them in repair. But there is a great deal of new work being done in India, the great bulk of which is controlled by the Indian Government, and we recommend the Indian Government to consider whether facilities might not be given to Indian students to obtain practical experience in

their own country. It is conceded on all hands that there is enormous scope for civil engineering in India, and that, owing to lack of funds, Government can only undertake a small part of the work which needs to be done. The growth of an independent engineering profession would probably assist in getting this work done outside Government; Indian engineers might prove more successful than Englishmen in pointing out to landowners and municipalities or other Indian capitalists the financial advantage of engineering works. It appears to us that it would be sound policy for the Government to offer facilities to Indian engineers, whether trained in England or India, for acquiring practical experience. It was suggested to us by Mr. Brereton (Government Director of Indian Railways) that the proper way to do this would be to allow engineers of the Public Works Department who were in charge of works of construction to take a certain number of premium-paying pupils. In view of the difficulty which civil engineers experience in getting practical training in England, and of the desirability of encouraging the growth of an independent engineering profession in India, we recommend that this suggestion be carefully considered by the Government of India.

In the specialised branch of Civil Engineering known as Sanitary and Municipal Engineering, good courses are given at the Manchester School of Technology and at University College, London, and practical experience can, we understand, be obtained without difficulty.

MINING.

70. We discovered that at the time of our inquiry an acute controversy was in progress among experts as to the proper training of a mining engineer. Sir Thomas Holland, in a public speech, had put forth the view that the proper training for a mine manager was actual work in a mine, supplemented by evening classes at the colliery centres, and that the University classes were usually failures. Sir Thomas developed this view to us and said that, in the present condition of Indian mining, evening, or out-of-shift, classes at certain mining centres gave Indian students all the training that they needed, and roundly declared that a University education was of little use to the practical miner.

This opinion has been strenuously disputed, and the two points of view are set out in detail in Appendix VII. (pp. 125—130).

71. As the experts disagreed we submitted the point to Mr. R. A. S. Redmayne, His Majesty's Chief Inspector of Mines. He expressed a decided opinion in favour of University training:—

“The old idea, which we may call the rule-of-thumb idea, is that a man is much better employed at work in a mine and attending evening classes. All I can say, as a man who has worked as a workman, is that it is utterly impossible for a man

Particular Industries—Engineering —cont.

Engineers in the Public Works Department might take premium-paying pupils.

Sanitary and Municipal engineering: special facilities available in England.

Mining: controversy as to the comparative merits of University training and evening classes in mining centres.

Opinion of His Majesty's Chief Inspector of Mines.

Particular Industries—Mining—*cont.*

who is dog-tired to go home and set to work on science applied to mines ; it is not impossible to learn something, but it is quite impossible to set to work on very serious brain-racking study. That class of teaching was quite advantageous, and is to a certain extent advantageous now, for elementary mining and a knowledge of the properties of mine gases—the detection of gas, simple questions of the strength of materials, and so on but now it is quite hopeless for a man to be an efficient mining engineer unless he has had a high education. I do not see how that education can be obtained unless a man has had a thoroughly good technical education at a University, of the kind that they insist on in America.” Mr. Redmayne went on to give instances of the development of South African mines under men trained in American and Canadian Universities, and added : “ Nobody has a stronger belief in the necessity of a practical mining education than myself—I had many years of it underground myself—but I do think the only proper combination is a combination of theory and practice, and I think you cannot get your theory better than at the best mining departments in this country.”

Opinion of Professor Cadman.

72. A similar opinion was expressed by Professor J. Cadman, D.Sc., of Birmingham University, who said : “ I am entirely opposed to the view that efficient mine managers and mining engineers can be trained by evening instruction alone ; evening classes are in my opinion only suited, and indeed eminently suited, for the instruction of subordinates. . . . I entirely and emphatically disagree with the view that a mine manager is made only by a long and often painful practical experience, and that therefore Universities ought not to, and could not, compete with evening classes of technical schools. . . . I have managed mines, and am still connected with the direct management of mines, and I say with absolute confidence that the successful mine manager and mining engineer of the future is the man who has a sound University education, together with a sound practical training. . . . In my opinion it is imperative that carefully selected Indian mining students should be sent to this country for instruction, particularly until such time as Indian mining is more fully developed ; to qualify students in a country which is developing is really driving the cart without the horse. You want to send the students to an area where there are active mines and mines of a very much better order than the small mines at present in operation in India.”

State scholarships in mining to be continued, subject to more stringent conditions of selection.

73. After carefully weighing the evidence laid before us, we consider that the policy of sending students to this country for the study of mining should not be abandoned ; but there is a consensus of opinion that scholarships in this subject should only be granted to men who have had considerable practical experience in Indian mines. In the past too little attention appears to have been paid to

this point; some of the Government scholars have arrived in this country without ever having seen a mine, and therefore without the slightest idea as to the conditions of work underground. The result has been that after they have been here a short time, and have been down into the mines, they find that they do not like mining, and endeavour to change their course to geology or some other more congenial subject. If sanction to change the subject of study is refused, their interest is not in their work, with the result that they sometimes fail to get the mining diploma or degree, and have to return to India very little better qualified to take any responsible position than when they first arrived in this country.

74. It has been urged by all the experts in mining from whom we have taken evidence that at least one year's actual experience of work in Indian mines should be made a *sine qua non* of the grant of Government Scholarships for the study of mining. In this connection we may quote the views of Professor Latham (Professor of Mining, Glasgow University), who said :—

“What I would recommend the Indian Government to do is to send these men to their own mines for, say, a year, and after they have proved their ability, to send them over here.”

Again, Sir T. Holland said :—

“The first thing the student notices on going back is that the tips he has picked up in Europe are of no use to him in India. If he were a practical man beforehand, he would be able to turn those ideas to account; and in fact every lecture he attends he would be saying to himself, ‘this just fits in with the conditions in my home or my village. Now I know exactly how to do my work a little better than I did before.’ But without that previous practical training, it is quite hopeless for a student to apply his training in Europe at once to conditions in India.”

Professor Cadman, of Birmingham University, who has had a considerable number of Government scholars under his charge, was equally emphatic. “The Indian scholars in mining find that they are unable to obtain employment in mining on their return to India. The reason is largely due to the defective system of selection. The students are recruited from candidates who are in no way associated with mining before leaving India, are not known to any mine owners or mine officials, and indeed, in many cases, have never seen or been connected with a mine before taking up the scholarship.”

“It is my opinion that if the students were recruited from persons actually connected with Indian mining, there would be no difficulty in their obtaining re-employment on their return.”

75. The advantages of previous practical experience in India appear therefore to be—

- (i) Students whose interests do not lie in mining or who are physically unfitted for

Previous experience of work underground indispensable; a consensus of opinion.

Effect of this test in eliminating the unfit.

Particular Industries Mining—*cont.*

work underground will be eliminated during the period of probation in India ;

- (ii) The students will be better able to adapt English methods to Indian conditions and to apply the knowledge they acquire here more readily on their return ;
- (iii) Having been in touch with Indian mine managers and owners, they should find less difficulty in securing employment on return, in the first instance in some subordinate capacity, for such period as may be necessary for qualifying for the mine manager's certificate under the Indian Mines Act.

Abundant facilities for practical training in English mines.

76. It should be added that the question of obtaining practical experience in mines in this country for scholarship-holders does not present serious difficulty, owing to the close relations which exist, at Birmingham and elsewhere, between the professors of mining and local mine owners and managers. Evidence was given by Government scholars, now under training at Birmingham University, that they had no difficulty in securing admission during vacations to as many mines as they wished, and that the miners themselves were helpful and friendly.

Further practical training needed, to supplement the University course

77. It is recognised, however, that the period spent in mines during vacations is insufficient. A suggestion was made that Government scholars should spend a continuous period of at least 12 months in a mine in this country subsequent to their University training. This suggestion met with the approval of Mr. Redmayne, who thought that this arrangement would enable the student to learn the best possible underground mining practice. We were informed of an arrangement by which a student might be apprenticed to a mining engineer, and on payment of a premium be put through all branches of the mine. We consider that in some cases it may be desirable to extend the period of the scholarship in order to include a pupilage of this kind, but ordinarily we think it will be better for the scholar to obtain the practical part of his training in India.

Summary of recommendations in regard to mining scholars

78. Our recommendations therefore in regard to the grant of scholarships in Mining, as distinguished from Geology, are—

- (i). that they shall only be given to men who intend to become mine managers or mining engineers ;
- (ii). that in every case the candidate shall have actually worked for at least one year in an Indian mine—preferably in a paid position ;
- (iii). that a specially strict test of physical fitness shall be imposed on candidates before selection ;
- (iv). that the candidate shall have reached at least the Intermediate Science standard, and shall have a competent knowledge of physics, chemistry, and mathematics :

- (v). that the period of the scholarship shall be extended, when the Professor under whom the student is working considers it desirable, so as to include a period of continuous practical training in an English mine.

Particular Industries—Mining—cont.

Geology.

79. The above considerations apply only to the case of students intending to become mine managers or mining engineers. There is another quite distinct class of mining expert, namely, the mining geologist or prospector. The latter is described by Sir T. Holland as "the economic mineralogist who wants to know enough of mining methods to know whether a mineral can under certain circumstances be worked with a fair prospect of profit. He wants to know more than one mineral. He is not like the mine manager who knows only his one mineral and knows it thoroughly; the mining geologist wants to know the habits and economic problems of several minerals. He does not want to handle fans, dynamos and every other variety of mining machinery. He wants to know just as much about mining methods as to be able to put down his own prospect pits, to size up the situation generally, and make his own surveys with regard to new mining positions." . . . "The mining geologist requires more of the so-called scientific training and less familiarity with the actual methods of mining. . . . His training can be given in technological institutions supplemented by a comparatively short experience in various types of mines." We have it in evidence from Sir T. Holland that for the training of experts of this class better facilities exist at present in Europe than in India. It may be desirable, therefore, to make provision in the scholarship system for the training of mining geologists, but in this case the qualifications required are somewhat different, and consist of a knowledge of economic geology supplemented by some experience of surveying and general mining methods, such as might be obtained by a pupilage in the Department of the Geological Survey of India. Special arrangements are now being made for the training of such experts under Sir T. Holland at Manchester University.

The mining geologist or prospector; general qualifications required and course of training outlined.

Metallurgy.

80. The leading considerations as regards Indian students of Metallurgy are succinctly stated by Professor T. Turner, of Birmingham University, as follows:—

"The Indian students who have attended in the Metallurgical Department of the University of Birmingham have generally been quite satisfactory in regard to regularity, conduct, and progress. They are, however, generally rather below than above the average in strictly metallurgical work. In assaying, where careful routine work is necessary, Indian students are probably equal to the average.

Metallurgical industries; Professor Turner on the record of past scholars, and the facilities available at Birmingham

Particular Industries—Metallurgical
—cont.

The importance of physique and of previous connexion with some metal trade, however primitive.

But no native Indian student has yet headed an examination class list, or been chosen as a "shift leader" in the vacation practical courses. It is doubtful if the best type of man has been selected for the purpose. In England, as a rule, a metallurgical student has some family or other interest in metallurgy or the metal trades. This helps him in many ways. He has a pride in his subject and his future profession; he has the opportunity of visiting metallurgical works, and not unfrequently he has a definite position in view when his training is completed. The question of physique also is important in metallurgical industries. The managers must be prepared in many cases, when emergencies arise, to work for lengthened periods in heat or cold, and by their example lead and stimulate the men in their exertions. The power to do the right thing quickly may save expensive equipment or valuable lives. In this initiative and resource the native Indian student appears to be lacking. In practical courses he generally stands by and looks on as though it were all a demonstration prepared for his instruction, instead of a real thing in which he has to take part.

"The development of the metallurgical resources of India should come largely through British-trained Indian students. These students should be physically well developed, and, if possible, either connected with the industry in some way, or with a definite prospect of employment on their return to India. The training could then be somewhat modified, in their final year, so as to meet the needs of any special case. It is impossible to give a course of training which will equally well fit a man for an ironworks, a brass foundry, or a gold mine.

"Hitherto opportunity has been found for the Indian metallurgical students at Birmingham to supplement their University education by practical experience in large manufacturing establishments. It has been done by means of application from the Professor among his friends and acquaintances. As a number of English students have to be similarly provided for, such a system of gratuitous training cannot be indefinitely extended. Further, English students are preferred to Indian students, as they may ultimately enter the works. Doubtless, extended facilities could be obtained for Indian students if important firms were officially approached, and if a fee of, say, one guinea per week, were offered in approved cases."

Recommendations as regards scholarships in metallurgy.

81. It will be seen, therefore, that the same importance is attached as in the case of mining to previous experience of metal industries, and a knowledge of even primitive processes is of great assistance; students who have no previous experience of metallurgy should be sent for some months to metal works before the scholarship is granted to them.

Here also physique is of vital importance, and, if possible, an indication should be given of the branch of metallurgy which the student intends to take up on his return, in order that his course of training here may be specially modified to meet his

particular requirements. We also recommend that in special cases the scholarship should be extended for a fourth year, so as to allow a year of postgraduate specialised training. Whether the University course extends over three or four years, it should be supplemented by practical training in large manufacturing establishments; for such training arrangements must be made by the India Office with individual firms, as suggested by Professor Turner.

Particular Industries—Metallurgical
—cont.

THE TEXTILE INDUSTRIES.

82. Of the 66 scholarships which had been granted by the Government of India up to 31st March 1912, 24 were awarded in the subject of textile manufacture.

The textile industries.

The study of textile manufacture embraces not only the fundamental processes of spinning and weaving, but the further treatment of the fabric by bleaching, finishing, mercerising, dyeing, or printing. Some of the scholars have spent part of their time, and one or two the whole of their time, in studying the latter processes, whilst the majority have given all their time to the study of spinning and weaving.

All the Government scholars in textile manufacture, no matter in what branch, have carried on their studies in the Manchester School of Technology and devoted themselves, except in two instances, where silk manufacture was chosen, to the study of the manufacture and subsequent treatment of cotton goods.

83. It will be convenient to deal first with the subject of spinning and weaving, in respect of which the Committee had the advantage of the written and oral evidence of Professor T. W. Fox, the head of the Textile Department of the Manchester School of Technology, who has been in close relations not only with the scholars sent by the Government of India, but also with a further considerable body of Indian students since 1903.

Spinning and weaving, the admirable record of Indian Government scholars.

As a rule they have come to the spinning and weaving department with fairly good practical preparation; referring to the whole body of Indian students, 42 in number, including the Government scholars, who have come into the department since 1903, Professor Fox said: "Five have been first class men, nine second class men, and eleven third class men, the remainder being below the average European student." Four of the first class men were Indian Government scholars, and one of them, Mr. P. N. Mehta of Bombay, "was exceptionally good and was easily the best man of his year" "His position was, apart from his natural ability, due to a wide experience gained in Indian mills before taking up the Government Scholarship." "He was the ablest Indian student who ever entered the textile department of the Manchester School."

Mr. J. Hübner, the Director of the Department for Bleaching, Dyeing, Printing and Finishing, and Paper Manufacture in the Manchester School of Technology, said that among the Indians

Particular Industries—Spinning and Weaving—*cont.*

Importance of previous works experience; some examples of this among Government scholars.

scholars he had found "some very brilliant and "some very good students, together with some "poor ones," and Dr. E. Knecht, the Head of the Applied Chemistry Department, stated that his impression of the Indian students has been that "on the whole they are satisfactory students."

84. The importance of previous practical experience before entering upon theoretical studies was strongly advocated by all the witnesses. Mr. T. Butterworth, of Messrs. Butterworth and Dickinson of Burnley, textile engineers, stated in his evidence that "these students would learn more during "their time in the school if they were sent to a "weaving shed in their own country first."

Mr. Sarabhai, mill-owner of Ahmedabad, gave it as his opinion that "it would be better if the "scholars came here (to England) after receiving "some practical training in India" "They should work for a couple of years in a "mill in India, and then come to England."

Mr. Gurjar, one of the present Indian Government scholars, said that before coming to England the student "should have some technical education "in India so that he will not come to this country "to learn the A.B.C. of technical subjects," and that he should have some practical knowledge of the industry, serving in the mill as apprentice.

The value of previous practical experience is well illustrated in the case of Mr. Gurjar now studying finishing processes as applied to cotton cloth, at the Manchester School. He was able to discern the fundamental difference between Indian and English cloth arising from the character of the staple, and to point out that the process applied to English goods would not produce a satisfactory finish in India. Being a man of marked ability he applied the knowledge of finishing processes which he has gained in the School to the special problems of Indian cloth.

Mr. Guha, another of the present Government scholars, further emphasised the importance of previous practical training, stating that "if a "student is to come here to learn textiles he "should have a previous training in mills in India "so that he can compare the conditions of the "industry in England with those of India, and "adapt the English system to Indian conditions, "because everything that is applicable in English "mills is not applicable to Indian mills."

Practice of German institutions.

85. Evidence was placed before the Committee that in the German Technical High Schools, notably Charlottenburg, it was now required that a student should have had at least a year's experience in a works before entering upon his technical studies.

Standard of general education and physical fitness prescribed.

86. The evidence offered throughout the inquiry emphasises the importance of a rigorous selection of the scholars in respect of the quality of their previous general education, which should at least reach the standard of Intermediate (in science) followed by a sufficient period of practical training in the industry concerned to test the mental and

physical fitness of the candidate, so that he may follow with advantage the course of theoretical and practical training he would enter upon in England.

87. The provision made in the universities and technological schools of the United Kingdom for training in the textile industries is excellent. Spinning and weaving, and the bleaching, dyeing, finishing, and printing of cotton goods and the manufacture of silk fabrics are taught in Manchester, and the manufacture and subsequent treatment of woollen goods in Leeds. The plant in the Municipal School of Technology, Manchester, and at Leeds University (to mention only those institutions which we actually inspected) is on a works scale and the professors and instructors are in all cases themselves trained in the industries.

Professor R. Beaumont, head of the Textile Department at Leeds University, said, "In the first place I have had quite a number of students who pass from the University direct to the works and take up some position there either in the designing room or in the management of the factory, and of course they have what I call a living wage from the first. A number of these have come direct from school to my department, which shows that the department can qualify that type of young fellow, who has a good training and power of initiative."

88. Sir William Mather, whose experience as special Commissioner in the United States of America, Canada, and Russia in connection with the Royal Commission of 1883 on Technical Instruction, gives great weight to his opinion, said:—"It is necessary first to concentrate the minds of these young people upon the subjects from the theoretical side, with, of course, practice in the shops of the technical school. There is a considerable amount of practice there, so far as hand work is concerned, which is very useful to the students."

89. The importance of further practical training, upon the completion of the theoretical and practical studies of the schools, by subsequent experience in mills for spinning and weaving, or in works for bleaching or dyeing and finishing or calico-printing, was the subject of much weighty evidence. Thus, Professor Fox said:—"They (the students) must have practical experience in addition to the education given in the textile department." Professor Knecht stated that:—"A student going from a school into a works is of no use to the works until he has been there for a certain length of time." Again, Sir Frank Forbes Adam said:—"It is most important that a man looking to his future career should have practical experience and practical application of what he has learnt theoretically at school

Particular Industries—Textiles—cont.

The training given in the technological schools and universities of the United Kingdom; its practical character.

Sir William Mather on the value of the practical training in technical school workshops.

Need for subsequent works experience under business conditions, preferably in the United Kingdom.

Particular Industries—Textiles—*cont.*

“and college.” Sir F. Forbes Adam was unhesitatingly of opinion that “it would be to the advantage of Indian students if a system could be devised by which they could get some of their practical experience here.” . . . “The mill would be run better here in every way.” Indian students should have a standard before them and know how to apply it. “If they were long enough in one of these mills and got impregnated with the methods, they could go out there and apply them.”

Difficulty of securing admission of Indians to textile concerns in this country: the attitude of manufacturers—“Not a business proposition.”

90. While some of the Government scholars have occasionally secured admission to mills or works for brief periods through the good offices of the authorities of the Manchester School, in general the difficulties of getting such training in textile mills or works are at present very great, especially in regard to the subsequent treatment of the fabric which makes it marketable. The attitude of English textile manufacturers is not altogether sympathetic. They realise that the effort to develop Indian industries cannot be stopped, but ordinarily they see no reason why they as manufacturers should be called upon to accelerate it. “It is not a business proposition,” one manufacturer urged, “to come and ask me to teach somebody at my place who is going to practise what he learns in direct competition with me”; and the same gentleman said, “it is quite certain that none of the manufacturers I represent would allow an Indian student to come into their works to learn what he can with the avowed intention as soon as he got to India of practising what he had learned in direct competition with them.” It must however be remembered that this exclusiveness, which is not confined to Lancashire textile concerns only, but prevails everywhere in the textile industry, refers not merely to Indian students but affects English students as well. An Indian witness went so far as to say, “I think it is more easy for us (*i.e.*, Indians), to get into an English mill than for Englishmen themselves.” This, however, was not the opinion of the manufacturers, for they mentioned as a secondary objection to the Indian student that he had no intention of remaining in the employ of the firm into whose works he proposed to enter.

Textile machine makers helpful.

91. It is possible to a limited extent to make arrangements through the agency of certain makers of textile machinery, for, as has been pointed out by Professor Fox, “Every textile machine-maker can see in an Indian student a possible customer. whilst every spinner and manufacturer can only see a potential competitor.” In one case, however, that of the firm of Butterworth and Dickinson, loom builders of Burnley, facilities have been offered not only for entering their engineering works but also for practical training in the weaving shed attached to the works, and advantage

has been taken of this privilege in several instances. There is some probability that the firm would accept a scholar for a full year on the completion of his studies at the School of Technology.

Particular Industries—Textiles—cont.

92. It is very doubtful whether the privileges granted to Indian scholars by German firms (in all cases machine makers) were at all more advantageous than those granted by English machine makers, so far as actual work and experience in the mills were concerned. They had, in any case, the same purpose in view, namely, to familiarise the student with their machines with a view to their ultimate purchase. And still less is it certain that vacation visits to the German Colour Works have resulted in any real industrial advantage which the Indian textile scholars, who were interested in dyeing, could not have gained in the laboratories of Universities or Technological Schools in this country.

Facilities offered by German firms of doubtful utility.

93. Since the number of Indian scholars sent each year to this country is, after all, but small, the Committee were encouraged by Sir Frank Forbes Adam, a large exporter of Lancashire cotton goods, and by other witnesses to believe that, on representations made by the India Office, duly accredited textile students, to the number of perhaps four a year, would be granted facilities by well-established firms in one or other department of the textile industry.

Facilities for a limited number of picked men probably obtainable in the textile industry; some offers of co-operation already secured.

94. We have submitted to the India Office the names of the gentlemen who have volunteered to co-operate in securing practical training for at least the Government scholars, and we believe that, with their assistance, the officer who will carry on our work will find it possible to secure for Indian textile students the experience in mills and factories which is necessary to complete their training.

95. As regards the grant of future scholarships for the study of spinning and weaving we recommend:—

Recommendations as regards scholarships in spinning and weaving.

- (i.) That the student should ordinarily have been educated up to the standard of the B.A. (on the Science side), or the B.Sc. Examination of an Indian University, or have gone through a complete course of training in an Indian Technical College and have obtained a diploma such as the L.T.M. (Licentiate of Textile Manufacture) of the Bombay Victoria Technical Institute.
- (ii.) That the scholars should in all cases have had considerable experience in one or more Indian mills, preferably through having served in a paid position.

Particular Industries—Textiles—*cont.*

- (iii.) That the period of the scholarship should be extended to cover an adequate course of practical training in an English mill, subsequent to the theoretical or college course, whenever it is found possible to provide such facilities.

Bleaching and Finishing.

Bleaching and finishing, college training not the primary qualification.

96. We were fortunate enough in the course of our inquiry to secure the advice of an expert who was able to give the Committee very valuable evidence as regards the training of Indian students of bleaching and finishing processes. In the first place it was pointed out that, unlike dyeing and calico printing where highly trained chemists are essential, bleaching has been built up largely on rule-of-thumb principles, and that therefore many years of actual experience, rather than a high scientific or chemical training, is the primary qualification of a really good bleacher. It was not, of course, contended that some training at a technical school was not beneficial, but it was argued that such training was a very long way from enabling a man to take a proper position in managing a bleaching business, and in support of this contention it was stated that many of the best bleachers in the trade had had no scientific training whatever.

No admittance as a rule to bleaching and finishing works in this country.

97. With regard to the possibility of gaining practical experience for Indian students, the Committee were given little hope that any proposal to admit scholars to cotton bleaching and finishing works in this country would be favourably received. It was pointed out that the Lancashire bleaching trade was becoming more and more dependent upon the Indian and China markets, and that those interested in it would strongly resist any proposal to allow an Indian student to get experience in any of the works controlled by them. Another difficulty arises from the effect of different conditions upon the bleached product. We learned that it was frequently found to be impossible to produce the same class of goods at two places in this country only a few miles apart, and that it must necessarily be even more difficult to apply in India the knowledge gained in any particular works here.

Recommendation as regards the grant of scholarships in the bleaching and finishing of cotton

98. We are therefore compelled to recognise that in this branch of industry it is almost impossible for Indian students to obtain in this country anything more than the training given in Technological Colleges, and, in order that they may complete this by practical experience, efforts should be made to secure openings for a few carefully selected students in some of the more up-to-date bleach works now existing in India.

Some facilities procurable in the woollen industry

99. With regard to woollens the case is somewhat different, and the difficulty of obtaining practical

experience is rather less acute. We have in fact received an offer from a firm of woollen dyers and finishers to take an Indian student for a year into their works, and if in the future it should be considered desirable to grant a scholarship for the study of dyeing and finishing of woollen cloth it is probable that arrangements could be made for a thoroughly practical course of training. It must, however, be remembered that this offer is, so far, an isolated one, and that the number of students for whom such facilities could be secured is probably very limited.

Particular Industries—Textiles—cont.

Dyeing.

100. Several scholars have been awarded scholarships for the study of dyeing, usually in conjunction with some such co-ordinate subject as calico printing or bleaching. The men have, on the whole, been well selected in that they have in almost all cases had some experience of Indian conditions and methods.

Dyeing; experienced men selected as State scholars.

101. As regards the training in this country, we may quote Mr. Herbert Kitchen (a dyer of Leeds), as to the necessity of both theoretical and practical training: "All practice without theory is almost useless, and all theory without practice, in my opinion, is practically the same. Personally, I consider that you require the two in dyeing, whatever you may do in any other branch of trade." There is little difficulty in obtaining for our students the highest kind of theoretical training, but the problem of gaining admission to a dye-works for the purpose of learning the practical side presents the usual difficulties. The dyers are a very conservative class, and are at great pains to guard jealously what they consider to be their secret methods. We may again quote the evidence of Mr. Kitchen to show the attitude of the dyeing trade on the point: "There are a lot of secrets in dyeing . . . science has not solved every question yet in the dyeing trade, and there are many secret methods, secret recipes and secret mixtures of colours, which, when a man has found them out either by research or accident or pure luck, he wants to reap the benefit of; he is going to keep them to himself, and he is very chary about whom he allows to come into his dye-house."

The training of a dyer: theoretical instruction and practical experience alike necessary, the former readily procurable by students, but the latter, as a rule, not.

102. The authorities of the technological institutions are now endeavouring to overcome to some extent this difficulty with regard to practical training, by equipping their laboratories with plant on an actual works scale, and at Leeds, Bradford, and Manchester facilities now exist for a practical training, which, although admittedly only a substitute for the greater advantage of working in actual dyeworks, are of considerable service to the student of dyeing. In the past, students have

Well-equipped laboratories in English institutions; special facilities at Bradford, Leeds, and Manchester.

Particular Industries—Dyeing.

frequently been sent to the volunteer laboratories of German colour-making firms, but there is a consensus of opinion that the experience to be thus gained is no greater than that available in the dye-houses attached to the best technical institutions in this country. We may quote the reply of Dr. Réé, a member of the Committee of the Manchester School of Technology, to a question as to the value of such training: "Without confining myself at all to the question of the Indian students, I should say, quite broadly, that the benefits obtained are benefits to the particular concern rather than to the individuals who go there as volunteers. . . . I do not see that there is any advantage to be gained as compared with the experience to be gained in a large technical institution." The value of the practical training to be obtained in the experimental dye-house of the University or laboratory of the Technical Institution, organised as they now are, is well brought out by Professor Green of Leeds University, who said: "You must not forget that the student can get a great deal of practical knowledge here in the Institution. We have the practical machines and we get practical men to teach. In many cases our students, although we do not claim that they are always able to do it, have left here and have taken full command in a works straight away. I have had many men who have done that. They have had the whole charge of the dyeing in large works put into their hands, and have managed it well."

Fair prospect of securing works experience for well-qualified Indians; a generous offer noted.

103. There is evidence to show that the value of the training in chemistry given in the universities and technological schools as a preparation for practical work in the dyeing industry is gradually becoming more widely recognised, and we think there is reason to hope that the difficulties in the way of securing admission to dye works for a limited number of thoroughly well-qualified Indian students will not prove insuperable. We are confirmed in this view by the promise of co-operation which we received from Mr. Ivan Levinstein, the head of an important firm of aniline colour manufacturers of Manchester. We have already, in the preceding chapter, expressed our appreciation of the broad-minded view taken by Mr. Levinstein of the question in its general aspect, and it only remains to add that he supplemented his general observations by a generous offer to take into his works one or more properly qualified Indian students for practical training; it would be a condition of admission that such students should have obtained previously a thorough knowledge of chemistry by means of a full course at a university or technical school, lasting three or sometimes four years, and including, if possible, a certain amount of research work, and further, such students would be required to stay for at least two years in the works. Mr. Levinstein explained that there is

a large testing dye-house attached to his firm's works, in which all fibres and fabrics are dyed and in which also research work is carried on. We consider that a practical training in such a works would be extremely valuable.

Particular Industries—Dyeing—cont.

104. Our recommendations with regard to the grant of scholarships in dyeing are—

Recommendations as regards scholarships in dyeing.

- (i) that the candidate shall have had sufficient general scientific education in India to enable him to follow the specialised lectures here, *i.e.*, that he should have read up to the standard of the B.Sc. or B.A. with science in India;
- (ii) that no scholarship shall be granted to a candidate who does not possess some knowledge of the dyeing industry as carried on in India;
- (iii) that when it is found possible to secure admission for an Indian student to a good dye works, the period of the scholarship shall, if necessary, be extended up to five years in order to cover this practical experience.

TANNING.

105. As regards students of tanning and leather industries, from the evidence of the experts whom we consulted it appears necessary to divide them into two classes, *viz.*—

Tanning; two types of student distinguished. Value in either case of technical training in the United Kingdom.

- (i) those who aim at becoming managers or owners of tanneries;
- (ii) those who intend taking up scientific research as applied to leather industries.

There is ample evidence to show that both classes derive great benefit from a course of training in one of the technological institutions in this country, which specialise in the subject. Thus Dr. Parker, Principal of the Leathersellers' Company's Technical College at Bermondsey, writes:—

“I consider that the custom of sending over State scholars to be trained in the technology of leather manufacture is excellent, and from my own experience I know that certain students who have gone through a course of training at Leeds or London have benefited materially, and that two or three have already made great progress and great improvements in the factories where they are now working in different parts of India.”

106. For a student of the first class it is essential that he should have what has been figuratively described to us as “tanning in the blood,” that is to say, hereditary connexion with the industry. Such a man would have considerable acquaintance with Indian methods of tanning, and would thus be enabled to reap the full benefit of his training in this country.

(1) The man with “tanning in the blood.”

Particular Industries—Tanning.

Previous working experience specially important as there is no system of apprenticeship, whether for English or Indian students.

107. This necessity for previous working experience is particularly emphasised by Dr. Parker: "Only one State scholar who has been through my College has had any real practical training in tanning before coming to this country. This is a great drawback and delays their studies. It would be most advantageous if they could have some training in an Indian tanyard before being sent over. I do not mean that they should necessarily learn the business, but that they should know the nature of the various skins—the difference between the skin of a calf, a goat, an ox and a cow, and so on; and that they should have some elementary knowledge of the processes of tanning." The ideal course for these students is, as indeed in most industries, a combination of theoretical training and practical experience, but we have to face the fact that in the leather industry there is no system of apprenticeship, such as exists in the engineering profession, and that ordinarily the owners of tanneries in this country are not prepared to afford students facilities for gaining practical experience of the industry.

This difficulty is not by any means confined to Indian students, but applies equally to English students.

Special advantages at the Leathersellers' Company's College, at Bermondsey

108. In the past the difficulty has been overcome to some extent by sending scholars to the Leathersellers' Company's College where the training is of an eminently practical character. Of the course there Dr. Parker says: "We make a speciality of technical work in a model tannery where we turn out leather on more or less commercial lines. We are always tanning 4,000l. or 5,000l. worth of leather every year; therefore they do get a practical training with me. I do not say that that practical training is as good as they would get in a works; it is on a smaller scale, but I make the students take a pack of skins, bought on the market in the hair—bought from India or anywhere else in the world—and they have to put those skins through on commercial lines and cost every process right through. The students work practically every morning from 9 till 1, and in the afternoon they are in the laboratory doing the scientific work. We are trying to work the two things—practice and theory—hand in hand." Dr. Parker also explained how, in one respect at least, such a training had distinct advantages for Indian students over an apprenticeship in an English tannery. In the college experiments are encouraged, and conducted under expert supervision and criticism, *e.g.*, to quote Dr. Parker's evidence: "The student after going through the ordinary training may point out to me, 'I could not do this in India; the temperature is too great,' then I let him modify things to suit the conditions. Or again, a student says he does so and so at home and I say 'All right! do it here—let me see exactly how you do it in India.' I then criticise it and find fault with it, and show how

“ he can improve it. He would not be permitted “ to carry out experiments in a tannery turning “ out leather for the regular market.” Moreover, the course in the college has been supplemented by visits to works and factories during vacations, which have proved very valuable to those students who have had previous experience of Indian tanneries, and who have acquired the necessary theoretical knowledge to enable them to follow intelligently the processes in use.

109. In addition, it has been suggested that a period of practical training in an up-to-date Indian tannery, such as the Government factory at Cawnpore, would be an excellent method of completing the training of a Government of India leather scholar.

110. Our recommendations regarding the grant of scholarships to students of this class are—

- (i) that hereditary connexion with the leather industry is desirable, and a knowledge of Indian methods is essential ;
- (ii) that where these conditions are satisfied, high academic qualifications need not for the present be insisted upon ; a fair knowledge of chemistry and physics, and some knowledge of mathematics will suffice ;
- (iii) that the scholarship shall be granted for three years at least, and should include visits to American and Continental tanneries, when recommended by the Professor.

If after inquiry the India Office is unable to arrange for practical training in this country, arrangements should be made for supplementing the training given here by a period of practical experience in one of the Government leather factories in India.

111. The qualifications to be desired in candidates of the second type are very different. Hereditary connexion with the Indian leather industry, although of course advantageous, is by no means essential, but it is imperative that the candidate shall have received in India the highest scientific training possible, and also have shown considerable aptitude for research work. The ideal course for such a student would be a three-years' training at one of the best technical institutions in this country, followed by the practical training to be gained by holding a paid position as chemist in an up-to-date tannery. That the difficulty of obtaining such a post is not insuperable is proved by the fact that in certain cases Indian students have succeeded in overcoming it, and as first-class chemists are rare, a really good man of any nationality is likely to be given a trial. Should it be found impossible to gain admission to any tannery, a student of first-class ability and scientific training would greatly benefit by spending a fourth year on post-graduate research work in the laboratory of a technical institution. Our

Particular Industries—Tanning—cont.

Practical training possible in Government leather factories in India

Recommendations as regards scholarships for hereditary tanners.

(2) Research chemists in the leather industry: an ideal course of training indicated

Particular Industries—Tanning—*cont*

Recommendations as regards scholarships in chemistry as applied to tanning.

Scholars of the first type likely to predominate at present.

recommendations with regard to this type of candidate are—

- (i) that the scholarship shall only be granted after the student has received the highest scientific training in India ;
- (ii) that he must have shown considerable aptitude for research work ;
- (iii) that the scholarship shall be tenable for four years ; and
- (iv) that if the scholar be successful in gaining a paid position in the laboratory of an English tannery, his right to a free passage back to India shall be extended for a further three years.

112. In concluding our remarks regarding the grant of scholarships in tanning we would point out that, owing to present conditions in India, students of the first type will necessarily predominate for some years to come, and will be by far the most useful in improving the industry in India ; but as the standard of education rises the highly scientific man, who is at present rare, will become more common, and as the industry improves his usefulness will increase.

CHEMICAL MANUFACTURES.

Chemical manufactures Works do not take students, whether British or Indian, as apprentices.

113. As regards chemical manufactures generally, the difficulties in the way of obtaining practical experience were clearly stated by Dr. Beilby, F.R.S., of Glasgow. "A chemical manufacturer is a person who by years of labour and painful and expensive experience has found out a lot of information which is valuable in his manufacture and which can very easily be carried away by anyone who has a little knowledge. I remember a man who said 'in half an hour in walking through a chemical works I could pick up what has taken a life-time to find out.' Therefore one cannot be surprised that a chemical manufacturer is extremely jealous. . . . Speaking as a manufacturer, we have to be extremely careful about the men we admit into our works. . . . We recognise when a man comes in to our chemical works, that, as a rule, once admitted we must keep him. At least there are very few men we would care to give a few months' experience to." Dr. Beilby added that he did not know of any place in the United Kingdom or Germany where students studying applied chemistry could gain admission to works as apprentices ; the difficulty was not peculiar to Indians, but applied equally to British students.

Salaried employment as a means of securing works experience.

114. The only recognised method at the moment of obtaining practical experience was to enter a works as an employé, taking a post at some remuneration, however small, merely to make a

beginning. This view was confirmed by Professor Cohen of Leeds who said:—

“It is not quite so much the actual obtaining of positions but the sort of apprenticeship required which is the difficulty. I mean that where a man does not want to tie himself to remain on, but where he wants to get practical experience and go somewhere else when he has got it,—that is what the manufacturers do not like. They do not mind having a man in their employ whom perhaps they will have to train, provided they can get something back after he has got through his training; but they do object, and it is natural in a way, to take people on their premises who are merely coming to learn without any idea of giving anything back when they have learnt it.”

We may also quote Professor Green of Leeds University:—

“As a rule our students on leaving here can easily get employment straight away, and at a very decent salary. Students who, if they offered themselves for nothing, would not be taken on, very often get taken on at a salary, because people do not want to be bothered by a man who is known not to be going to stay. They do not mind paying a salary to a man who ultimately may be of use to them, even if he is not of much use to them to begin with, and they anticipate that a young fellow will not be of very much assistance the first year or so. But they expect him to stay, and they pay him a living wage, at least, to start with.”

115. These opinions have also been confirmed by the experience of the single Government scholar who has so far come to this country for the study of alkali manufacture, for it has been found impossible to secure for him admission to any works. As regards theoretical training, we have evidence that there are ample facilities for obtaining the highest form of scientific training in this country, and from the extracts quoted above it will be seen that a student who has been through the University course is capable of filling a paid post in a works; but in view of the present dearth of chemical manufacturing works in India, it is very doubtful whether Indian industries will benefit sufficiently from the sending of students to this country for the study of chemical manufactures to justify the outlay necessary, and it is for consideration whether the Indian Institute of Science at Bangalore, and other institutions which may shortly be established in India, do not for the present afford sufficient facilities for the training of as many students as are likely to find employment in this branch of applied chemistry. In any case we consider that before any scholarship is granted for the study of a special branch of chemical manufacture, inquiry should be made as to the facilities available for giving the student a complete training in this country, and at the same time full particulars should be given of his qualifications and his prospects of obtaining suitable employment on return.

Particular Industries—Chemical Manufactures.—cont.

Grant of scholarships to Indians for the study of chemical industries in the United Kingdom of doubtful utility; training in India recommended.

CONCLUSION.

Conclusion:—The scholarship system has yielded good results, and may be made to yield even better results in future.

116. Our general conclusion may be stated as follows:—The results attained so far justify the continuation of the system of Government Technical Scholarships, and, with the modifications which we have suggested, the system may be expected to yield even better results in the future, but this expensive form of training at public cost should only be given to a well chosen few who may reasonably be expected to help the industrial development of India. We recognise that the openings for such men are not at present numerous, and that the most urgent demand of Indian industry at present is for skilled mechanics, and we are in complete sympathy with the efforts now being made for giving in India a better training to men of that class. But the necessity for educating the artisan does not preclude the desirability of having a limited number of men with the highest technological training, capable of holding posts of control. Both classes are needed for the development of Indian industry, and opportunities for the improvement of both should be given simultaneously.

117. We wish to place on record our high appreciation of the services rendered to the Committee by our Secretary, Mr. P. H. Dumbell, and his assistant Mr. R. E. Field; our inquiry has thrown upon both of them a heavy burden of work which they have discharged with highly commendable despatch to our entire satisfaction.

(Signed) T. MORISON.
K. G. GUPTA.
J. H. REYNOLDS.
W. E. DALBY.

P. H. DUMBELL (*Secretary*).
R. E. FIELD (*Assistant Secretary*).

18th October 1912.

APPENDICES.

APPENDIX I.

Correspondence between the Government of India and
the Secretary of State.

No. 1.

DESPATCH from the Government of India (Home Department) to the Secretary of State for India, No. 8 (Education), dated 9th October 1912.

Simla,

9th October 1902.

My Lord,

We have the honour to advert to your Lordship's Despatch No. 105 Public (Educational), dated the 2nd August 1901, with which you forwarded a question asked in the House of Commons by Sir M. M. Bhownaggee, and the answer given thereto, on the subject of founding additional Government scholarships for natives of India who might desire to pursue technical studies in Great Britain or other countries of Europe.

Your Lordship at the same time expressed a wish to be informed of the result of our deliberations in the matter.

2. The question of the institution of State technical scholarships formed one of the subjects which came up for discussion before the Educational Conference held at Simla in September 1901, and the following resolution was then passed :—

“That it is desirable that the Government of India should institute a number of State technical scholarships, perhaps ten in number, with an approximate allowance of 100*l.* a year, in addition to travelling expenses and fees, to be awarded annually in fixed proportions by the Local Governments, subject to the sanction of the Government of India, to selected candidates, who should be sent abroad to undertake definite courses of study in subjects connected with industrial science or research. That these scholarships might be held for an average duration of two years.”

3. In our letter* addressed to Local Governments and Administrations on the 20th November 1901, relating to the subject of practical and technical

education, we informed them that the Government of India accepted the recommendation of the Conference as to the institution of ten State technical scholarships, and that they proposed to give two of them to the Madras Presidency, two to the Bombay Presidency, and two to Bengal, and to distribute the remaining four among the other provinces, where technical instruction had not yet advanced so far as in the three provinces mentioned. It was suggested that the selection of the students to hold these scholarships should be made by the Local Governments subject to the approval of the Government of India; that the Universities should have no power of nominating to them; and that no candidate should be considered qualified unless he had displayed in his educational career an aptitude for technical study. Subject to these conditions, it was considered that a wide discretion should be left to the Local Governments in selecting candidates for the award of these scholarships. We stated our opinion that in ordinary circumstances the period for which the scholarships might be held should be two years, but that in special cases it might be increased to a third year or even reduced below two years; and that the scholarships should be tenable in foreign countries as well as in Great Britain. The Local Governments and Administrations were asked to submit their views as to the details for working out the scheme.

4. The replies of the Local Governments and Administrations to our communication have received careful consideration at our hands, and we have now the honour to enclose a copy of them for your Lordship's information. It will be seen that the outlines of the scheme sketched out by us have been generally accepted, but that there is a divergence of views in connection with the details. The scholarships are to be given for the purpose of providing for natives of India the higher technical education which may qualify them to assist in promoting the improvement of existing native industries and the development of new industries, wherever this may be possible. Technical education for this purpose may be defined as (a) the study of the scientific methods and principles underlying the practice of any handicraft, industry, or profession, (b) the application of these methods and principles to the practice of the handicraft, industry, or profession in question. Law, Medicine, Forestry, and Veterinary science being already provided for, are not included among the subjects to be studied by the holders of these technical scholarships, and Agriculture does not fall within the scope of the present scheme. The scholarships will be awarded by the Government of India upon the recommendation of the Local Governments, and will for the present, as already stated, be distributed as follows:—Two annually to the Madras Presidency; two to the Bombay Presidency; two to Bengal, and the remaining four among other Local Governments and Administrations.

5. We do not propose to prescribe the particular industries for the encouragement of which particular provinces should give scholarships. The Local Government or Administration which is asked to recommend a candidate will consider what industries are of importance in the province, and which of them may best be encouraged by scholarships, taking care to connect the scholarship scheme with the system of technical and industrial education in the province. In determining the choice of an industry Local Governments should in our opinion obtain assistance from the mercantile and industrial public, and take all measures that appear to them to be possible and expedient for interesting the influential sections of that public in the scheme. Industries in which native capital and enterprise are engaged or likely to be engaged, will be particularly appropriate for selection. It should be borne in mind that men who have received an expensive European training can be employed only upon such industries as are susceptible of being organized upon a considerable scale.

6. In each case in which a Local Government recommends a scholarship, it will be necessary for it to support its selection by giving the Government of India some account of the state of the particular industry which it is intended to promote and some comparison with other industries which might be considered eligible for encouragement. In determining the industry to be studied and choosing the man recommended for the scholarship, the Local Governments and Administrations will be required to bear in mind the importance of ensuring that the returned scholar shall find scope for his skill and ability. It has been proposed on the one hand that such scholars before they are appointed should be placed under engagement to serve Government on their return. On the other hand it has been suggested that private firms should be asked to guarantee their employment, and that the scholars should be reciprocally bound by engagement to such firms. We consider that the holder of one of these scholarships should not be bound by any such engagements, but that the prospect of his chances of employment after the completion of his studies should be well weighed when he is selected, and that upon his return the choice of his career should be, in the first instance, determined by his own inclination. If the early results of the scheme are successful, we think that the services of the returned scholars are sure to be in good demand, and that, failing private employment, Government will be glad to turn their abilities to account as teachers in industrial schools, or in other capacities connected with the improvement of local industries.

7. It is our intention to make it a condition of the grant of these scholarships that no candidate is to be selected for recommendation to one of them

on the result of competitive examination either open or limited. It is desirable that, in selecting the industry to which they are to be directed, Local Governments should give the widest possible publicity, through such channels as they think fit, to their intention to nominate scholars, and that they should take such advice as they need from persons cognisant of the industry, and from officers and others connected with technical education. In making the selection they should bear in mind the fact that it will be necessary for the student to have a competent knowledge of English, or of the language of any other country to which he is to be sent; and they should also be guided by considerations of his capacity, intelligence, practical interest in the industry, and the assurance which they feel that he will continue to devote himself to it on his return to India. These are matters which cannot be decided by competition; and we intend that it should be made clear from the beginning that these scholarships are not to be regarded as prizes, for which everyone has a right to claim an equal opportunity of competing. It is not necessary to lay down more precise rules as to the kind of general education which the scholar is to have received. Governments will act on their own discretion, having regard to the above considerations. As a general rule a scholar before being nominated should have received the best technical education available in the province in the particular industry which he has to study. The standard of this education differs in different industries, and each may be considered on its own merits. Even if the standard of technical education in a particular industry in a province is low, the scholar may be nominated if he has availed himself of the best facilities obtainable, and shows an interest in the industry. No age limit will be laid down for scholars, and none should be generally laid down by the Governments; but an age limit may at the discretion of a Local Government be fixed for any particular scholarship for which they invite applications. The particular industry to be studied will, as is stated above, be specified by the Local Governments in nominating a scholar, but they will hardly be in a position to define minutely the course of study to be pursued, nor will they ordinarily be in possession of the most recent information as to the facilities for such studies existing in England and elsewhere. We are inclined to think therefore that the best plan will be to leave these matters to be settled by Your Lordship when the scholar arrives in England; and if this view is accepted we will arrange that timely information shall be submitted to you as to the probable date of each scholar's arrival and the subject which he is required to study. We propose that those scholars who study in England should be under Your Lordship's control, and we trust that in the case of those who elect to pursue their studies on the continent or in America Your Lordship may be able to make suitable arrangements for their supervision. The conditions under which they will hold their scholarships will be similar to those laid down for Government of India scholarships. Progress reports will be required upon them from time to time, and power will be retained to cancel a scholarship and to send the scholar back to India if his progress is not satisfactory.

8. Should the principles which we have advocated in connection with the institution of these technical scholarships meet with Your Lordship's acceptance, we trust the scheme for the establishment of ten scholarships of 100*l.* a year may receive Your Lordship's early sanction.

We have the honour to be,
 My Lord,
 Your Lordship's most obedient, humble Servants,
 CURZON.
 A. P. PALMER,
 T. RALEIGH.
 E. R. ELLES.
 A. T. ARUNDEL.
 E. F. G. LAW.
 DENZIL IBBETSON.

ENCLOSURES.

Enclosure No. 1.

Extract paragraph 6 of a letter, No. 501-508, dated the 20th November 1901, from the Government of India to the Local Governments and Administrations, except the Chief Commissioner of Coorg and the Resident at Hyderabad.

* * * * *

The examination by the Conference of the subject of technical education terminated in a resolution recommending the institution of a number of State technical scholarships for the encouragement of the further studies of Indian students in the higher branches of technical education. This proposal is accepted by the Government of India. The existing State scholarships of 200*l.* a year are given in rotation to students from the different Universities, and are subject to the condition that the holders must proceed to England to study at one of the Universities there. The Government of India propose that the number of Technical State scholarships to be given should be ten a year, two of which should be distributed to the Madras Presidency, two to the Bombay Presidency, and two to Bengal, the remaining four being distributed among other Local Governments and Administrations, in whose territories technical instruction has not as yet made the same advance as in Madras, Bombay and Bengal. It is considered that the selection of the students to hold these scholarships should be made by the Local Governments subject to the approval of the Government of India; that the Universities should have no power of nominating to them, and that no candidate should be considered qualified unless he has displayed in his educational career an aptitude for technical study. Subject to these conditions, the Government of India would propose to leave a wide discretion to the Local Governments in selecting candidates for their approval. The course of instruction and the place at which a scholarship holder is required to study will have to be strictly laid down by the Local Government in the case of each selected candidate prior to his departure from India. In ordinary circumstances the period for which a scholarship might be held should be two years, but in special cases it might be necessary to extend the term to a third year, and in other cases even to reduce it below two years. In the opinion of the Government of India these scholarships should be tenable in foreign countries as well as in Great Britain. The Government of India are prepared to give to the holder of a Government technical scholarship 100*l.* a year, as well as to provide him with a second class passage to and from the place at which he will have to study, and to pay the fees at the institution where he is to be sent. I am directed to ask as to the details for working out this scheme.

Extract from the Resolutions passed at the Educational Conference held at Simla in September 1901.

V.—STATE SCHOLARSHIPS.

That it is desirable that the Government of India should institute a number of State technical scholarships, perhaps ten in number, with an approximate allowance of 100*l.* a year, in addition to travelling expenses and fees, to be awarded annually in fixed proportions by the Local Governments, subject to the sanction of the Government of India, to selected candidates, who should be sent abroad to undertake definite courses of study in subjects connected with industrial science or research. That these scholarships might be held for an average duration of two years.

Enclosure No. 2.

From M. Hammick, Esq., C.I.E., Secretary to the Government of Madras,
Educational Department, to the Secretary to the Government of India,
Home Department.

Dated Fort St. George,
13th March 1902.

Sir,

I am directed to reply to the 6th paragraph of Mr. Hewett's letter No. 501, dated 20th November 1901, on the subject of the institution of a number of technical scholarships. It is proposed to allot to Madras two of these scholarships of the annual value of 100*l.* each, and to leave to the local Government the selection of the students to hold them, the selection being subject to the approval of the Government of India. It is considered that the Universities should have no power of nominating any candidate, and that no one should be regarded as qualified for nomination unless he has displayed some aptitude for technical study.

2. I am to state that in the opinion of the Governor in Council these conditions are suitable. He considers that the scholarships should not be awarded to students at the termination of their college course, but only after they have spent at least two years at practical work of some kind and have gained some experience in the matters they wish to specially study abroad. The best means of giving effect to this decision appears to be to make the nominations at the conclusion of the college course and then employ the students on probation in the technological department (if it is formed) or in approved private workshops or manufactories, the scholarships being actually granted only when the applicant has clearly made up his mind as to what line of work he intends to pursue and with what object. If these meet with the approval of Government, the course of instruction and the place where a scholarship holder should study will then be determined. Periodical reports, say half-yearly, on the progress of the scholar may be insisted upon.

3. As matters stand at present, this Government is not in a position to give guarantees of subsequent employment, but it is possible that private firms and companies would be ready to make a conditional promise to take into their service such as intended to study industries in which the firms or companies are interested. If guarantees are given the students should be bound by agreement to continue in the service concerned for a term of years.

I have the honour to be,

Sir,

Your most obedient servant,

M. HAMMICK,

Secretary to Government.

 Enclosure No. 3.

Extract paragraph 4 of a letter from the Government of Bombay, No. 855,
dated the 8th May 1902.

In paragraph 6 of the letter under reply the opinion of this Government is invited as to the details of a scheme of technical scholarships proposed by the Government of India. As Mr. Burns has pointed out,* the absence of eligible candidates for these scholarships prevents the immediate realization of the scheme. When men combining high general education with special aptitude for technical study, and capable of utilizing the instruction they would receive in Europe, are forthcoming, as they doubtless will be hereafter, the scheme of scholarships proposed might be worked generally on the lines indicated by Mr. Burns in paragraphs 10 and 11 of his report.* In present circumstances it is impossible to formulate any precise scheme. It is understood that the report of the Industrial Schools Committee will

* See letter, dated 14th April 1902, overleaf.

indicate the industries for which men trained in Europe are specially required in each Presidency. After this is settled, it will be necessary to ascertain by inquiry in England what facilities exist for training students from India in those particular industries.

Annex.

Extract paragraphs IX., X., and XI. of a letter from C. L. Burns, Esq., Principal, Sir Jamsetjee Jejeebhoy School of Art, No. 362, dated the 14th April 1902, enclosure to above.

IX. With reference to paragraph 6 of Mr. Hewett's letter, it is to be presumed that the scholarships are intended for students who will specially study one of those industries which are at present depressed and are capable of revival or improvement by the introduction of modern technical methods. Such industries as handloom weaving in cotton and silk, hand-block printing, pottery, woodwork, jewellery, house-decorating, &c., and not for such crafts as engineering, powerloom weaving, machine printing, &c., which are all flourishing industries supporting large factories, works, and mills in India, in which students from such institutions as the Victoria Technical Institute and the College of Science at Poona can gain all the practical experience necessary, and which require no assistance from Government. If this is the case, I have the honour to point out that the principal objection to the immediate despatch of men to England supported by the proposed scholarships of 100*l.* a year, is that among the craftsmen employed in those industries most requiring improvement there is, so far as I am aware, scarcely any who knows sufficient English to be able to make full use of the opportunity. On the other hand the well educated Natives (such as those from whom the Drawing Masters are chiefly enlisted) have as a rule no technical knowledge of the shortcomings of the present methods which would enable them to readily seize upon the points where improvement is possible.

Scholars capable of making the best use of such a desirable opportunity must be trained, and should the suggestions of the Sub-Committee appointed by the Government of Bombay be adopted, there is every reason to suppose that no lack of suitable candidates for such scholarships from among the scholars trained in the proposed Central Institution will be experienced.

X. Should two suitable men be found in Bombay at once, I beg to suggest that the following course be adopted:—

- (a) That each scholarship holder should agree and be bound, so long as he holds the scholarship, to devote himself to the study of one special industry.
- (b) That in place of spending his time in a college or technical school, he be placed in a factory where the industry he is studying is being carried on. In this case a premium of some sort will have to be paid to the manufacturer to enable the student to spend a certain time in several departments, so that he can obtain a working knowledge of all parts of the trade, for the value of the student's labour will be practically *nil* to the manufacturer.
- (c) That the student be required to spend at least two of his evenings every week in the local technical institute to study those branches of his work which he cannot learn in the factory.
- (d) That specimens of his work and his notes be forwarded every quarter to the Bombay Government to indicate his progress and that a report be asked for from the head of the factory and the technical institute.
- (e) That instructions be sent from time to time to the student from Bombay directing his attention to such points in the technical methods at present in practice among the native workmen in the particular craft he is studying as may seem to the experts in India to require improvement.

XI. Keeping the student at practical work during the day in a factory will not only ensure his regular attendance at his studies, but will also give

more assurance that, while he is in attendance, he will be working and will be under supervision. In this respect the attendance at a factory is in every way preferable to joining a technical school. In nearly all the technical schools in industrial centres the staff only attend during the evening when most of the students are able to be present. The school is consequently practically empty during the day, when perhaps only the Principal attends at his office. Little or no provision is therefore made for day pupils, any who attend being practically left to themselves. Again, the instruction in all technical institutes must to a great extent be theoretical and is intended to supplement the knowledge gained in the workshop, and not to supplant it. To make the best use of the institute training therefore, the student must do practical work during the day, and there is in my opinion the best prospect of both the Government and the student obtaining adequate value for the money expended by combining the two.

Enclosure No. 4.

No. 646, dated 7th February 1902.

From W. C. Macpherson, Esq., Indian Civil Service, Officiating Secretary to the Government of Bengal, General Department (Education), to the Secretary to the Government of India, Home Department.

In reference to paragraph 6 of your letter No. 503, dated 20th November 1901, asking for the views of this Government as to the details for working out the scheme for the award of State Technical Scholarships, I am directed to submit, for the information of the Government of India, the accompanying copy of a letter, No. 256 of the 10th January 1902, from the Director of Public Instruction, Bengal, and to say that the Lieutenant-Governor accepts in the main the suggestions put forward in paragraphs 4 and 5 of that letter. He doubts, however, whether it would at present serve any useful purpose to ask heads of technical schools to nominate students to the scholarships, since students of technical schools seldom possess that competent knowledge of English which the Director justly makes the first condition for nomination.

2. The Lieutenant-Governor also doubts whether it is really desirable that Government should retain a lien on the services of all scholars on their return from England as the Director suggests. There are no industries which are directly worked by Government and in connection with which the services of these scholars could be utilized; nor is the number of the higher inspecting posts sufficiently large to allow the entertainment of two scholars every year in those appointments. Sir John Woodburn is therefore of opinion that it would be best in the interests of the industries which it may be desirable to foster to make them a free gift of the scholars trained at Government expense. The expansion of technical education will no doubt give greater room some years hence for the employment of Government inspectors, but it seems sufficient that an occasional scholar should then be selected for the purpose and sent home in order to come back fully trained for the duties of an inspector.

Annex.

(Confidential.)

No. 256, dated the 10th January 1902.

From A. Pedler, Esq., F.R.S., C.I.E., Director of Public Instruction, Bengal, to the Secretary to the Government of Bengal, General Department.

I have now the honour to reply to paragraph 4 of your letter No. 364, dated 4th December 1901, in which you ask for an expression of my opinion on the proposal made by the Government of India to create certain scholarships to enable selected natives of India to proceed to Europe and other countries generally to study technical subjects there.

2. The proposal indicated in paragraph 6 of the letter of the Government of India, No. 503 of 28th November 1901, is to create about ten scholarships of the value of about 100*l.* a year, together with travelling expenses and fees at the institution at which the student will work, and which will usually be tenable for two years. Ordinarily two of such scholarships will be assigned to Bengal. The selection of the candidates is to rest with the Local Government and the Calcutta University is not to be consulted in the nomination, but the candidates are to have shown special aptitude for technical study.

3. The exact source of the funds for the payment of these scholarships is not indicated; but assuming that funds are available, the general scheme of such scholarships should undoubtedly meet with the full approval of the Government of Bengal. It will therefore only remain to roughly work out the details of the principles under which the scholars are to be selected and the rules under which the students will work while in Europe.

4. As regards the first of these two points, it is obvious that the selection must be confined to those who have shown a practical or scientific bent in their education, and who have shown ability for practical work in contradistinction to theoretical or book work. One method of securing candidates of this stamp would be for the Director of Public Instruction yearly, two or three months before an election for such scholarships is to take place, to address—

- (1) the principals of technical colleges, such as the Sibpur Civil Engineering College, the Behar School of Engineering, the Dacca Engineerings School, and the Calcutta School of Art, and the heads of all technical schools in Bengal;
- (2) the principals of all colleges in which science is taught practically; and
- (3) to issue advertisements addressed to the various employers of industrial labour, such as those employing master-foremen of shops, &c., intelligent apprentices, &c., stating the qualifications required in the scholars to be selected to be sent to Europe and stating that they will be allowed to submit selected names.

These classes of officers would be asked to submit the names and all necessary particulars of any students who might seem to them to fulfil the necessary conditions, and specifying specially if such students have any hereditary interest in industry.

From the names thus received the Director of Public Instruction could suggest nominations to the Local Government, and in making his selection he would be guided (i) by the fact that it would be necessary for the student to have a competent knowledge of English, &c., to enable him to take full advantage of any course of study and instruction in Europe; (ii) by the interest and knowledge which such student had shown in practical work; (iii) by the history of the candidate showing whether he is likely to continue to follow industrial work after his training in Europe; (iv) by the capacity and intelligence of the candidate; and (v) by the desirability or necessity of fostering the branch of industry to which the candidate has directed his thoughts and attention. From the names so selected the Government of Bengal would make its nominations for the approval of the Government of India.

5. Then, as regards the work to be done by the scholar when in Europe, this would be to a certain extent decided on by the considerations (iv) and (v) given in paragraph 4, and on the appointment of such scholar a definite programme should be laid down for the scholar's work for the time he is to hold the scholarship, showing where it is intended he should work, the exact subject he would work at, &c. The programme would be drawn up by the Director of Public Instruction in consultation with the candidate and with local experts in the industry which is to be studied. While in Europe the scholar should be under the supervision of the Secretary of State in the same way as the Government scholars are at the present time; and a set of rules

somewhat like those for the present holders of Indian scholarships should be framed. These rules will be found in detail in pages 236-237 of the calendar for the Calcutta University for the year 1901. Somewhat similar rules also obtained in the case of the agricultural scholars who proceeded to Europe. Among the rules also should be included one which would make it incumbent for the student to have reports of his work submitted to the Director of Public Instruction as well as to the Political Aide-de-Camp to the Secretary of State.

6. On the return of such scholars from Europe to India the Local Governments should have the first claim on the services of such men and the Local Governments should employ them in posts or occupations calculated to foster the industry which the student has been deputed to Europe to study. They might be even made inspectors of schools devoted to such industries or might themselves superintend schools, &c.

7. At the present time it does not appear possible to give any more detailed indications of how the proposed scheme should be worked. It is, however, clear there would be no difficulty whatever in at once starting the scheme even from the year 1902-03, and there would, in my opinion, be every probability of such a scheme proving eminently successful.

Enclosure No. 5.

No. $\frac{589}{XV-318 A}$, dated the 30th December 1901.

From L. M. Thornton, Esq., I.C.S., Secretary to the Government of the North-Western Provinces and Oudh, Educational Department, to the Secretary to the Government of India, Home Department.

I am directed to reply to paragraph 6 of your letter No. 504, dated 20th November 1901, in which the Government of India ask the opinion of this Government as to the details for working out the scheme of Government technical scholarships. I am to submit, for the information of the Government of India, copy of a letter No. F. 1880, dated 30th November 1901, from the Director of Public Instruction, North-Western Provinces and Oudh, who was consulted on the subject, and to communicate the following remarks and suggestions.

2. It is understood from your letter that perhaps one State scholarship, of the value of 100*l.* per annum *plus* fees of the institution, and tenable as a rule for two years, would, under the scheme contemplated by the Government of India, be available each year in the North-Western Provinces and Oudh. His Excellency in Council desires that the Local Government shall award the scholarship, and shall prescribe on each occasion the branch of higher technical education which the holder is to study in Europe and also decide at what institution he is to study it. As regards the initial measure of giving due publicity to the intentions of Government beforehand, the Lieutenant-Governor and Chief Commissioner thinks that the proposals detailed in the letter of the Director of Public Instruction may be accepted. His Honour also concurs with Mr. Lewis in thinking that a really good knowledge of English is essential and that suitable candidates will not generally be forthcoming direct from school. The maximum age limit might be fixed at 25 years. As a preliminary, the Government will have to decide each year in what subject or branch of technical education the scholarship shall be given. At first it will no doubt be desirable to give the scholarship in one of the branches which are taught at the Thomason Civil Engineering College at Rurki. It appears to the Lieutenant-Governor that it will be expedient to adopt a system of limited competition. Applications would be received by the Education Department, and submitted, with the opinion of the Director, for the orders of Government, which would

make a selection from among the applicants. An examination of the selected candidates could then be held at Rurki.

3. I am to say, however, that the above suggestions are tentative only, and should be regarded as liable to revision in the light of experience. I am to add that a separate reply will, in due course, be submitted with regard to Industrial Schools (paragraphs 3 to 5 of your letter of 20th November 1901).

Annex.

No. 1880 F., dated 30th November 1901.

From. T. C. Lewis, Esq., Director of Public Instruction, North-Western Provinces and Oudh, to the Secretary to the Government of the North-Western Provinces and Oudh.

With reference to paragraph 6 of Government of India's No. 504, dated 20th November 1901, forwarded with your No. 546/XV. 318—A., dated 29th November 1901, in which the opinion of the Government of the North-Western Provinces and Oudh has been asked for as to the details for working out the scheme for the proposed State technical scholarships, I have the honour to reply that there are two points to be considered:—

- (i.) How to give the widest publicity to the offer of scholarships.
- (ii.) How to select the most suitable students to hold them.

As regards (i), announcements should be made in the Government Gazette, in all colleges affiliated to the University in Arts, Science, or Engineering, and also to important firms of manufacturers, more especially those under the management of natives of India, who might be likely to profit by the improvements in their manufacturing business, which a technical scholar deputed by them would be able to introduce after studying the best European or American methods for the period of two years.

With regard to (ii), the selection of the scholars from among the applicants, it is important to insist upon good attainments in English, beyond such as school boys are likely to possess; hence applications should not be expected from schools. As regards other subjects which the applicant may have studied, only so much proficiency should be required as is sufficient to show that he is ordinarily intelligent. Among students in Arts Colleges evidence of aptitude for technical study is not often to be found, nor, when found, easy to estimate at its right value; but it may sometimes be both forthcoming and convincing. Students attending Science and Engineering classes would find less difficulty in proffering such evidence in a satisfactory shape; and there would be no difficulty in the case of an employé of a manufacturing firm. Amongst candidates otherwise qualified the preference should be given to the one who appears to be most likely to be able to put his new knowledge or skill to practical use on his return to India, *i.e.*, generally to one who is directly connected with a business concern either by family relations with the managers or by being actually employed in it. The bringing out of technically educated men who are at a loss to know what to do with their technical education, and so are apt to be of no practical use to the country, is a possible evil that should be guarded against from the beginning.

Enclosure No. 6.

Extract paragraph 3 of a letter from the Government of the Punjab, No. 131, dated the 8th April 1902.

In paragraph 6 of letter No. 505 of 20th November 1901, the opinion of the Local Government is asked with regard to the establishment of Government technical scholarships of 100l. a year. The Government of India

propose to found ten scholarships a year, two each year to be given to Madras and the same number to the Bombay and Bengal Presidencies respectively, the remaining four to be distributed among other Local Governments and Administrations. It is also proposed that the selection of the students to hold these scholarships should be made by the Local Governments subject to the approval of the Government of India. The course of instruction and the place at which a scholarship-holder is required to study are to be strictly laid down by the Local Government in the case of each selected candidate prior to his departure from India. In ordinary circumstances the period for which the scholarship might be held is to be two years, but in special cases the term may be extended to a third year or reduced below two years. These scholarships are to be tenable in foreign countries as well as in Great Britain. The Government of India also propose to provide the scholarship-holder with a second class passage to and from the place at which he will have to study and to pay the fees at the institution to which he is to be sent.

These conditions seem to Sir Charles Rivaz very suitable, and he proposes to consult, when it is the turn for this Province to select a candidate, the local authorities and experts best fitted to judge of the qualifications of the candidates and to suggest appropriate courses and places of study: such experts would include the Principals of Colleges and of the School of Art, and officers of the Public Works Department and the Railways.

Enclosure No. 7.

No. 97-4-E.-1, dated Rangoon, the 2nd April 1902.

From the Secretary to the Government of Burma, General Department,
to the Secretary to the Government of India, Home Department.

With reference to paragraph 6 of your letter No. 506, dated the 20th November 1901, relating to the establishment of Government Technical Scholarships, I am directed to say that the Lieutenant-Governor concurs generally in the proposals of the Government of India, but that his Honour is not prepared at present to make any detailed recommendations so far as this Province is concerned.

Enclosure No. 8.

Extract paragraph 4 of a letter from the Chief Commissioner, Central Provinces, No. 1793, dated the 1st April 1902.

In regard to the technical scholarships referred to in paragraph 6 of Mr. Hewett's letter under acknowledgment, I am to say that the Chief Commissioner does not at present think that he should press the claims of the Central Provinces to one of these scholarships.

Enclosure No. 9.

Extract paragraph 6 of a letter from the Chief Commissioner of Assam,
No. $\frac{2621-P.I.}{262}$ G., dated the 11th January 1902.

With reference to paragraph 6 of your letter, I am to say that the Chief Commissioner does not consider it necessary for the present to bring Assam within the operation of the scheme for granting Government Technical Scholarships tenable in Great Britain and foreign countries for the encouragement of the further studies of Indian students in the higher branches of technical education.

No. 2.

Despatch from Secretary of State for India, No. 65 (Public), to His Excellency the Right Honourable the Governor-General of India in Council, dated 29th May 1903.

My Lord,

On receipt of the letter of Your Excellency in Council, No. 8 (Education), dated the 9th October last, in which you proposed the establishment of ten State technical scholarships, to be awarded annually to natives of India studying in Great Britain or other Western countries, I thought it desirable to obtain the opinion on the scheme of the Board of Education.

2. I enclose a copy of the letter addressed to the Board, and of their reply thereto.

3. It is not necessary for me to assure your Excellency that the principle of the scheme, which applies to India a system which has, I understand, proved very successful in the case of Japan, and more recently in that of Siam, meets with my full approval, and that I cordially sympathise with the desire of your Government to further the development of Indian industries by providing promising young men with the means of studying the progress which has been made in industries and arts in the most advanced countries of the West. It appears to me, however, that before the details of the scheme can be finally settled there are some points which call for further examination.

4. Your Excellency will observe that the Board of Education express a doubt, which I share, whether a scholarship of 100*l.* a year, in addition to fees and travelling expenses, will fully meet the expenses of a student in this country. I observe that in 1887, when dealing with the existing Government scholarships of 200*l.* a year, the Government of India found it necessary to issue a public warning*

* See Home Department Education Proceedings, March 1887, p. 60.

that "while the scholarship allowance of 200*l.* a year is sufficient to cover the necessary expenses of college life at Oxford or Cambridge, it is very desirable, if not absolutely necessary, that the scholars should have some small private resources of their own to meet expenses in the vacation and other general expenses which are scarcely avoidable." And it appears to me that the holders of the proposed technical scholarships will be in the same case. I would therefore ask you to consider whether it is not necessary to fix some higher limit to the scholarship allowance.

5. I observe from your fifth paragraph that it is proposed to connect the scholarship scheme with the system of technical and industrial education in the various Provinces, which will no doubt be established as the result of your deliberations on the report of the Industrial Schools Committee. I do not gather from the replies of the various Local Governments which you forward that there is any large supply of qualified candidates for the scholarships as yet forthcoming, at any rate in the two provinces which are believed to be industrially most advanced, Bombay and Bengal, and I should suppose that it would take some time to bring into existence a class of students, trained in properly equipped technical schools in India, who would be ready to take up the scholarships when established. Before, therefore, sanctioning any definite annual number of scholarships to be awarded, I think it would suffice to announce the readiness of Government to give a scholarship or scholarships if promising and well-qualified candidates present themselves in some particular branch of industry. In other words, it appears to me that the scheme should for the present be worked experimentally, its further development being left for consideration when your technical institutions in India have begun to produce a class of students who might be expected to profit by its extension.

6. I notice that you exclude from the scope of the scheme Law, Medicine, Forestry, and Veterinary Science, as being already provided for; and certainly there is no lack of Indian students who, without the inducement of a scholarship, visit this country in order to study the first two of

these subjects. Engineering is not mentioned among the excluded subjects; you are, however, aware that Indian candidates present themselves in considerable numbers for entry to the Coopers Hill College, while the engineering Colleges in India are, I presume, capable of giving instruction of a high class in that subject.

7. I shall be ready, with the advice of the Board of Education, to undertake the selection of the course of technological study best fitted to the needs of any particular scholar. Your Excellency will observe that the Board, in the concluding paragraph of their letter, ask that they may, in any case in which their advice is desired, be furnished with full particulars as to the past educational experience and future requirements of each scholarship-holder. Should any student elect to pursue his studies on the Continent or in America, it would probably be found possible to obtain from the head of the institution where he is studying a periodical report on his progress and conduct; but no more extended supervision by this Office would in such a case be practicable, and I should hope that the persons selected for the scholarships would ordinarily be of such formed character and habits, and of such an age, that detailed tutelage would in their case be unnecessary.

I have the honour to be,
My Lord,
Your Lordship's most obedient humble Servant,
(Signed) GEORGE HAMILTON.

ENCLOSURES.

Enclosure No. 1.

India Office to Board of Education.

J. and P. 2392/02.

Sir,

India Office,
25th February 1903.

I am directed by Lord George Hamilton to enclose, for the information of the Board of Education, a copy of a Despatch* which has been received from the Government of

* No. 8, dated the 9th October 1902, with enclosures.

India, proposing the establishment of ten scholarships annually for natives of India who may desire to pursue technical studies in Great Britain or other European countries.

It will be seen that the Government of India, while contemplating that the particular industry to be studied by a scholarship holder shall be determined in India by the Local Government before he is nominated, propose to leave to this Office the prescription of a course of study, with reference to the facilities for such studies existing in England and elsewhere. They propose also that special arrangements should be made for the supervision of any students who may elect to pursue their studies on the Continent or in America. The value of the scholarships is fixed at 100*l.* a year, in addition to the fees payable to the institutions where the scholars will study, and travelling expenses.

Lord George Hamilton would be much obliged if the Board of Education would favour him with their advice on the proposed scheme, and in particular in regard to those points in it which are enumerated in the preceding paragraph. There is not at present in this Department any official who could be made responsible for selecting a course of study for an Indian holding a technical scholarship, and his Lordship hopes that if the scheme is brought into operation he may count on the assistance of the Board of Education especially in this respect.

It is understood that the system of deputing students to Europe for technical study has been adopted with much success by the Government

of Japan, and more recently by that of Siam; and it is probable that the experience gained in these cases (if known to the Board of Education) would afford some criterion of the results which may be expected from the establishment of a similar scheme for natives of India.

Lord George Hamilton would be glad to learn whether, in the opinion of the Board, an allowance of 100*l.* annually (in addition to fees and travelling expenses) is likely to suffice for the support of an Indian in this country while undergoing a course of study.

The Secretary,
Board of Education.

I have, &c.,
HORACE WALPOLE.

Enclosure No. 2.

Board of Education to India Office.

Whitehall, London, S.W.,
21st April 1903.

Sir,

In reply to Sir H. Walpole's letter of February 25th, I am directed by the Board of Education to state that they regard the proposed establishment of ten annual travelling scholarships for natives of India who shall pursue technological studies in Great Britain or some other Western country as likely to prove of benefit to Indian industry and education.

The Board note that the Government of India in their Despatch of October 1902 contemplate cases in which the scholar will elect to pursue his studies in America, while in your letter of 25th February last the sphere of study is limited to Great Britain or other European countries. If this discrepancy is due to inadvertence, the Board would take this opportunity of saying that in their opinion some of the scholars might derive special advantage from a course of study in America supplementing a period of residence in Europe.

If requested by the Secretary of State for India, the Board of Education, though unable to undertake responsibility for the personal supervision of the students, will be happy to give such advice as is within their competence, from time to time, as to the course of technological study best fitted to the needs of any particular scholar.

In reply to the question of the Secretary of State as to the sufficiency of the proposed annual allowance, the Board are of opinion that 100*l.* annually (in addition to fees and travelling expenses) would not be adequate to the student's needs, and they believe that this view is confirmed by the experience of those who have organised similar scholarship-systems for the Governments of Japan and Siam, but, of course, much would depend on the social status of the scholars and on the country to which they were sent.

In this connection the Board of Education would be glad to receive more precise information as to the exact educational standing of the proposed scholarship holders. The Board are at present not clear whether it is contemplated that these scholars should pursue technical studies of the highest grade, or of an intermediate character, or whether they might even be of artizan rank; but it is presumed that the reference is to the needs of the first two classes. In any case in which the Board might be called upon to advise with regard to any student they would desire to be furnished with a statement of his past educational experience and future requirements.

The Under Secretary of State
for India.

I have, &c.,
ROBERT L. MORANT.

No. 3.

Extract from Despatch from Government of India to Secretary of State,
No. 18, dated 11th August 1904.

We have the honour to refer to the correspondence ending with the Despatch No. 65 (Public), dated the 29th May 1903, in which your predecessor intimated his general approval of the proposals made by the Government of Lord Curzon to award State technical scholarships to qualified natives of India who might desire to pursue technical studies connected with some particular branch of industry in Great Britain or other Western countries.

2. After considering Lord George Hamilton's Despatch, Lord Curzon's Government published a copy of the correspondence for general information. At the same time they explained to Local Governments the conditions under which they desired to introduce the scheme; they intimated that the textile industry in Bombay and the mining industry in Bengal appeared to offer the most favourable fields for the initiation of the experiment; and they stated that they would be glad to consider any suggestion which the Local Governments might have to offer for the establishment of a technical scholarship in any other branch of industry which could thereby be developed, if a suitable candidate could be found. In view of the doubts expressed by the Board of Education and your predecessor as to the adequacy of the scholarships of 100*l.* originally proposed, the Government of Lord Curzon raised their value to 150*l.* a year, exclusive of the fees payable at the institutions at which the scholars might study, and of travelling expenses.

Enclosure to Government of India Despatch No. 18,
dated 11th August 1904.

Circular Letter from Government of India to Local Governments,
Nos. 565-570, dated 21st September 1903.

I am directed to forward, for the information of the Governments of Madras, Bombay, &c., a copy of the papers noted on the margin,* regarding the institution of State technical scholarships to enable natives of India to pursue a course of study in Great Britain or other Western countries.

* Despatch to the Secretary of State,
No. 8, dated the 9th October 1902.

Despatch from the Secretary of State,
No. 65, dated the 29th May 1903, and
enclosure.

2. In view of the doubts expressed by the Board of Education and the Secretary of State as to the sufficiency of the proposed amount of the scholarships, the Government of India think that it would be well to fix their value at 150*l.* a year. As has been pointed out, however, the question depends largely upon the status of the scholar, and on the country to which he proceeds for study: and if in any particular case the Local Government regards the sum now named as insufficient, the Governor-General in Council will be prepared to consider proposals for increasing it.

3. Instead of announcing the intention to award a definite number of scholarships annually, the Government of India agree with the Secretary of State that it will for the present suffice to intimate the readiness of Government to give a scholarship or scholarships if promising and well-qualified candidates present themselves in some particular branch of industry. They further accept His Lordship's suggestion that engineering should be excluded from the scope of the proposals.

4. Subject to the foregoing modifications, the Despatch of 9th October 1902 to the Secretary of State indicates the conditions under which the Government of India desire to introduce experimentally a scheme of technical scholarships. The information now before them suggests that the textile industry in Bombay and the mining industry in Bengal will be found to offer the most favourable fields for the initiation of the experiment.

The Government of India will, however, be glad to consider any suggestions which the Governments of Madras, Bombay, &c., may have to offer for the establishment of a technical scholarship in any other branch of industry which can thereby be developed, if a suitable candidate can be found.

No. 4.

Despatch from the Secretary of State for India, No. 138 (Public), to His Excellency the Right Honourable the Governor-General of India in Council, dated 8th October 1909.

My Lord,

I desire to address Your Excellency in Council on the question of the employment on their return to India of young Indians who have been granted technical scholarships by Your Excellency's Government for the study of various branches of technical education in this country. My attention has been called to the general question by the particular case of

* Letter from Mr A. Bose, dated 25th July 1909.
 Letter to ditto, dated 19th August 1909.
 (Not printed)

Mr. Asok Bose, a copy of correspondence* with whom I forward for the information and consideration of your Government; but there have been four other cases in which students who have received scholarships for the study of mining have applied for appointment under Government on the termination of the scholarship. The names of the four applicants are N. D. Daru, H. C. Read, A. M. Sen, and C. Fox; the first-named alone received an appointment, namely, in the Geological Survey.

2. Other cases of holders of technical scholarships have also occurred in which the student has appeared to think that the fact that he has been assisted by Government in obtaining technical instruction, constitutes a reason why Government should provide him with employment on his return to India.

3. The notification issued by the Government of Bengal, of which a copy was sent to me with your Despatch No. 18, dated 11th August 1904, announcing the grant of these scholarships, for one of which Mr. Bose was selected, deals with the subject of returned scholars in paragraph 11, and is so worded as to leave the scholar under the impression that if he fails to secure suitable private employ, Government would be glad of his services. It is plainly impossible to find Government employment for all such returned scholars, and I commend it to your consideration whether these notifications should not make clear to such scholars that they must generally depend upon their own exertions to make their living on their return to India, and must not ordinarily expect to be taken into Government service.

4. If this is not done, there appears to be a risk that a sense of grievance may be created, and that the expenditure involved in the grant of these scholarships may prove to be unprofitable.

I have the honour to be,
 My Lord,
 Your Lordship's most obedient humble Servant,
 (Signed) MORLEY OF BLACKBURN.

No. 5.

Extract from Despatch from Government of India to Secretary of State, No. 18, dated 26th May 1910.

We have the honour to forward for Your Lordship's information a copy of the papers noted in the attached list of enclosures regarding the grant of State technical scholarships to certain candidates in the United Provinces.

2. With regard to the subjects mentioned in paragraph 2 of the letter from the Government of the United Provinces, dated the 12th April 1910, we have already asked Your Lordship for information as to the facilities available in certain countries for instruction in these subjects in our Educational Despatch No. 4, dated the 24th February 1910.

3. The Government of the United Provinces has also raised the question whether mechanical engineering should be excluded from the scope of the proposals for technical scholarships. Engineering was originally so excluded for the reasons stated in paragraph 6 of Lord George Hamilton's Despatch No. 65 (Public), dated the 29th May 1903. But having regard to the reference to Coopers Hill College in that despatch, it would appear that the intention was merely to exclude civil engineering, a subject for the teaching of which there was then and is now ample provision in India. In view of the representation now submitted by the United Provinces Government we are disposed to think that electrical and mechanical engineering should be considered as falling within the scope of the technical scholarship scheme. Provision for instruction in these subjects is not so advanced in India as in the case of civil engineering, while the demand for qualified electrical and mechanical engineers to take charge of factories and works is steadily on the increase. We have already, as intimated in our Educational Despatch No. 16, dated the 10th June 1909, awarded a scholarship in electrical engineering to a candidate from the Bombay Presidency, and we see no objection to the grant of scholarships in mechanical engineering to the two candidates who are now recommended by the United Provinces Government.

Extract from Letter from the Government of the United Provinces to the Government of India (Home Department), No. 368, dated 12th April 1910 (Enclosure 1 to Government of India Despatch No. 18, dated 26th May 1910).

With reference to Mr. Fell's Letter No. 1003, dated the 30th November 1907, I am directed to forward the recommendations of the Lieutenant-Governor for the grant of technical scholarships in the year 1910-11 to enable candidates to study a selected industry in England.

2. In accordance with the usual practice the Upper India Chamber of Commerce and Commissioners of Divisions were consulted as to the industries to be selected, and on a consideration of the replies received applications were invited by advertisement in the papers for scholarships in the following subjects :—

- (i) extraction of alkalis ;
- (ii) manufacture of cane sugar by machinery ;
- (iii) manufacture of vegetable oils ;
- (iv) wool dyeing ;
- (v) mechanical engineering.

The Lieutenant-Governor was advised, however, that a candidate could not obtain the full benefit of instruction in the technology of sugar by studying in England. A reference was therefore made to the Government of India in my Letter No. 1730, dated the 16th November 1909, enquiring whether scholarships could be made tenable in Java, and as the question is still under the consideration of the Secretary of State it is clear that the grant of a scholarship in this subject must be held over for the present; the result is one which His Honour regrets as the industry is one of the greatest importance in this province, and a study of improved methods is urgently required. He hopes, however, to be permitted to nominate a candidate next year. In the same letter enquiry was made also whether a course of instruction would be available in extraction of alkalis, manufacture of vegetable oils, and wool dyeing; a reply to this enquiry has not yet been received, and His Honour would therefore have some hesitation in recommending the grant of a scholarship in any of these subjects. Apart from

this, however, having considered both the merits of the candidates who have applied and the relative importance of the subjects they have selected, he is of opinion that his nominations should be given to men who are desirous of taking up mechanical engineering. He is not certain, I am to say, what are the intentions of the Government of India as regards scholarships in this subject, since it was intimated in Mr. Marris's Letter No. 566, dated the 21st September 1903, that they had accepted the suggestion of the Secretary of State that engineering should be excluded from the scope of the proposals for technical scholarships. He understands, however, that a scholarship in electrical and mechanical engineering was sanctioned last year in the Bombay Presidency, and he desires strongly to urge the need for similar scholarships in this province. A new spirit of industrial enterprise is showing itself among the people, and various factories and works are being started in which large sums of capital are invested. But the promoters labour under the disadvantage that they can find among their own people no one equipped with the expert knowledge that is necessary for the running of a large concern, such as a spinning mill, and they have to employ outsiders. The province, indeed, appears to be singularly weak in mechanical engineering, so much so that when the executive committee of the United Provinces Exhibition desired to get a mechanical engineer they were unable to do so. It is true, no doubt, that civil engineering is amply provided for in India, but instruction in electrical and mechanical engineering is not equally satisfactory. It would be of the greatest advantage to the nascent industries of this province to have men who belong to the province and who would naturally seek their career in it, trained in the latest practice in this subject at home; a good supply of engineers may, indeed, be considered a preliminary essential to any industrial advance since there is scarcely an industry in which their services are not required, and His Honour believes that next to sugar mechanical engineering is the most important branch of study that needs encouragement at the present time.

APPENDIX II.

EXTRACTS from Fifth Quinquennial Review of the Progress of Education
in India, 1902-7.

The following extract from the reply of the Madras Chamber of Commerce indicates the nature of the difficulties which they detected :—“ The Chamber “ understands that manufacturing industries are what Government have “ chiefly in mind, and if it is only in that direction that encouragement “ by the grant of scholarships is proposed, the Chamber fears that the “ difficulty you mention of attracting suitable native candidates for them “ will prove insurmountable. The reasons are that practically all manu- “ facturing industries in India are at present run by Europeans, and “ they, when requiring men with expert knowledge for responsible posts “ (such as an ex-scholarship holder would naturally aspire to), would almost “ certainly prefer to employ a European, whose capacity and general reliability “ they could better form an opinion of. Natives doubtless realise this, so “ those of a class and with the education, ability and energy to qualify for “ technical scholarships are scarcely likely to care to enter on a career with “ no very promising or assured prospects for them in it.”

The Chamber of Commerce for Upper India appointed a Committee and arrived at negative conclusions, which are expressed in the following remarks :—

“ The Committee have been assisted in their deliberations with the views held by a comprehensive range of industries, and, though diversity of opinion was to be expected in regard to a question possessing such different bearings when viewed from the standpoint of the various classes of producers, the Committee feel that certain well-defined objections to the Government of India’s proposals are shared by the great majority of those interested in production on a large scale by means of extensive labour-saving machinery. I am to represent in the first place, that so far as the organised industries of these provinces are concerned, it is not thought that specially trained scholars, who have undergone such a course of studies as is contemplated by the Government of India’s scheme, would be of any material value. These students would presumably expect to be installed in positions of trust and importance, and as it is not considered that it would be possible for them in the time at their disposal to gain more than a limited and circumscribed acquaintance with the practical details of the particular industries they had selected for their studies, it would be extremely doubtful that the heads of important concerns would regard them as qualified to replace European experts, possessing years of practical experience, in the more responsible appointments. On the other hand, the very fact of their being favoured by such special selection at the hands of Government as is indicated in the memorandum under consideration would be calculated to render them unfitted in their own estimation for the more subordinate positions in mills and factories.

“ As to the value of such students as instructors in technical schools, the Committee does not feel itself competent to pronounce an opinion : but in the case of what may be termed the major industries, the knowledge gained by a thorough training in a factory working under Eastern conditions would seem to provide a very much more useful preparatory course than the superficial instruction which a scholar would be likely to receive in foreign countries. In the present position of the local manufacturing industries it is not experts or highly qualified men with a knowledge of the technique of their trades that are difficult to obtain, but a more plentiful supply of the crude material from which to select the ordinary rank and file of operatives and the improvement of the standard of intelligence and manual skill amongst those operatives.”

* * * * *

The Governments, however, persevered in giving effect to the scheme. In Madras it was reported that there were a large number of native industries, but very few of them were appropriate for selection, as the majority were not susceptible of being organised on a considerable scale. Amongst others which were passed in review were the trade in gold lace, which is imported up to the value of 10 or 15 lakhs per annum from France; metal plate work; pottery and brick manufacture; textile industries, including cotton spinning, dyeing, machine loom weaving, and hand weaving; mining which, however, except for mica in Nellore is entirely in the hands of European syndicates; glass making; and the manufacture of sulphuric acid, the demand for which in the Madras Presidency was said to average about 90 tons per annum. After careful consideration the Government came to the conclusion that first scholarships might be most advantageously assigned in connection with the study of industrial chemistry in one or more of its branches, and with the tanning industry. Government therefore invited applications in January 1906 for scholarships in these subjects. Although industrial chemistry and tanning represented the deliberate choice of the Madras Government, before suitable candidates could be found in these, an opportunity occurred to nominate a scholar to study weaving, and this was accordingly the subject of the first State technical scholarship instituted in Madras. A scholar 39 years of age, who was weaving master in the Coimbatore jail, was sent to Manchester to study the various types of hand looms for dealing with silk, cotton, and other fibres, and the means to be employed to secure the best preparation of warps for hand looms. The occupation of cotton weaving, spinning, and dyeing maintains about 1½ million persons in Madras, and a hand loom factory for the teaching of improved methods has recently been started by the Government of Madras at Salem.

In Bombay, it was the unanimous opinion of the authorities consulted that the first scholarships ought to be given in connection with the textile industry. Contrary to the experience in some other provinces, it was found that a European firm, that of Messrs. Wallace & Co., Bombay, had shown sufficient faith in the technical training of Indian employés to send home a Hindu, employed at their mill at Sholapur, to go through the textile industry course at the Manchester School of Technology. It was settled that one of the State technical scholarships should be awarded to a candidate who was willing to go through the course of textile industry at Manchester, Leeds, or Bradford. There was some difference of opinion as to the precise direction which it would be best to give to the second scholarship. Hand block printing had been suggested as the subject of study, and it seemed that there was a considerable opening for the improvement of this industry, if developed on proper and scientific lines, in Gujerat; but it was doubtful whether a scholar could obtain training in it in Europe. It was agreed, however, that if a student were trained as a textile chemist he would acquire knowledge which might enable the hand-printers of this country to regain the position they once held as producers of printed fabrics with colours of exceptional brilliancy and endurance. The Government of Bombay therefore decided that the second scholarship should be offered for a course of textile study, with special reference to chemistry in its application to textile requirements, and especially to the printing of textile fabrics, with the special object of improving the hand methods now followed in the villages and towns of the Bombay Presidency.

Of the candidates who applied for the scholarships, five were found to be fully qualified, and it was decided to award three scholarships instead of two. The three scholars sailed for England in May 1905 and were entered at the Municipal School of Technology at Manchester.

In Bengal the proposal that mining should be the subject of the first scholarships was received with general consent; and the Indian Mining Association added the suggestion that electrical engineering should form one of the subjects to be taken up by the mining students. The need for a further supply of trained men to be employed in connection with mines has been recognised by the publication of rules under the Indian Mines Act, 1901. The scholarships were widely advertised, and of the applicants four were chosen and sailed to England in September 1904 to enter upon a

course for the diploma in mining at the Birmingham University. The course there is three years, and the scholarships were to be capable of extension to three years if satisfactory progress was made. In the next year, 1905, two more scholars were selected in a similar way for the course in mining at the Birmingham University.

In the United Provinces, where the Chamber of Commerce held the unfavourable opinion already quoted as to the prospects of the scholarship scheme, the Government made very full enquiries, which, however, turned out to be fruitless, for an industry for the support of which a scholarship might suitably be given. The first suggestions tentatively made were that the indigenous industries which might be helped by a scholarship were:—(1) ghee and butter making, (2) sugar refining, (3) brass work. As regards the first of these, it was reported that although there might be a good deal of scope for a man who devoted his life to the chemical investigation of fatty matters to improve the ghee industry, it was unlikely either that the necessary training could be obtained out of India, or that ghee factories on a large scale would be established. Butter making was considered an unsuitable industry in which to train an expert, because of the monopoly of this trade by the Military Department. Sugar refining was also reported to be an industry in which it was unlikely that large factories would be started with the aid of local capital. Inquiries with the brass-work trade did not reveal sufficient positive grounds for expecting that the institution of a scholarship in it would be a success. The proposal to institute technical scholarships in the United Provinces was therefore postponed. In the year 1906 two natives of Benares asked for scholarships to enable them to continue technical training which they had already begun, one in the subject of silk weaving, and the other in that of glass making. An exception was made to the rules which require that the subject in which the scholarship is to be given is to be selected by the local Governments, and that applications for candidates are to be invited with the widest publicity, and scholarships were promised to these two men.

In the Punjab many suggestions were made by those whom the Government consulted. Some of these pointed to existing industries carried on by natives and capable of improvement by an application of more scientific methods, while others pointed to trades which might be called into existence if the necessary capital and knowledge were forthcoming. Prominence was given to the fact that many hides are exported from the Punjab, and re-imported when tanned and dyed; and it was stated that of the natives who are engaged in the trade in hides some are possessed of large capital. Pottery was also recommended as an industry to be encouraged by a scholarship. Mr. Percy Brown, the Principal of the Mayo School of Art, Lahore, calling attention to the passage in the report of Colonel Clibborn's Committee on Industrial Schools, in which they recommended the establishment of an institute for pottery at Delhi, and remarked upon the bad quality of Indian pottery owing to the ignorance of the most suitable clays, and the imperfect kilns in use, and the prevailing ignorance of the use of glazes, wrote:—"The above indicates mainly that an experimental institute is required; but it also points out the important fact that an industry employing a large number of workpeople is waiting to be improved by the introduction of an expert. Delhi is shown as being the centre of the craft, but Mooltan has been omitted, and here some of the finest glazing of the country is made. The preparation of tiles, plain and glazed, for walls and floor, is also an industry of the future, and, in fact, there is no limit to the list of useful and artistic articles which may be made of terra-cotta. I think it may be accepted that pottery chinaware will well repay development in the Punjab. As an ancient art, it must have employed many thousands of hands; the remains of the mosaic tile work and terra-cotta decoration on old buildings all over the province testify to this, and with encouragement there is every possibility of it becoming an important craft of the future."

Metal in various forms was also mentioned as an industry likely to be improved by the increase of expert knowledge. Under this heading were mentioned the trade in despatch boxes at Sialkot and Mooltan, surgical instruments at Sialkot, cutlery and steel work generally; the manufacture of

brass and bell-metal utensils, and iron foundries. It was stated that inferior metal was in use, and that the bazaar methods of casting and moulding were very crude and the instruments very primitive; and there was room for more or less improvement in every branch of this important craft.

Other subjects mentioned were glassware, manufacture of articles from the bones of animals (*e.g.* buttons), boiler-making, calico printing, dyeing and bleaching, sugar industry, cotton and flour mills.

The Local Government, decided that of all the industries mentioned, those which might be developed with advantage by the help of scholarships were tanning, metal work, and pottery.

Two scholarships were allotted to the Punjab, and the Local Government decided to invite applications for scholarships in tanning and metal work. The best of the candidates for the tanning scholarship had received no instruction in science, his school career having extended only as far as the middle school examination. Inquiries were made in England whether it would be useful for such a candidate to proceed there for the purpose of technical training, but the reply was unfavourable. Consequently no scholarship for tanning was awarded in the Punjab. A suitable candidate was found for the study of metal work, and a scholarship was awarded to him.

Burma saw no opening for the technical scholars and no means of obtaining a suitable candidate. The Local Government considered whether a scholarship might be offered for training an analytic chemist for the purposes of the petroleum industry, but came to the conclusion that a native of the province so trained would be unlikely to obtain remunerative employment in Burma.

In the Central Provinces, where the prospectors for minerals have been active and successful, the promised growth of the coal, iron and manganese industries were sufficient to justify a demand for a technical scholarship. The other industries examined were the culture and manufacture of tussah silk, dyeing, tanning, hand weaving, oil pressing, mining. Tussah silk and dyeing were set on one side because the Local Government considered that they were in a primitive condition, which called, not for the moderate amount of expert knowledge which a technical scholar might be expected to apply, but for an original investigator of high scientific training and faculty. Tanning, hand weaving and oil pressing, on the other hand, were not pursued in any one place upon a large enough scale to give prospect of the profitable employment of a scholar.

Assam saw no opening for the award of a technical scholarship.

APPENDIX III.

STATEMENT showing the various Subjects for the study of which Government Technical Scholarships have been awarded, together with the Universities or other Institutions at which the training has been, or is now being, carried out.

Place of Training.	SUBJECT OF STUDY.										Totals.
	Textile Industries, &c.	Electrical and Mechanical Engineering.	Mining and Mining Engineering.	Metallurgy.	Manufacture of Alkalis.	Leather Industry.	Soap-making and Chemistry of Oils, Fats, &c.	Sugar Industry.	Pottery.	Engineering and Sanitary Science.	
Manchester University -	-	-	2	-	-	-	-	-	-	-	2
Manchester School of Technology -	24*	2	-	-	-	-	-	1	-	-	27
Birmingham University -	-	1	16	2	-	-	-	-	-	-	19
Leeds University -	-	-	-	-	-	2	-	-	-	-	2
Liverpool University -	-	-	-	-	1	-	-	-	-	1†	2
Berlin University -	-	-	-	1	-	-	-	-	-	-	1
City and Guilds (Engineering) College	-	1	-	-	-	-	-	-	-	-	1
London School of Mines -	-	-	1	-	-	-	-	-	-	-	1
Leathersellers Company's College -	-	-	-	-	-	3	-	-	-	-	3
Faraday House -	-	3	-	-	-	-	-	-	-	-	3
Battersea Polytechnic -	-	-	-	-	-	1	-	-	-	-	1
Dr. Lewkowitsch's Laboratory -	-	-	-	-	-	1	-	-	-	-	1
West Indies -	-	-	-	-	-	-	1	-	-	-	1
Pilkinton's Tile and Pottery Company	-	-	-	-	-	-	-	-	1	-	1
Totals -	24	7	19	3	1	5	2	2	1	1	65‡

* One of these students was transferred to l'École Supérieure de Lyons at the expiration of the first year of his scholarship.

† This student afterwards spent one year at London University studying Sanitary Science.

‡ Mr. Daru, who was sent to Canada for the study of Mineral Prospecting, is not included in this total.

APPENDIX IV.

84

INDIAN GOVERNMENT TECHNICAL SCHOLARS.

Expenditure on	Year ending 31st March.							
	1905.	1906.	1907.	1908	1909.	1910	1911.	1912.
	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>
Stipends - - - -	292 14 1	1,134 15 2	1,631 19 6	2,732 1 9	3,471 5 2	4,289 13 1	4,397 17 4	4,165 5 4
Travelling expenses - - -	18 9 8	38 13 6	101 17 3	96 9 10	138 9 6	517 7 0	426 16 1	403 16 6
Passages to India - - -	—	—	—	140 16 0	99 11 0	209 0 0	367 9 4	322 6 0
University and college fees, &c. -	8 0 0	169 15 0	320 19 6	680 11 2	882 9 7	1,131 11 3†	942 7 10§	758 15 7
Fees for practical work - - -	—	10 10 0	28 17 0	40 5 0	20 5 0	71 9 0	85 5 1	401 13 0
Other expenditure - - -	—	—	—	40 0 0*	20 0 0†	1 5 0	1 5 0	68 7 0||
Total expenditure - - -	319 3 9	1,353 13 8	2,083 13 3	3,730 3 9	4,632 0 3	6,220 5 4	6,221 0 8	6,120 3 5
Number of scholars - - -	4	10	14	25	30	35	41	39
Average expenditure per scholar £	79 15 11	135 7 4	148 16 8	149 4 2	154 8 0	177 14 5	151 14 8	156 18 6

APPENDIX IV.

N.B.—It will be noted that, although the stipend payable to each student is 150*l.* per annum, the average cost per student (including expenses of journeys, fees for practical training, &c), seldom rises above that figure. This is because in certain cases (when the scholarship is about to expire soon after the beginning of a financial year, or has only just been granted towards the end of it) the payments shown in this statement include only one or two, instead of the full four, quarterly instalments of the stipend.

* { Grant to Mr. I. K. Kaul for drawing instruments = 5*l.*

{ Grant to Mr. Abdul Hafiz for purchase of microscope = 35*l.*

§ Includes 9*l.* 17*s* 6*d* paid to Dr Lewkowitsch on account of Mr Menon.

|| Includes a special grant of 50*l.* to Mr. Obaidullah to enable him to remain at Birmingham till the end of the Session in order to take his M Sc. degree.

† Grant to Mr. Abdul Hafiz towards cost of publishing thesis for D.Sc degree = 20*l.*

‡ Includes 137*l.* 16*s* 3*d.* paid to Dr Lewkowitsch on account of Mr. Menon.

APPENDIX V.

**Statement relating to Government of India
Technical Scholars (1904—1912).**

APPENDIX

Statement relating to Government of

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
<p>1.</p> <p>Mehta, P N. 27 years. Bombay. 1904.</p>	<p>Parsi Native of Navsari in Gaekwar's territory Bombay Presidency. Father was a Weaving Master in the New Great Eastern Spinning and Weaving Mills, Byculla.</p> <p>Applied in response to a Government notification. Selected by the Director of Public Instruction.</p>	<p>Educated at Bombay Victoria Jubilee Technical Institute; L.T.M. (Licentiate of Textile Manufacture) of Bombay and Lord Reay Gold Medallist.</p> <p>Held 1st Class City and Guilds Certificate in Cotton Weaving and Spinning.</p> <p>Had been engaged in Indian weaving mills for several years, and was employed in the Colaba Land and Mills Company as Weaving Master on Rs. 250 at time of nomination.</p>	<p>Textile industry Two years. Manchester School of Technology.</p>
<p>2.</p> <p>Pathak, V. T. 28 years. Bombay. 1904.</p>	<p>Caste—Brahman Native of Sanganner, District Ahmednagar.</p> <p>Applied in response to a Government notification Selected by the Director of Public Instruction.</p>	<p>L.T.M. and Gold Medallist of Bombay Institute.</p> <p>Had been engaged in textile industry in India for some years, and was employed as Weaving Master on Rs. 125 in the Pulgaon Mills at time of nomination.</p>	<p>Textile study with special reference to chemistry in its application to textile requirements.</p> <p>Two years; extended to three.</p> <p>Manchester School of Technology.</p>
<p>3.</p> <p>Hoogewerf, E. 29 years. Bombay. 1904.</p>	<p>Domiciled European. A native of Belgau. Father—E. H. Hoogewerf, Headmaster, Sirdar's High School, Belgau.</p> <p>Applied in response to a Government notification. Selected by the Director of Public Instruction.</p>	<p>L.T.M. and L.M.E. of Bombay Technical Institute, and held 2nd Class Certificate under the Boilers Act. Considerable experience in Indian mills, and was Assistant and Mercantile Traveller on Rs. 250 and travelling expenses to Messrs. Greaves, Cotton, & Co, textile machinery agents, at time of nomination.</p>	<p>Textile industry Two years. Manchester School of Technology.</p>

V.

India Technical Scholars (1904-1912).

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India	Expenditure incurred up to 31st March 1912.				Total.
		Stipenda.	Theoretical Training.	Practical Training.		
				Travelling Expenses (including Journeys to and from Universities, &c.).	Premium, &c.	
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.		
Visited works of Meister Lucius and Bruning at Höchst on Main and other Continental works during two vacations.	Obtained the Certificate of the University of Manchester and the Diploma of the School of Technology. Since return to India has conducted an inquiry and issued a report for Government on certain aspects of the handloom industry; is now an agent for bleaching machinery materials, yarns, and sizing materials, at Bombay.	358 19 3	45 2 0	76 19 5	Nil.	481 0 8
	Did not take the Diploma course. Is now Manager of Serampore Mills.	450 0 0	64 11 0	38 12 4	Nil.	543 3 4
Spent two months in the works of Messrs. Hattersley and Sons, Loom Machinists, &c., Keighley.	Obtained the Certificate of the University of Manchester and the Diploma of the School of Technology. Is now Principal of Serampore Weaving Institute.	360 10 3	44 11 0	6 2 6	Nil	411 3 9

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known) How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
4. Read, H. C. 24 years. Bengal. 1904.	A statutory native of India Applied in response to a Government notification published in the Calcutta Gazette, and circulated to the Chambers of Com- merce, the Managers of important mines, and others connected with the industry	Was educated at St. Paul's School, Darjeeling, and passed F.A. examination of Calcutta University. Had been employed since 1899 in Messrs. Bird & Co.'s col- lieries, and held the post of Assistant-in-Charge of the Kantapahari Colliery at time of nomination.	Mining Two years; extended to three. Birmingham University.
5. De, S. C. 23 years Bengal. 1904.	Applied in response to a Government notification published in the Calcutta Gazette, and circulated to the Chambers of Com- merce, the Managers of important mines, and others connected with the industry.	Passed Entrance examination of Calcutta University, and was trained at the Bihar School of Engineering, where he obtained a Survey Standard Certificate. Entered the ser- vice of the Birbhum Coal Company as Mining Surveyor in 1901; and was employed in similar capacity by the Nandi Coal Company at time of nomination.	Mining Two years; extended to three. Birmingham University.
6. Bose, Asok 20 years. Bengal. 1904.	Father—P. N. Bose, late of the Geological Survey of India, and owner of the West Baraboni Coal Company's Mine. Applied in response to a Government notification published in the Calcutta Gazette, and circulated to the Chambers of Com- merce, the Managers of important mines, and others connected with the industry.	Passed F.A. examination of Cal- cutta University, and was studying for B Sc. degree at the Presidency College at time of nomination. Had received some practical and theoretical training in mining at his father's mine.	Mining Two years; extended to three. Birmingham University.
7. Mazumdar, P.H. 25 years. Bengal. 1904.	Applied in response to a Government notification published in the Calcutta Gazette, and circulated to the Chambers of Com- merce, the Managers of important mines, and others connected with the industry.	Passed Entrance examination of Calcutta University. Was reported to have gained some knowledge of mining by superintending the working of several mica mines for five years	Mining Two years. Birmingham University.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.					Total.
		Stipends	Theoretical Training.	Practical Training.		Premium, &c.	
				Travelling Expenses (including Journeys to and from Universities, &c.)			
Spent three months in various mines, during Degree course.	B.Sc. (Mining) 1907 Manager, Bhuskojori Colliery, Asansole.	£ 447 s. 0 d. 5	£ 56 s. 14 d. 6	£ 5 s. 17 d. 2	£ Nil	£ 509 s. 12 d. 1	
Spent three months in various mines, during Degree course.	B.Sc. (Mining) 1907 Is now a Consulting Mining Engineer	450 0 0	57 4 6	15 5 6	3 3 0	525 13 0	
Spent three months in various mines, during Degree course	B.Sc (Mining) 1908 Investigated the mineral resources and made a geological survey of the Tippera State under the supervision of his father. Now deceased.	450 0 0	56 14 6	19 16 4	15 2 0	541 12 10	
- - -	Joined the Bar	298 13 3	23 9 6	7 11 8	2 2 0	331 16 5	

APPENDIX 'V'.

Name, Age, Province, and Year of Nomination	Status or Caste, Father's Name and Profession (if known) How selected	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
8. Daru, N. D. Bombay 1905	Applied through the Secretary of State		Prospecting for minerals in Canada, under Geological Survey of Canada.
9 Fox, C. 19 years. Bengal. 1905	Father—Superintendent of Jails, Jaipur Recommended by the Principal of Sibpur College.	Sibpur College, 1901-05 Stood first for four successive years in the annual examination of the Apprentice Department of the Civil Engineering College, Sibpur.	Mining Two years; extended nine months. Birmingham University.
10. Sen, A. M. - 25 years. Bengal. 1905.	Father—B. M. Sen, retired Headmaster of Dacca Collegiate School, Government Pensioner. Recommended by the Principal of Sibpur College	Sibpur College, 1897-1902. Passed F.A. examination of Calcutta University and first examination in Engineering of Sibpur College. Had gone through a complete course of Analysis of Coal under Professor Tate; also trained in Practical Mineralogy and Field Geology under Professor Brühl.	Mining Two years; extended nine months. Birmingham University.
11. Mokadam, B. P. 25 years. Central Provinces. 1905.	Selected on the recommendation of the Manager of the Warora Government Colliery.	Matriculated Calcutta University, 1900. Passed examination under Bombay Steam Boilers Act, 1904. Served as Engineering apprentice in Warora Government Colliery; also as Engineer in cotton ginning factory in Berar.	Mining Two years; extended to three. Birmingham University.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India	Expenditure incurred up to 31st March 1912.				Total.
		Stipends.	Theoretical Training	Practical Training.		
				Travelling Expenses (including Journeys to and from Universities, &c.).	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
	Assistant Superintendent, Geological Survey of India.			No particulars available.		
Spent one year in a coal mine as Assistant Manager, Overman, and Surveyor.	Diploma of Mining, 1907. B.Sc. (Mining), 1908. Held appointment as Mining Lecturer at Birmingham University. Is now an Assistant Superintendent, Geological Survey of India.	412 10 0	101 5 0	8 11 10	11 5 0	533 11 10
Had three months' practical training in various mines during vacations.	B.Sc. and M.Sc. (Mining); A.M.I.M.E. Now employed in the Mysore Geological Survey	412 10 0	84 9 6	11 14 5	16 3 0	525 6 11
Spent two months in various mines whilst reading for Diploma.	Mining Diploma, 1910. Is now an Assistant in the Ballarpur Colliery, Central Provinces	450 0 0	89 6 6	2 16 8	6 13 0	548 16 2

Name, Age Province, and Year of Nomination	Status or Caste, Father's Name and Profession (if known) How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship College or University selected.
12 Dewal, G. N. 39 years. Madras 1906.	Born a Brahmin, now a Brahmo. Applied through the Government of Madras Recommended by the Superintendent of Coimbatore Jail.	Studied for the Matriculation Examination of Bombay University, but abandoned his studies in order to enter upon his profession. Served as Weaving Master at Coimbatore Jail for eight years. Previously worked for eight years in Bombay mills as a jobber, sizer, and finisher.	Textile industry - - Two years; extended to three. Manchester School of Technology.
13. Saklatvala, B D 25 years. Bombay. 1906	Caste—PARSI - Applied through the Government of Bombay Recommended by the Principal of St Xavier's College, Bombay.	Educated at St Xavier's College, Bombay, where he obtained the degree of B Sc. Was studying Metallurgy at the Royal Polytechnic at Charlottenburg in Berlin at the time of nomination	Metallurgy - - Two years Berlin University
14. Ray, M. K. 23 years Bengal. 1906.	- - - - - Applied in response to a Government notification published in the Calcutta Gazette and other papers.	B Sc. (Calcutta) - - - Had acted as Assistant in the Laboratory of the Presidency College, and was employed as Assistant to the Superintendent of the Apprentice Department of the Civil Engineering College, Sibpur, at the time of nomination.	Mining - - - Two years; extended to three and a half. Birmingham University.
15. Ashcroft, C. E. 25 years Bengal. 1906.	- - - - - Applied in response to a Government notification published in the Calcutta Gazette and other papers.	Educated at La Martinière College. Had been engaged at various collieries.	Mining - - - Two years; extended for six months. Birmingham University
16. Chand, L - - - 23 years Benares, United Provinces. 1906.	Member of Agarwala family; connected with leading silk merchants and bankers. Applied in response to an advertisement in the United Provinces Gazette. Recommended by the Collector of Benares.	Educated at Queen's College, Benares, and Government College, Benares. B.A. (Allahabad), 1902 M.A. (Allahabad), 1904 Had worked for some months with a Weaver	Silk Weaving - - Two years, extended to three. Manchester School of Technology.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912				
		Stipends.	Theoretical Training	Practical Training		Total.
				Travelling Expenses (including Journeys to and from Universities, & c.)	Premium, & c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Visited various works in England, Scotland, and Ireland, and spent one vacation in the works of Meister Lucius and Bruning at Höchst - on - Main.	Did not take Diploma course. No information available as to present employment.	475 0 0	66 13 6	58 17 1	Nil.	600 10 7
- - -	Andrew Carnegie Research Scholar, 1907. D Sc. (Berlin) Not yet returned to India. Employed by the Vanadium Metal Co., Ltd., of U.S A.	300 0 0	37 16 0	15 13 0	Nil.	353 9 0
Three months' practical training in various mines in England and Sweden during vacations.	B.Sc. (Mining), Birmingham, First Division. Is now Geologist on the staff of the Assam Oil Company, Limited.	525 12 3	159 12 6	26 16 6	18 13 0	730 14 3
Spent two months in various mines during vacations.	Mining diploma. Was employed on return at the Murilidi Colliery, Mahoda, <i>via</i> Katras. Has since become a mine manager.	375 12 4	81 6 9	16 7 8	5 5 0	478 11 9
Vacation work in England, Germany, and France Visited the works of the Bayer Company at Elberfeld; Meister Lucius and Bruning at Höchst - on - Main; and the Berlin Aniline Co. at Berlin,	B Sc. (Tech), 1909. M Sc (Tech.), for research work. Invented electro-gilding machine. Appointed Principal, Technical Institute, Brindaban, United Provinces.	450 0 0	80 3 0	155 0 10	13 13 0	698 16 10

Name, Age, Province, and Year of Nomination	Status or Caste, Father's Name and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
<p>17.</p> <p>Kaul, I. K. - 26 years. Punjab. 1906.</p>	<p>Applied in answer to an advertisement in the Punjab Government Gazette.</p>	<p>Educated at Bombay Victoria Technical Institute. L.E.E and L.M.E. (Bombay). Studied up to B.A. standard (Science side). Was Headmaster of Victoria Diamond Jubilee Technical Institute, Lahore, at time of nomination.</p>	<p>Engineering and Sanitary Science (originally metal work). Two years, extended to three. Liverpool, two years. London, one year.</p>
<p>18.</p> <p>Hafiz, A - Punjab. 1906.</p>	<p>Member of a respectable family owning land in the Hoshiarpur District Applied through the Secretary of State Recommended by the Vice-Principal of Birmingham University.</p>	<p>Educated at the M A.O. College, Aligarh Had taken a two years' course at Birmingham University before scholarship was granted.</p>	<p>Mining. Two years, extended to three. Birmingham University.</p>
<p>19.</p> <p>Joshi, G L. 21 years. Central Provinces. 1906.</p>	<p>A native of Khapa, Central Provinces Selected on the recommendation of the Director of Public Instruction.</p>	<p>Educated at Bombay School of Art and Victoria Technical Institute. L.T.M. (Bombay), 1905 Obtained first class certificate in cotton spinning, City and Guilds Institute, 1905. Had served as Weaving and Dyeing Master in the Swadeshi Mills, Nagpur.</p>	<p>Practical Chemistry in connection with textile fabrics and weaving and dyeing. Two years, extended to three. Manchester School of Technology.</p>

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends	Theoretical Training	Practical Training.		Total.
				Travelling Expenses (including Journeys to and from Universities, &c)	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
	B.Eng., 1909 Passed Certificate Examination in Sanitary Science of Royal Sanitary Institute Assistant to the Sanitary Engineer under Punjab Government	470 19 2	244 6 6	17 5 11	Nil.	732 11 7
Had three months' experience in mines during vacations.	B.Sc. (Mining), 1907 M.Sc. (Mining), 1908. Thesis for D.Sc not accepted. Now studying for the Ph.D. degree in Science (Mining) at the University of Leipzig.	450 0 0	157 16 0*	10 4 1	11 11 0	625 11 1
Visited works in Ireland and on the Continent; also had some practical training with Messrs. Butterworth and Dickinson, of Burnley. Returned to India <i>via</i> Japan, in order to study stencil printing.	Did not take Diploma course. First class certificates of City and Guilds Institute in cotton dyeing, and in cotton and linen bleaching and finishing. Is now employed as Superintendent of the Weaving, Dyeing, and Bleaching Departments at the Pulgaon Cotton Mills.	450 0 0	68 6 6	75 15 10	Nil.	594 2 4

* Includes 35*l.* for microscope and 20*l.* towards cost of thesis for D.Sc. degree.

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any)	Subject and Period of Scholarship, College or University selected.
20. Paniker, M. A. R. - 21 years. Madras. 1907.	Native of Malabar, and a Nayar by caste. Member of a well-to-do family of good social position. Father—V. D. Paniker, retired Sub-Registrar, and a Bench Magistrate at Palghat. Brother is Adikari, or headman of a village in one of the taluks of South Malabar. Recommended by the Government of Madras.	M A. (Madras), Science side - Educated at Victoria College, Palghat, from 1900-02, and at Presidency College, Madras, from 1903-06. Worked for 12 months at a native tannery at Kodambakam, near Madras.	Leather industry. Two years; extended to three. Leeds University. Granted special extra scholarship of 75l. a year for three years, for the purpose of gaining practical experience.
21. Patwardhan, A. P. - 24 years. Bombay. 1907.	Resident of the Ratnagiri District, Bombay. Scholarship was advertised in the Government Gazette. Selection made by Director of Public Instruction.	L.T.M. of Bombay - - Assistant Weaving Master at Pulgaon Mills, Bombay.	Dyeing and bleaching. Two years; extended for two months. Manchester School of Technology
22 Bhatt, K. J. - 27 years. Bombay. 1907.	A native of Rander, Surat District. Applied through the Director of Public Instruction, Bombay.	L.T.M. of Bombay - - Had been employed as Spinning Master in Ramdyal Cotton Mills, Howrah.	Cotton weaving and designing, with textile colouring and calico printing. Two years, extended to three. Manchester School of Technology.
23. Brühl, P. T. - 17 years. Bengal. 1907.	Father—Professor Brühl, of Civil Engineering College, Sibpur. Applied through Secretary to the Government of India, Home Department.	Educated at St. Joseph's College, Darjeeling, and Sibpur Engineering College.	Engineering and Metallurgy. Two years, extended to three. Birmingham University.

Particulars of Practical Training	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912				Total.
		Stipends.	Theoretical Training	Practical Training		
				Travelling Expenses (including Journeys to and from Universities, &c)	Premium, &c.	
Was employed at a salary of 3 <i>l.</i> per week by the Nance Tannage, Ltd., Surrey Is now employed by Messrs Rohm & Haas, of Darmstadt.	M.Sc. degree of Leeds University in Leather Industry, 1910. Also diploma. Not yet returned to India, but states that he has succeeded in raising a capital of Rs 2,50,000 to start a leather factory in Madras when he returns.	£ s. d. 563 18 9	£ s. d. 113 2 0	£ s. d. 95 2 4	£ s. d. Nil.	£ s. d. 772 3 1
Visited textile and colour works in England and Germany. Spent 5 weeks in the works of Meister Lucius and Bruning, at Höchst-on-Main.	Did not take Diploma course Weaving Master, Rai Saheb Reckchand Mohta Spinning and Weaving Mill, Hinganghat.	325 0 0	44 2 0	56 16 6	Nil.	425 18 6
Practical work on the Continent during vacations. Gained admission as "Volunteer" to dye-works and lace works in Germany. Spent 5 weeks in the works of Meister Lucius and Bruning, at Höchst-on-Main.	Did not take Diploma course. Now employed in a mill at Broach	450 0 0	65 2 0	30 5 4	Nil.	545 7 4
Spent 1909 vacation at Elliott's Metal Co., Ltd, Selly Oak.	M.Sc. (Metallurgy, Birmingham) Not yet returned to India. Is at present in the employ of the Prestea Block A. Gold Mining Company of West Africa, at a salary of 37 <i>l.</i> per annum.	450 0 0	114 0 6	11 17 11	7 0 0	582 18 5

APPENDIX V.

Name, Age, Province and Year of Nomination.	Status or Caste, Father's name and Profession (if known) How Selected	Particulars of Indian Education (including practical Training, if any)	Subject and Period of Scholarship College or University selected.
<p>24. Obaidulla, M. 21 years. Bengal 1907.</p>	<p>Native of Noakhali - Applied through the Government of Bengal Recommended by Principal of Sibpur College</p>	<p>Educated at Barisal Zilla School and Sibpur Engineering College. Obtained Upper Subordinate Certificate in Civil Engineering, Mechanical Engineering, and Surveying. Also Mining Diploma. Spent two months in Sodepur Colliery, Jerriah, and was Assistant to the Professor of Mining at Sibpur for the six months previous to obtaining the Scholarship.</p>	<p>Mining - Two years, extended to three, and permitted to remain in England till July 1912 with special grant of 50<i>l.</i> Birmingham University.</p>
<p>25 Mitra, H. M. 23 years Eastern Bengal and Assam 1907</p>	<p>A native of Dacca. Father --Ram Mohan Mitra, Kayestha, Head Master of Comilla Government School at Rs 200 per mensem Applied in response to an advertisement. Selected by Director of Public Instruction</p>	<p>Educated at Muir College, Allahabad University B Sc. (Honours in Mathematics and Physics) and M A. of Calcutta University No practical training in India; was working for D Sc. degree at time of gaining scholarship.</p>	<p>Electrical Engineering - Two years; extended to three. Birmingham University.</p>
<p>26. Dandekar, P V Central Provinces. 1907</p>	<p>- - - Recommended by the Principal, Victoria Technical Institute, Bombay.</p>	<p>L.M.E. of Bombay - Holder of First Class Certificate under Bombay Boiler Inspection Act. Had done no mining work but had had a good deal of experience in the management of machinery during three years spent in various mills.</p>	<p>Mining - Two years, extended to three. Birmingham University.</p>
<p>27. Kurup, M. N. P 29 years. Central Provinces. 1907.</p>	<p>- - - Recommended by the Chief Commissioner, Central Provinces.</p>	<p>Educated at Bombay Victoria Technical Institute. L.M.E. of Bombay, 1902. Served over a year under Messrs. Tata and Sons in their mining prospecting works; also employed in copper works of Messrs. Burn & Co., at Sleemanabad.</p>	<p>Mining - Two years; extended to three. Birmingham University.</p>

Particulars of Practical Training	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912				
		Stipends	Theoretical Training	Practical Training		Total.
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Practical work with: Sandwell Park Colliery two months, Holywell Lead Mine one week, Laxey Lead Mine one week, Madeley Coal Mine three weeks.	B.Sc. (Birmingham), 1911. Entered for M Sc in Geology, but failed. Not yet returned to India.	500 0 0*	123 6 0	18 19 6	8 16 0	651 1 6
Worked in Sandycroft Foundry electrical shops.	B. Sc. (Engineering). 1909. Now Assistant in the Loom Factory of Messrs. Tata & Co., Central Provinces.	419 11 9	112 0 0	2 4 6	Nil	533 16 3
Allowed to remain in England for two years more to gain practical experience without forfeiting his right to return passage to India. Has spent last 18 months in Birmingham Electrical Supply Company's Works	Mining Diploma, 1910. Not yet returned to India.	450 0 0	106 10 6	17 14 10	18 10 0	592 15 4
Practical training in various mines for three months during vacancies.	Failed Mining Diploma, 1909. Now engaged as Prospecting Engineer at the Digboi Oil Fields.	450 0 0	125 10 6	9 7 4	15 10 0	600 7 10

* Includes special grant of 50l. (see column 4).

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
28 Nair, V. G. - 23 years. Madras 1908	Member of "Valliyil," family of Malabar Applied in response to a Government notification published in the Fort St. George Gazette. Recommended by the Fibre Expert to the Government of Eastern Bengal and Assam	B A (Madras) in advanced Chemistry. Worked during spare time in Laboratory of Fibre Expert to Government of Eastern Bengal and Assam; was clerk in the office of the Director, Agricultural Re- search Institute, Pusa, at time of nomination.	Textile chemistry as ap- plied to the dyeing, bleaching, finishing, and printing of textile fabrics. Two years; extended to three; fourth year re- fused. Manchester School of Technology.
29. Rele, G. R - 28 years. Bombay. 1908.	Applied in response to a Government notification. Selected by the Director of Public Instruction.	Educated at Victoria Technical Institute, Bombay. L T M. of Bombay. Seven years service in a dyeing and finishing works in India.	Bleaching, dyeing, and printing in mills Two years; extended to three. Manchester School of Technology.
30. Gupta, M N. Sen. - 21 years Bengal. 1908.	"A native of Faridpur" - Father a lawyer. Applied in response to an advertisement in the Calcutta Gazette. Recommended by Mr. Hay- den of the Geological Survey of India	M.A Calcutta (Geology, first on list). Was Assistant to Curator of the Geological Museum at Cal- cutta.	Mining - - Two years; extended to three. Birmingham University.
31. Rout, R T. - 28 years. Bengal 1908.	Unya Christian - - Father—J. S Rout, Sarish- tadar to Commissioner of Orissa Division. Applied in answer to noti- fication published in the Calcutta Gazette.	Had attended Madras School of Art and read up to F.A. standard of Calcutta Univer- sity Had been engaged in leather tanning industry in India.	Leather tanning - - Two years; extended for nine months. Leatherseller's Company's College

Particulars of Practical Training	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				Total.
		Stipends.	Theoretical Training.	Practical Training		
				Travelling Expenses (including Journeys to and from Universities, &c.).	Premium, &c.	
Spent 4 months in dyeing and finishing works of Messrs J. C. Taylor & Co, Pendleton; also visited the works of the Bayer Company at Elbenfeld; Meister Lucius and Bruning, at Höchst - on - Main; and the Berlin Aniline Company at Berlin	M.Sc. (Tech) - B.Sc. (Tech.) Hons. Is now employed in the Calico Mills, Ltd., Ahmedabad.	£ 450 s. 3 d. 8	£ 83 s. 18 d. 0	£ 66 s. 11 d. 11	£ Nil.	£ 600 s. 13 d. 7
Gained admission to bleaching and finishing works of Messrs. Heinrich Wolfssohn & Co, Grunsu, Berlin; also visited the works of the Badische Com-at Offenbach-on - Main, the Berlin Aniline Company, and Meister Lucius and Bruning.	Obtained Certificate of Manchester University, and Diploma of the School of Technology. Appointed Weaving Master, Morarjee Gokuldas' Spinning and Weaving Mills, Bombay.	390 0 0	59 0 6	107 12 4	28 9 1	585 1 11
Practical training at.— Sandwell Park, 6 weeks Laxey Lead Mine, 2 weeks. Bagholt Coal Mine, 7 weeks. Glasdir Copper Mine, 3 weeks. Madelay Coal Mine, 3 weeks. Visited leather works in United Kingdom during vacations	Failed B.Sc. (Mining), 1911. Failed B.Sc. (Mining), 1912. Not yet returned to India. Obtained City and Guilds Second Honours Certificate in leather dyeing; First Ordinary Certificate in leather tanning, and Second Ordinary Certificate in dressing skins Also First Class pass in Leatherseller's College examination in tanning of heavy leathers. No information available as to present employment,	450 0 0	131 15 0	7 18 5	25 10 0	615 3 5
		423 13 11	124 2 0	29 5 0	Nil.	577 0 11

Name, Age, Province, and Year of Nomination	Status or Caste, Father's Name and Profession (if known) How selected.	Particulars of Indian Education (including Practical Training, if any)	Subject and Period of Scholarship. College or University selected.
<p>32.</p> <p>Srivastava, J. P. 19 years. United Provinces. 1908</p>	<p>Kayasth - - - - - Father—Munshi Janki Prasad (now deceased), Tahsildar. Applied in response to a Government notification. Recommended by the authorities of the Mur Central College.</p>	<p>Educated at Allahabad University; a third year student in B.Sc. class of Mur College at time of nomination.</p>	<p>Cloth dyeing and printing Two years; extended to three. Fourth year refused. Manchester School of Technology.</p>
<p>33.</p> <p>Yusuf, S. M. - 21 years. United Provinces 1908</p>	<p>Mussulman - - - - - Father—S. Y. Hasan, Resident of Muhalla Shah Wilayat, Saharanpur Father owns a flour mill, and had owned a cotton factory which had to be closed down owing to want of an expert Has promised to revive the industry when Yusuf returns Applied in response to a Government notification.</p>	<p>Educated at Anglo-Oriental College, Aligarh, and Thomason Civil Engineering College, Roorkee Passed F.A. examination of Allahabad University.</p>	<p>Cloth dyeing and printing. Two years; extended to three. Manchester School of Technology.</p>
<p>34.</p> <p>Amin, M. - 23 years. Punjab. 1908.</p>	<p>Member of Gora family of Kasur Khojas for many generations engaged in textile industry. Scholarship was advertised in the Punjab Government Gazette. Applied through the Commissioner, Lahore Division.</p>	<p>Educated at Forman Christian College, Lahore Matriculated in 1902, and passed Inter. Arts, Punjab University, in 1904 Manager of a cotton factory for three years.</p>	<p>Textile industry. Two years Extension refused owing to ill-health. Manchester School of Technology.</p>
<p>35.</p> <p>Parshad, Sheo 27 years. Punjab. 1908.</p>	<p>- - - - - Applied in response to Government notification in the Punjab Gazette. Recommended by the Punjab Chamber of Commerce.</p>	<p>Educated at St. Stephen's College, Delhi. Inter. Arts 1899. Failed B.A. 1901. Had been engaged in Indian textile industry for 4½ years.</p>	<p>Textile industry. Two years; extended to three. Manchester School of Technology.</p>

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends	Theoretical Training	Practical Training.		Total.
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Spent six months in the Bleaching and Finishing Departments of Messrs. J. C. Taylor & Co., Pendleton; also one month with Meister Lucius and Bruning, and one month with the Berlin Aniline Company.	M Sc. (Tech.) - B.Sc. (Tech.), Honours. Appointed Assistant Chemist, Technological Institute, Cawnpore, on Rs. 300 per mensem, from 1st April 1912, for five years.	487 10 0	92 18 0	124 16 3	50 0 0	755 4 3
Practical work on the Continent during vacations Spent 2 months in the works of Messrs. Cassella & Co., at Frankfort.	B.Sc. (Tech.), 1910 M Sc (Tech), for research work, 1911. No information available as to present employment.	450 0 0	85 1 6	27 18 9	Nil.	563 0 3
Worked for four weeks in a cotton mill, and two weeks in works of Platt Bros., Ltd., Oldham.	Did not take diploma course. Proprietor and manager of a cotton factory at Kasur (Punjab).	300 0 0	44 2 0	1 8 4	5 0 0	350 10 4
Practical work on the Continent. Gained admission to textile mills of Messrs. Butterworth and Dickinson, of Burnley.	Obtained diploma of the School of Technology Now Textile Assistant to the Director of Industries, Punjab.	450 0 0	58 17 0	67 15 2	6 10 0	583 2 2

Name, Age, Province, and Year of Nomination	Status or Caste, Father's name and Profession (if known) How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
36 Nag, D. C. Eastern Bengal and Assam 1908.	Native of Baradi - Brother—N. C. Nag, Professor, Agra College, and Fellow of Allahabad University. Several relatives in Government Service. Applied in response to a Government notification.	Attended Poona College of Science. L.C.E. of Bombay University. Seven months experience as a draftsman in the Public Works Department.	Mining Engineering - Two years; extended to three. Birmingham University.
37. Naidu, C. S. B 28 years. Central Provinces. 1908.	Hindu Father—C. S. Naidu, retired Inspector of Police, Raipur, Central Provinces Applied in response to a notification published in the Central Provinces Gazette.	Attended Bombay Victoria Technical Institute L.T.M. of Bombay. For several years engaged in Indian mills as Spinning Master. Was Assistant Weaving Master at the Pulgaon Mills at the time of nomination.	Textile industry Two years; extended for three months. Manchester School of Technology.
38. Menon, A. K. 22 years. Madras. 1909	Native of Cochin Scholarship was advertised in the Fort St. George Gazette. Selected candidate withdrew his application; Mr. Menon recommended as "next most suitable."	B.A. (Madras), fourth place in second class of advanced Chemistry (December 1909).	Chemistry of soap-making and use of native oils. Two years; extended for nine months. One year and six months in private laboratory of Dr. Lewkowitsch, Priory Road, Kilburn.
39. Gurjar, R. V. 29 years. Bombay 1909.	Applied in response to a Government notification. Selected by the Director of Public Instruction.	Educated at Bombay Victoria Technical Institute and in Poona Science College Workshops. L.T.M. of Bombay Institute. Five years experience of Indian textile mill work.	Bleaching, dyeing, and printing in mills. Two years; extended to three. Manchester School of Technology.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends.	Theoretical Training.	Practical Training.		Total.
				Travelling Expenses (including Journeys to and from Universities, &c.).	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Had 3 months training in various mines during vacations, also visited mines near Dresden on way back to India.	B.Sc. (Mining), 1911. Now engaged at the Assam Oilfields as Assistant Engineer.	450 0 0	130 9 6	46 13 9	17 17 0	645 0 3
Visited works in Switzerland, and spent eight weeks in lace-works of Mr. A. Sourci, Arbon, Switzerland.	Not yet returned to India.	337 10 0	44 2 0	38 17 0	Nil.	420 9 0
One year in works of Messrs. D. and W. Gibbs at Wapping. Three months visiting other works in United Kingdom.	Not yet returned to India.	382 7 11	232 3 9	7 8 9	105 0 0	727 0 5
Spent 1 month in works of Meister Lucius and Bruning.	Obtained the certificate of Manchester University and the Diploma of School of Technology. Not yet returned to India	388 1 0	71 11 0	31 2 3	Nil.	490 14 3

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's name and Profession (if known). How selected	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
40. Pradhan, B. B. 21 years. Bombay. 1909.	Somawaushi-Kshatriya - Member of an agricultural Hindu community ("middle class and backward") Applied in response to a Government notification Selected by the Director of Public Instruction.	Educated at Bombay Victoria Technical Institute L.E.E. of Bombay; also Fellow and Gold Medallist.	Electrical and Mechanical Engineering. Two years; extended to three. Manchester School of Technology.
41 Bysack, M. N. 28 years. Bengal. 1909.	"Member of respectable family of Calcutta." Applied in response to a Government notification.	Attended Bombay Victoria Technical Institute. L.T.M. of Bombay. Educated up to F.A. standard of Calcutta University. Some experience of Indian weaving industry.	Textile chemistry, with special reference to the dyeing, printing, and bleaching of textile fabrics. Two years; extended to three. Manchester School of Technology.
42 Nawab(-nd-din), M. 32 years. Punjab. 1909.	Khatik - Belongs to a well-to-do family of hereditary tanners and dyers Applied in answer to an advertisement in the Punjab Government Gazette.	Educated at Government High School, Amritsar. Had had four years' practical experience of the leather industry.	Tanning Two years; extended to three. Leathersellers' Company's College.
43. Thukral, L. K. F. 23 years. Punjab. 1909.	Brother—L. M. Chand, Public Prosecutor of Sialkot. Applied in response to a notification in the Punjab Gazette. Recommended by the Deputy Commissioner, Sialkot.	Passed Inter. Sc. examination of Punjab University and graduated as B.A. of Allahabad. Had been working with hand-looms under the style of K. T. Thukral & Co., Sialkot City, Punjab.	Textile industry Two years. Manchester School of Technology.

Particulars of Practical Training,	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends.	Theoretical Training.	Practical Training.		Total.
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Practical work on Continent during vacations; visited electrical works in Germany and Switzerland. Is at present receiving practical training in the works of Callenders Cable and Construction Co., Ltd., at Birmingham.	B Sc. (Tech.) in Electrical Engineering, 1911. M.Sc. (Tech.), 1912 Not yet returned to India.	388 1 0	78 4 6	63 7 2	Nil.	529 12 3
Practical work on Continent during vacations. Spent one month in works of Meister Lucius and Bruning; and one month with the firm of Christian Kirchoff, at Ashe, in Bohemia.	Obtained certificate of Manchester University and diploma of School of Technology Not yet returned to India.	381 17 8	82 1 0	49 13 10	Nil.	513 12 6
Practical work with Messrs. Popp and Becker, at Frankfurt (2 weeks); Messrs. Doerr Rheinhardt, of Worms (one week); the Turner Machine Co., of Offenbach (one week); and the Moenus Tanners Machine Co., Offenbach (one week); also spent two months in America, where he visited over a dozen factories.	First Class Ordinary Certificate of City and Guilds' Institute in Leather Tanning and Leather Dyeing. First Class pass in Heavy Leather Tanning and third Class pass in Applied Chemistry at Leathersellers' College examinations. Is now a member of the firm of Shamsud Din Nawabud-din, Leather Manufacturers and Dealers in hides, skins, &c, of Amritsar.	342 6 6	97 6 8	76 13 11	Nil.	516 7 1
Visited filatures in Italy.	Managing own business in Lahore (Textile Engineers' Agents, and Merchants)	300 0 0	45 15 6	22 12 7	Nil	368 9 1

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship College or University selected.
44 Thein, Maung Po - 23 years. Burma. 1909.	Christian - Applied in response to a Government notification.	Educated at St. Paul's High School, Rangoon; St. Xavier's College, Calcutta; and Government College, Rangoon. B.A., Calcutta (Chemistry and Physics).	Mining engineering - Two years; extended to three. London School of Mines.
45. Bardaloye, S. G. C. - 23 years. Eastern Bengal and Assam. 1909	"Member of a family of some wealth and consideration." Applied in response to a Government notification.	B.A. of Calcutta. Had undergone a three months' course of practical training under a Colliery Superintendent on the Margherita Coal-fields.	Mining engineering - Two years; extended to three. Birmingham University.
46. Faiz-ud-din, S. - 22 years. Central Provinces. 1909.	Mussalman. Son of a farmer of Ellichpur; nephew of Assistant Agricultural Chemist in Agricultural College, Nagpur. Uncle intends, with help of grandfather-in-law, to incorporate a sufficiently large company in any suitable district of the Central Provinces or Berar to tan the local hides and to manufacture them into finished marketable articles. Was nominated by a Selection Committee.	Educated at Amraoti High School. Served as apprentice of mechanical engineering in ginning factories in Berar and mills in Nagpur; also worked for two months in Government Chrome Tannery, Madras.	Leather industry - Two years; extended to three. Leeds University.
47. Narke, G. G. - 25 years. Central Provinces, 1909.	Brahmin (Maharatta). Son of G. R. Narke (deceased), clerk in a native bank at Umrer. Applied through the Director of Public Instruction, Central Provinces. Selected on the recommendation of the Director of the Geological Survey of India (Sir T. Holland).	M.A. (Calcutta), Science side. Educated at Free Church Institute, Nagpur, Hislop College, and Morris College. Some practical work in India during recess periods.	Mining - Two years; extended to three. Manchester University.

Particulars of Practical Training	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends.	Theoretical Training.	Practical Training.		Total
				Travelling Expenses (including Journeys to and from Universities, &c.).	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Visited Foxdale Lead Mine.	Not yet returned to India, but two firms — Messrs. Finlay, Fleming, & Co., and the Burma Mines, Ltd.—have offered to employ Mr. Thein on his return.	382 7 11	148 18 4	6 17 6	16 16 0	554 19 9
Practical work at Great Rock Iron Mine, 1 month. Hanwood Coal Mine, 3 weeks. Glasdir Copper Mine, 3 weeks.	Not yet returned to India.	379 10 5	125 14 0	13 13 6	12 12 0	531 9 11
Studied boot and shoe manufacture at Leeds Technical School during summer vacation, 1911.	Obtained Leeds University Diploma in Leather Industries, 1912. Not yet returned to India.	382 7 11	84 16 6	1 8 5	5 0 0	473 12 10
Practical work at Sandwell Park Colliery and Francis, Son, and Bower Colliery.	B.Sc. (Tech.) in Mining, First Class Honours M.Sc. (Tech.) in Mining, 1912. Not yet returned to India.	379 2 2	80 2 6	11 12 8	21 0 0	491 17 4

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
48. Nair, T. K. - 24 years. Madras. 1910.	Member of a respectable family in the district of Malabar. Father—A. P. Nair, retired Senior Grade Hospital Assistant. Applied in answer to a Government notification published in Fort St. George Gazette and three leading Madras newspapers.	Educated at St. Joseph's and S. P. G. Colleges, Trichinopoly. B.A. of Madras in Physics and Inorganic Chemistry.	Metallurgy Two years. Birmingham University.
49. Ba Tin, M. - 22 years. Burma. 1910.	Native of Burma Father—Maung Kyaw Nyen, A. T. M., Additional District Judge, Henzada. Applied in answer to an advertisement in the Rangoon Times.	Educated at St. Paul's High School and Rangoon College; passed entrance examination of Calcutta University; and was working for Inter. Arts Examination at time of nomination.	Pottery. Two years.
50. Patel, A. C. 21 years. Bombay. 1910.	Father—Deputy Educational Inspector in Panch Mahals and Rewa Kantha Sub-Division. Applied in response to a Government notification. Selected by the Director of Public Instruction.	L.C.E. of Bombay	Electrical Engineering Two years. City and Guilds (Engineering) College.
51. Sahasrabuddhe, G. N. 24 years. Bombay. 1910.	Maharashtra Brahmin Applied in response to a Government notification. Selected by the Director of Public Instruction.	L. Agric. of Bombay Had served in the Agricultural Department of the Government of India.	Sugar refining. Two years. Sent to Barbados under Commissioner of Agriculture. Allowed to visit Cambridge, Glasgow, and Edinburgh to study scientific agriculture.
52. Guha, A. - 26 years. Bengal. 1910.	Native of Bikrampur, near Dacca. Father was Educational Clerk in the District Board Office. Applied in answer to an advertisement. Recommended by the Manager of the Empress Mills, Nagpur.	B.A. (Calcutta), and read some Science for the M.A. Served as assistant in Weaving Department of Empress Mills at Nagpur for three years.	Textile industry Two years; extended to three. Manchester School of Technology.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India	Expenditure incurred up to 31st March 1912.				
		Stipends	Theoretical Training.	Practical Training		Total.
				Travelling Expenses (including Journeys to and from Universities, &c).	Premium, &c	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Spent six weeks during the 1911 vacation at Sheepbridge (Derbyshire) Iron and Coal Company's Works; and is spending one month of the 1912 vacation with the Frodingham (Lincolnshire) Iron and Steel Co., Ltd	Not yet returned to India.	232 16 2	85 16 0	3 15 3	6 6 0	328 13 5
Under training at Messrs. Pilkington's Tile and Pottery Company, Clifton Junction, near Manchester.	Not yet returned to India	232 7 11	9 6 0	1 6 2	37 10 0	280 10 1
Practical work at Rugby and in Sweden during vacations.	Not yet returned to India.	237 14 9	85 0 0	17 18 6	Nil.	340 13 3
	Not yet returned to India.	241 0 6	Nil.	62 10 1	Nil.	303 10 7
Visited Turin and handloom districts in Ireland during vacations.	Not yet returned to India.	232 16 2	47 9 0	13 1 0	Nil.	293 6 2

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name, and Profession (if known). How selected.	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship. College or University selected.
53. Mookerjee, H. K. - 20 years. Bengal. 1910.	Member of respectable Hindu family of Calcutta. Applied in response to a Government notification published in the Calcutta Gazette. Recommended by the Principal, Government Weaving Institute, Serampore. Selected by the Director of Public Instruction.	Passed entrance examination and studied up to Inter. Arts standard. Received instruction at Government Weaving Institute, Serampore. Practical training at Bengal Luxmi Cotton Mills, Ltd.	Power loom weaving, finishing, and dyeing. Two years; extended to three. Manchester School of Technology.
54 Chaudhuri, P. C. - 23 years. Eastern Bengal and Assam 1910.	Father—D. K. Acharya (deceased), brother by adoption of Raja Jagat Kishore Acharya Chaudhuri of Muktagacha. Scholarship was advertised by Director of Public Instruction who also made the selections.	Passed F.A. examination and read up to B.Sc. standard of Calcutta University. Practical training at Government Weaving School at Serampur; had also been engaged in silk industry in India.	Silk weaving and dyeing. Two years; extended to three. Sent to Manchester School of Technology for one year, and then transferred to Ecole Supérieure de Lyons.
55. Yadav, A. P. S. - 22 years. Bombay 1910.	Hindu Rajput - - - Father—Director in various cotton factories. Applied in response to a Government notification Recommended by the Head of the Textile Department, Bombay, Victoria Technical Institute.	Attended Bombay Victoria Technical Institute. L.T.M. of Bombay Institute. Bronze Medallist of City and Guilds Institute Some practical experience as apprentice engineer in Indian mills.	Mechanical Engineering - Two years. Manchester School of Technology for one year.
56. Newson, H. J. - 27 years. United Provinces. 1910.	Eurasian - - - Born at Allahabad. Applied from England. Recommended by Sir T. Holland and the Professor of Engineering, Manchester University.	Educated at La Martinière College, Lucknow. Began three years' course at Manchester University at own expense. Specialised in Applied Geology. Obtained B.Sc. (Hons.) Degree of Manchester before nomination.	Mechanical Engineering - Two years. Manchester University.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends	Theoretical Training.	Practical Training.		Total
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Spent summer vacation 1911 in mills of Messrs. R. Harworth and Sons, Salford. Is arranging with Messrs. N. Bothwell and Sons, of Walken, for a five weeks' course in their Mill during 1912 vacation.	Not yet returned to India.	238 13 0	47 9 0	13 1 0	Nil	299 3 0
Practical work during vacations. Proposes to visit various Continental works during third year.	Not yet returned to India.	238 13 0	69 13 11	7 12 10	Nil.	315 19 9
Now working as a fitter in Messrs. Asa Lees & Co.'s Cotton Spinning Machinery Works, Oldham.	Did not take Diploma course. Not yet returned to India.	232 8 0	47 9 0	1 3 10	Nil.	281 0 10
One year with Messrs. Thornycroft at Southampton; also visited various works in England and on the Continent.	M Sc. in Engineering of Manchester University. Obtained Certificate of Proficiency in Electrical, Civil, and Mechanical Engineering. Not yet returned to India.	245 19 2	43 0 6	18 14 9	115 0 0	422 14 5

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name, and Profession (if known). How selected	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship, College or University selected
57. Rai, H. 23 years. Punjab. 1910.		Educated at Government College, Lahore. B.A., M.Sc	Manufacture of Alkalis - Two years. Liverpool.
58. Sitaraman, M C. 23 years. Madras. 1911	Member of the weaving community of Sourashtras of Madura. ("Backward in education.") Father-in-law building a spinning mill at Madura. Applied in response to an advertisement in the Fort St George Gazette.	Attended Presidency College, Madras. B.A, Madras.	Weaving - Two years Manchester School of Technology.
59 Rao, H. S 28 years. Madras. 1911.	Saraswat Brahmin Father—Dr. H. Rangappa. Selected on recommendation of the Principal of the Manchester School of Technology.	Educated at Presidency College, Madras. B.A. (Madras). Applied from England; had taken a two years' course at School of Technology previously. B.Sc. (Tech.) of Manchester before scholarship granted.	Spinning and weaving - Two years. Manchester School of Technology.
60. Bennett, H. D. 22 years. Bengal. 1911.	Father served in Bengal Pilot Service for 25 years. Applications were invited in the Calcutta Gazette. Selections made by Director of Public Instruction.	Educated at La Martinière College, Calcutta, and Sibpur Engineering College.	Mechanical and Electrical Engineering. Two years. Faraday House.
61. Roy, P. B. Bengal. 1911.	Father—Dr. T. C. Roy, of Plantara. Uncle—M. N. Roy, Vakil of High Court, Calcutta, and Fellow of Calcutta University. Applications were invited in the Calcutta Gazette. Selections made by Director of Public Instruction.	Attended Sibpur Engineering College. Was a student Engineer in the P.W.D. at time of nomination.	Mechanical and Electrical Engineering. Two years. Faraday House.

Particulars of Practical Training.	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				
		Stipends.	Theoretical Training	Practical Training.		Total
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Visited Heidelberg for two months in order to learn German; but has so far been unable to obtain admission to an Alkali Works.	Not yet returned to India.	212 1 4	41 19 6	8 18 2	1 7 0	264 6 0
Spending five weeks of summer vacation, 1912, with Messrs. Butterworth and Dickinson, of Burnley.	Not yet returned to India.	82 16 2	24 10 0	1 15 6	Nil.	109 1 8
- - -	Not yet returned to India.	82 16 2	23 4 0	2 0 4	Nil.	108 0 6
Practical training with the British Westinghouse Electric and Manufacturing Company, Ltd.	Not yet returned to India.	75 8 2	23 6 8	0 17 3	Nil.	99 12 1
Practical training with Messrs. Clarke, Chapman, & Co., Ltd., Gateshead-on-Tyne.	Not yet returned to India.	75 8 2	34 6 8	0 12 9	Nil.	110 7 7

Name, Age, Province, and Year of Nomination.	Status or Caste, Father's Name and Profession (if known). How selected	Particulars of Indian Education (including Practical Training, if any).	Subject and Period of Scholarship College or University selected.
62. Srivastava, R. C. - 20 years United Provinces. 1911.	Kayasth - - Father — Munshi Janki Prasad (deceased), Tehsildar Present guardian—Uncle, M T Prasad, landowner. Applied in response to an advertisement in the newspapers Recommended by the Directors of the Basti Sugar Works, Ltd.	Educated at Christ Church Collegiate School, Cawnpore, and Muir College, Allahabad. B.Sc. and B.A. (Allahabad).	Manufacture of sugar - Two years. Manchester School of Technology for one year.
63. Datta, A. C. - - 23 years. Eastern Bengal and Assam 1911	Father—A. N. Datta, B.A. (Cantab), Senior Professor of Rajshahi College. Applied in response to a Government notification.	Educated at Rajshahi College and Sibpur Engineering College.	Silk weaving, dyeing, and finishing Two years Manchester School of Technology.
64. Muhammadi, M. G. - 29 years Central Provinces. 1911.	Muhammadan. Resident of Ellichpur in Berar Father serving in Government of India Agricultural Department. Applied in response to an advertisement in the Central Provinces Gazette.	B A and Fellow of Bombay University Was Assistant Lecturer at Agricultural College at Nagpur at time of nomination.	Manufacture of oils, fats, and their products. Two years Battersea Polytechnic.
65. Muttannah, K. 25 years Coorg. 1911.	Member of a respectable Coorg family. Scholarship was advertised in the Coorg District Gazette. Selected by the Chief Commissioner.	Attended Bombay Victoria Technical Institute and obtained complete Technological Certificate of second class. Was an apprentice in Kolar Gold Fields at Rs. 75 per mensem at time of nomination.	Mechanical and Electrical Engineering Two years. Faraday House.
66 Mehd, P. V. 23 years. Bombay. 1911.	Nagar Brahmin - Father and many other relatives have been in Government service. Applied in response to a Government notification	Educated at St Xavier's College M.A. and B Sc of Bombay. Was Assistant Professor of Chemistry, St. Xavier's College, at time of nomination.	Manufacture of tanning extracts, &c Two years. Leathersellers Company's College.

Particulars of Practical Training	Distinctions acquired, and Occupation on return to India.	Expenditure incurred up to 31st March 1912.				Total.
		Stipends.	Theoretical Training	Practical Training		
				Travelling Expenses (including Journeys to and from Universities, &c.)	Premium, &c	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Is to enter the Glasgow Works of the Harvey Engineering Co. (Sugar Machinery Manufacturers) in September 1912; part of each week to be spent in the Works and the remainder at the Royal Technical College.	Not yet returned to India.	82 7 11	25 11 0	2 1 4	Nil	110 0 3
	Not yet returned to India.	83 4 4	24 5 0	1 14 4	Nil.	109 3 8
Now in Messrs. D. & W. Gibbs' Soap Works at Wapping.	Not yet returned to India.	83 4 4	22 0 6	Nil.	Nil	105 4 10
Practical training with the British Westinghouse Electric and Manufacturing Company, Ltd.	Not yet returned to India.	82 16 2	34 1 8	0 17 1	Nil.	117 14 11
Is spending one month of 1912 vacation with Messrs J. Hall and Sons (Leather Machinery makers), of Leeds; and one month with Messrs. Blair, Campbell, and McLean (Makers of Tanning extract apparatus, &c.) of Glasgow.	Not yet returned to India.	82 16 2	44 0 0	Nil	Nil.	126 16 2

APPENDIX VI.

STATEMENT showing what the Students of the Association for the Advancement of Scientific and Industrial Education of Indians, who have returned to India, are doing. [*Extracted from the Report of the Association for 1912*].

1. Mr. G. C. Sen, M.A., F.C.S., returned after a distinguished University career in England and after learning the manufacture of dyes and the allied industries of calico-printing, colour-making, and paint-making in Leeds and Germany. He stood first in the Competitive Examination of the City and Guilds, London. He was elected a Fellow of the Chemical Society, London, and was selected, while in the University, for research work and investigations in connection with Tussah silk. He worked upon Rhea fibre in degumming, bleaching, and dyeing, and attained conspicuous success. He has been engaged as Chemist, Calcutta Paint, Colour, and Varnish Works, Limited.

2. Mr. R. N. Sen, M.A., obtained the Diploma in Dyeing of the Leeds University, stood first and got first class honours both in cotton dyeing and wool dyeing in the City and Guilds Examinations. He worked as a voluntary student in the dye-houses of two very big and well-known colour works of Germany, and pursued a course of research work under Professor Green of the Leeds University. He has been appointed as a Professor in the Imperial Service for Industrial Chemistry in the Sibpur Engineering College.

3. Mr. K. C. Nandi, B.A., B.E., A.M.I.M.E., returned after distinguishing himself in Glasgow in mechanical and electrical engineering. He was elected a Research Student of the Glasgow University and a Member of the Society of Mechanical Engineers, London, which in itself was a great honour. He has been engaged as the Chief Engineer of the Cooch Behar State on a salary of Rs. 550 per month.

4. Mr. J. K. Das Gupta, B.Sc., A.M.I.C.E., A.M.I.M.E., joined the University of Glasgow where he stood first in the B.Sc. Examination, distinguished himself in mechanical and electrical engineering, and secured several splendid certificates from his professors and the engineering firms where he worked. He also got certificates from the Weaving College. He, on his return, has been engaged as a Deputy Surveyor of the Calcutta Municipality on a salary of Rs. 300 per month.

5. Mr. I. B. Mojumdar, B.A., M.Sc., obtained the Master's Degree in Agriculture of the Cornell University in New York, U.S.A., and has been appointed on his return by the Cooch Behar State in their tobacco firm on a salary of Rs. 300 per month.

6. Mr. B. A. Taher, B.A., returned after fully qualifying himself as a leather expert after training in America and England. There is not a branch of leather industry which he did not learn. He has been engaged by the Boot and Equipment Factory Company, Limited, Agra.

7. Mr. A. K. Sen, B.A., B.Sc. (Manchester University), joined the Municipal School of Technology, Manchester University, where he applied himself to the study of bleaching, dyeing, calico printing and finishing. He appeared in the City and Guilds of London Institute Examinations in cotton and linen bleaching and finishing, and cotton dyeing. He got first class in both the subjects, and in the former he stood first and got the Institute's first prize and medal. He appeared in the same Institute's Examinations in Honours "Dyeing," "Calico Printing," and "Alkali and Acid Manufacture," and in all the three subjects he got first class. He also attended a special course of lectures on "Oils and Fats." He obtained degrees (Manchester University)

in Applied Chemistry and Chemical Technology, the Diploma of the Municipal School of Technology with the title of Associate of the School. While in England Mr. Sen had many occasions to visit works where the above industries are carried on and to study their working conditions. In Germany he joined and worked in a big dyeing and calico-printing works. He has been, on his return, engaged as dyeing expert in the Banga Lakshmi Cotton Mills on a salary of Rs. 250 per month.

8. Mr. P. C. Ganguly, B.Sc., joined the University of Glasgow, passed the final B.Sc. Examination in Mechanical Engineering, and got special distinction in Electricity, pure and applied. He has been, on his return, engaged as a Professor of Mechanical and Electrical Engineering in the Bengal Technical Institute on a salary of Rs. 250 per month.

9. Mr. A. Ahmed, B.A., having acquired sufficient theoretical knowledge of leather industry in the University of Leeds, joined the Herold's Institute, London, for practical training, and obtained certificate at the completion of his course. He also appeared in the City and Guilds of London Institute Examination and got first class certificates in tanning. He has been employed in the National Tannery, Calcutta.

10. Mr. M. Ismail, M.Sc., returned after passing the M.Sc. Examination in Leather Chemistry of the Leeds University with distinction. Before his return he also worked in a big tannery for practical training. He has been employed in the Utkal Tannery, Cuttack.

11. Mr. S. C. Basu, M.A., returned after obtaining the Degree of Master of Arts from the University of Nebraska in Political Economy and Commerce. He paid equal attention to theoretical as well as to applied economics, and his special subject of investigation was corporation finance, and industrial banking and insurance. He was highly spoken of by his professor. He has been employed as a Professor in the Victoria College, Cooch Behar.

12. Mr. J. C. Nag, B.S., returned after passing the B.S. Examination in Agriculture from the California University, U.S.A., with great distinction. He has been employed as a Professor of Botany and Chemistry in the Krishnanath College, Berhampur.

13. Dr. W. N. Chowdhury, Ph.D., returned after passing the final Examination of the Cothen Polytechnic in Ceramics and obtaining the Ph.D. Degree of the Basel University in Geology. Before his return he worked in several porcelain factories in Austria and Germany, and also worked as an Assistant of the Director of the Mineralogical and Geological Institute, Cothen. He has been employed as a Geologist by the Singhbhum Mining and Prospecting Syndicate.

14. Mr. A. Dutt, B.A., M.Sc., returned after passing the M.Sc. Examination in Agriculture of the Cornell University, U.S.A. He also worked in a big tobacco firm for practical training. He has been employed as a Settlement Officer by the Cooch Behar State.

15. Mr. N. Chakrabutty, B.A., B.Sc., returned after passing the B.Sc. Examination in Agriculture of the Ohio State University, U.S.A. He has started an agricultural firm near Kanchrapara.

16. Mr. K. C. Bharatkar, M.A., M.S.A., M.A.S., studied sericulture and agriculture in the Imperial University, Tokyo, and got the Imperial Diploma in Agriculture and Certificate in Sericulture. In the third year class he secured a research work and discovered a new compound which was named "Kanirin." He also studied the technology of sugar. He has been employed as Superintendent of Sericulture in the Mourbhanj State.

17. Mr. J. C. Das, B.Sc., got a Diploma from the leading Commercial College of the Pacific Coast in higher accounts, including factory management and banking accounts. He also obtained B.Sc. Degree in Economics and Commerce of the California University. He has been engaged in the Hindusthan Co-operative Insurance, and also as Professor of Banking and Commerce in the Government Commercial Institute, Calcutta.

18. Mr. S. Deb, M.C.E., had been sent to Japan by the Society of Theists and latterly got a scholarship from the Association. He returned after a complete course of study in colleges and factories for the manufacture of porcelain. He has been engaged in the Calcutta Pottery Works on a salary of Rs. 200 per month.

19. Mr. M. C. Roy returned after passing all the examinations and securing Certificates in Sericulture of the Imperial Agricultural College, Tokyo. He has been appointed by the Honourable Maharaja Manindra Chandra Nundy Bahadur, of Cossimbazar, in his sericultural firm on a salary of Rs. 200 per month.

20. Mr. P. C. Roy -	}	Returned after learning the industry of match manufacturing in Japan, Germany, and England. Mr. Roy has been employed in the Bande Mataram Match Factory, started by Dr. Rashbehari Ghose, on a salary of Rs. 150 per month and certain percentage on profits. Mr. Ghose has been appointed on a salary of Rs. 250 per month in the Irrawady Match Factory, Mandalay.
21. Mr. A. P. Ghose		

22. Mr. J. P. Bose, M.C.E., returned from Japan after learning the manufacture of printing ink. He has been engaged in the Calcutta Printing Ink Works on a salary of Rs. 150 per month and certain percentage on profits.

23. Mr. M. M. Chuckerbutty	}	Returned after passing all the examinations and obtaining Certificates in Sericulture of the Imperial Agricultural College, Tokyo. Mr. Chuckerbutty has been engaged as Superintendent of Sericulture by the Eastern Bengal and Assam Government on a salary of Rs. 150 per month; Mr. De, as Sericulture Assistant of the Pusa Agricultural College; and Mr. Chowdhury, as Sericultural Expert by the Tippera State.
24. Mr. M. N. De - -		
25. Mr. J. Chowdhury -		

26. Mr. A. Mitter returned from Japan after learning the manufacture of biscuit, and has started the Raj Lakshmi Biscuit Factory in Calcutta on his own account.

27. Mr. N. N. Mojumdar returned from Japan after learning the manufacture of pencil and candle, and has started the Manorama Candle Factory at Dinajpur on his own account.

28. Mr. M. N. Ghose, M.C.E., M.R.A.S., London, returned after learning the manufacture of celluloid and celluloid articles, *e.g.*, buttons, combs, handles of umbrella, and sticks, &c., in Osaka, Japan. He also learnt the manufacture of camphor, including the cultivation of camphor plants. He has been employed by "The Jessore Comb, Button, and Mat Manufacturing Company, Limited," and has been doing excellent work there.

29. Mr. A. M. Ghose, M.C.S., Chemical Engineer, returned after having attended the Part Institute, New York. He mastered the technology of oils, fats, and soaps, by entering the world-renowned Colgate and other soap works. He was elected a Member of the American Chemical Society, and was the first Indian honoured with that distinction. On his way home, *viâ* Japan, he was appointed Chemist and Supervisor of a big soap factory in Tokyo. His book entitled "Chemical Technology of Oils, Fats, and Manufactured Products" earned for him much reputation in America, where a large number of copies were sold. He has been employed in the Bengal Soap Factory, and has also started on his own account a soap factory under the name of Vegetable Soapery.

30. Mr. J. N. Sahai, T.E., graduated in Textile Engineering from the Higher Technological Institute, Tokyo. He had also practical training in

spinning, weaving, dyeing, in short, everything in connection with the weaving and spinning industry, by working in several factories in Nagasaki and Osaka. At the recommendation of the College Authorities he had the good fortune of working in both weaving and spinning sections of the Osaka Cotton Mill, the largest Mill in Japan. The President of the Mill was highly satisfied with his work, and recommended him to any mill he may desire to join. He, on his return, worked as Spinning Master of the Krishna Mill, Bewar, on a salary of Rs. 150 per month. He is now working as Manager of the Gorakhpur Weaving and Dyeing Works.

31. Mr. B. C. Das joined the Royal Sanitary Institute, London, passed therefrom and was appointed an Associate of the same Institute. He has been, on his return, employed by the Dacca Municipality on a salary of Rs. 150 per month.

32. Mr. S. P. Gupta, graduated in Ceramics from the Higher Technological Institute, Tokyo, and worked in several factories for the manufacture of cement and fire-bricks. He also learnt the manufacture of pencil. He has, on his return, started a pencil factory in Calcutta on his own account.

33. Mr. A. B. Sircar, M.A.C.S., took Chemistry and Bacteriology in the Stanford University, U.S.A. After that he learnt can-making and canning and preserving of fruits, vegetables and other food products in several canneries in California. He obtained the Diploma of the National Canners' Laboratory in Pennsylvania. He was also elected a Member of the American Chemical Society. He has been, on his return, appointed by the Bengal Preserving Company, Mozaffarpur.

34. Mr. H. N. Mukherjee returned after learning the art of tanning in all its branches in several factories in different places of America. He has been employed by the Berhampur Leather Manufacturing Company.

35. Mr. A. C. Ghose, M.A.S. (Japan), M.R.A.S. (London), returned after graduating in tobacco curing and the manufacture of cigar and cigarettes from the Government Tobacco Monopoly Bureau's Manufactory in Tokyo. The Director of the Bureau spoke very highly of his attainments and recommended him to the tobacco works of the Anglo-American Tobacco Company in America and England. He was the first foreigner who was granted a Graduation Certificate by the Imperial Government Monopoly Bureau of Japan. He was also elected a Member of the Royal Agricultural Society, London. He has been employed as Manager of the Gopalkheria Cigarette Company, Lucknow, on a salary of Rs. 250 per month.

36. Mr. D. C. Mojumder, after graduating from the Ceramic Department of the Government Higher Technical Institute of Tokyo, worked in one of the most up-to-date pottery works in Japan. He also qualified himself thoroughly in clay analysis, body and glaze-making, mould-making, furnace-building, firing and in all other different aspects of pottery industries. He has been engaged as Ceramic Engineer by the Gwalior State on a salary of Rs. 200 per month.

37. Mr. B. K. Sen returned after learning sheet metal works and electroplating from a big factory in Osaka, Japan. He has been employed in the Calcutta Sheet Metal Works.

38. Mr. I. B. Vidyanta, T.E., graduation in textile engineering from the Higher Technical Institute, Tokyo, with honours and obtained prizes and proficiency certificates. This was the first instance of an Indian student being admitted as a regular student in that Institution. He fully qualified himself in the seven courses of pattern analysis and designing, mechanism of textile machinery, mechanical engineering, weaving, dyeing, factory construction and industrial economy and obtained special certificates from the Director of the Institution. He has been employed by Messrs. Andrew Yule & Co., in their Bengal Mills.

39. Mr. L. Barathakur, M.A.S., returned after graduating in agriculture from the Imperial Agricultural College, Sapporo, Japan. He worked as Assistant Manager of the Sankhomten Sugar Mill, Hainan, Formosa, and visited many sugar factories, including the Government Sugar Experimental

Station in Japan. He has started a firm for producing sugar cane preliminary to his starting a sugar factory at Tinsukiah.

40. Mr. A. C. Sen returned after passing the intermediate B. Sc. Examination in Tanning of the Leeds University. While in England he joined and worked in a big tanning factory. He also visited several factories both in England and Germany. He has been engaged in the Nadia Tannery.

41. Mr. R. N. Tagore, B.S. - { returned after graduating in Agriculture from the University of Illinois, U.S.A. They have started an agricultural firm and also Agriculture Bank at Silaidaha.
Mr. N. N. Ganguly, B.S. - }

42. Kumar Amindronarain returned from Japan after learning the manufacture of pencil. His services were lent for some time to the Bimlipatan Pencil Manufacturing Co., Madras. During that short time he made several substantial improvements in the factory and manufactured pencils in no way inferior to the foreign ones. He is now working in the pencil factory of the Small Industries Development Company.

43. Mr. P. C. Bose, M.E., joined the Mechanical Engineering Department in the Imperial University, Kyoto, and got M.E. Degree. For practical training in ship-building he worked in the dockyard of Kobe. He has been employed as an assistant engineer in the Bilimorn. Sara Line (Baroda State Railway) on a salary of Rs. 300 per month.

44. Mr. S. C. Bannerjee returned after learning pharmacy in Japan. He has been employed by the Russa Pharmaceutical Works, Ltd.

45. Mr. K. T. Achaya returned after training in sericulture both in Japan and France. He has been employed in the sericulture farm of the Salvation Army in Aligarh on a salary of Rs. 200 per month.

46. Mr. J. C. Gossain, II., joined the testing department of the General Electric Company, New York. The director of the firm was highly pleased with his work and appointed him as an engineer in the hydro-electric plant which the Company undertook in Nepal. He is now working in the Calcutta Electric Supply Corporation.

47. Mr. J. C. Maitra returned after learning electrical engineering in London. He has been employed by Electric Supply Corporation, Calcutta.

48. Mr. J. L. Sen, M.B., I.M.S., returned after passing the I.M.S. Examination and taking course in bacteriology in the London Polytechnic. He has been appointed a civil surgeon of Lucknow.

49. Mr. C. C. Sen, L.C.E., returned after training in mechanical and electrical engineering, both in England and America. He had been engaged as an assistant engineer by the E.B.S. Railway.

50. Mr. P. D. Pande, B.S. returned after obtaining B.S. Degree of the Oregon Agricultural College, U.S.A. He has been appointed as Assistant Director of Sericulture in Kashmir State.

51. Mr. L. M. Sen, B.Sc. (Glasgow), returned after passing the final B.Sc. Examination in Mechanical Engineering of the Glasgow University with special distinction. He has been employed by Messrs. Jessop & Co., in their big engineering firm in Calcutta on a salary of Rs. 250 per month.

52. Mr. R. Dutt, B.A. returned after fully qualifying himself in the manufacture of soap and essential oil after theoretical and practical training in France, Germany and England. He has been employed as a professor in the Bengal Technical Institute.

53. Mr. J. C. Sen, A.B., returned after obtaining the A.B. Degree in Economics of the Harvard University, U.S.A. Before his return he worked in the National Bank of Commerce, one of the largest banks of Boston.

54. Mr. D. K. Roy. B.A., A.Sc., passed B.Sc. Examination in Chemistry of the Edinburgh University and worked in the firm of a pharmaceutical chemist for practical training. He has only just returned.

55. Mr. S. S. Sinha studied agriculture for two years in the Ontario Agricultural College, Canada, and obtained B.S. Degree in Agriculture of the University of Illinois. He was also elected Member of the American Society of Agronomy and Royal Agricultural Society of England. He has only just returned.

56. Mr. S. C. Roy, L.M.E., learnt enamelling and worked at the British Westinghouse Electric and Manufacturing Company, Manchester, and stood second in the sufficiency test. He was highly spoken of by the general manager of the works. He has only just returned.

57. Mr. S. C. Bose, B.A., returned after learning automobile in England.

58. Mr. L. Das returned after obtaining Diploma in Sericulture of the Superior National Agricultural School, Montpellier, France, and studying tropical agriculture in the Superior National Colonial Agricultural School, Paris. He worked for some time as a professor of the Pusa Agricultural College on a salary of Rs. 150 per month, which post he has resigned.

59. Mr. S. K. Dutt Gupta returned after learning the manufacture of buttons from Japan, and started the Bengal Button Factory in Calcutta on his own account.

60. Mr. B. M. Chatterjee returned after graduating in textile from the University of Leeds. He also obtained first class certificates in cotton and linen bleaching and finishing of the City and Guilds of London Institute Examinations. He, for practical training, worked in a big cotton mill in Manchester and visited several factories.

61. Mr. S. N. Bose, M.A.S., returned after graduating in agriculture from the Imperial Agricultural College, Sapporo. He also worked in a big firm for practical training.

62. Mr. B. B. Banerjee returned after learning the manufacture of umbrellas and scientific instruments such as telescope, compass, vacuum gauze, &c., from the Tokyo Meter Manufactory.

63. Mr. M. C. Sen returned after learning the manufacture of shell buttons in a big factory in Kobe, Japan. He has started a shell button factory on his own account.

64. Mr. R. R. Ghose, M.S.A.	}	Returned after brilliant career and obtained high certificates of merit and golden opinions of the Professors of the Sericultural Department of the Imperial University, Tokyo. They also learnt the practical side of the work in the Government Experimental Station at Nishigahara.
65. Mr. P. K. Mitter, M.S.A.		

66. Mr. S. N. Bose returned after fully qualifying himself as a leather expert after training in Japan and England.

67. Mr. N. C. Guha M.D.	}	Returned after passing the M.D. Examination of the Hahneman Medical College, Chicago, U.S.A., and also learning Mechanical Dentistry.
68. Mr. G. C. Das, M.D.		

69. Mr. J. Dutt returned after learning Ceramics in the Kato Porcelain Factory, Tokyo.

70. Mr. S. Roy.	}	Returned after passing the Final Examination of the Royal Sanitary Institute, London, and qualifying themselves as municipal engineers from the University College, London. Mr. Dutt is working as an engineer in the firm of Messrs. Incell and Silk.
71. Mr. H. C. Dutt.		

73. Mr. P. C. Pramanic returned after learning umbrella making in all its branches in the Iwasaki umbrella manufactory, and electro-plating in a firm in Tokyo.

74. Mr. P. K. Biswas returned after obtaining Ph.D. Degree of the Imperial Agriculture College, Sapporo, Japan.

75. Mr. K. D. Mitter returned after learning litho printing, and in a factory in Tokyo, Japan.

76. Mr. B. B. Bose got himself admitted in the Keyosu-shoten Tin Printing Factory, Tokyo, and learnt litho printing, tin printing, and can-making. To give a finishing touch to his education, he went to America. He has just returned.

77. Mr. B. N. Das returned after learning the manufacture of shell buttons in a big factory in Tokyo, and leatherette in Osaka.

78. Mr. A. Mitter returned after learning the manufacture of paints in Germany.

79. Mr. J. Hazra returned after learning shoe-making in the Universal Machinery Co., Ltd., Northampton, England.

80. Mr. B. C. Ukil returned after learning electro-plating and the manufacture of glass beads at Osaka, Japan. Before his return he was employed in starting the Bunraj Glass Beads Factory at Osaka. He will soon start a glass beads factory in Calcutta.

APPENDIX VII.

In view of the difference of opinion prevailing among experts as to the training of a mining engineer, we print here the written evidence submitted to us by Professor J. Cadman, D.Sc., and Sir T. H. Holland, K.C.I.E.

Written evidence submitted by Professor John Cadman, D.Sc., M.Inst.C.E., F.G.S. (Certificated Colliery Manager, late H.M. Inspector of Mines under the Home Office and Colonial Office, Professor of Mining in the University of Birmingham; also Consulting Engineer to a group of Collieries in the Midlands, and Mining Adviser to the Colonial Office for West Indian Colonies).

For a period of three-and-a-half years I was in charge of the Mines Inspection Department in Trinidad, and came in contact with a large number of Indians. I have also been in India and Burma, and have some knowledge of the conditions existing there.

I have been in charge of the Mining Department in the University of Birmingham during the past four years, during which time the following Indian scholars have passed through the department.

No.	Name.	Experience in Mining prior to obtaining Scholarship.	Occupation before gaining Scholarship.	Attending University.	Passed Degree or Diploma.	Work obtained on return to India	If work obtained in England other than during vacations.
1	Hafiz, A. -	No.	(?)	5 years.	B Sc., M.Sc.	(?)	No.
2	Fox, C. S. -	No.	(?)	3 years and returned 1 year as lecturer.	B Sc.	Mining Branch of Geological Survey.	Assistant Manager, Overman, and Surveyor in Coal Mine 1 year.
3	Mokadam, B. P.	Yes.	Mining.	3 years.	Diploma	Employment in Mines.	Yes; worked in Mines for a year.
4	Sen, A. M. -	No.	Civil Engineering.	4 years.	B Sc., M.Sc.	Mysore Geological Survey.	Yes, investigation of S. Staffs. Coalfield. Worked at several Mines.
5	Ashcroft, C. E.	Yes.	Mining.	3 years.	Diploma.	At a Coal Mine. Since become a Manager.	No.
6	Ray, M. K. -	No.	Chemist.	4 years.	B.Sc.	Geologist, Rajputana.	No
7	Dandekar, P. -	No.	Electrical work.	3 years.	Diploma.	Not yet returned.	Working in the Birmingham Corporation Power Station.
8	Kurup, M. N. P.	No.	Oil Boring and Prospecting.	3 years.	Failed.	Boring, Digboi Oil-fields.	No.
9	Obaidullah, M.	No, but took a course at Calcutta.	Engineering and Mining at Calcutta University.	5 years.	B Sc.	Not yet returned,	No.
10	Nag, D. C. -	No.	Civil Engineering.	3 years.	B.Sc.	Assam Oil-fields.	No.
11	Sen-Gupta, M. N.	No.	Geology.	4 years.	(?)	Not yet returned.	No.
12	Bardaloye, G. C.	Three months preparing for scholarship.	Calcutta University.	3 years.	(?)	Not yet returned.	No.
13	Rao, S. R. -	Yes.	Civil Engineering.	2 years.	Qualified for B.Sc. degree.	Mining work Geological Survey of Mysore.	No.

My experience of these scholars leads me to state emphatically that with a few exceptions the men are very badly selected for the profession they are undertaking. The above list will show that out of 13 students, only three had previous experience in mining, or, indeed, had any intention or ambition to follow the profession of mining engineer, prior to obtaining the scholarship.

There has been no difficulty whatever in obtaining ample opportunity at mines for Indian scholars to obtain practical experience. The general arrangement is that a small fee is usually charged to students, amounting to about the rate of 10s. to 1l. per week for short periods, or 4l. to 5l. for the long vacation. It is obligatory on all students to work in the mines for two months during the three years they are reading for the degree. My department obtains a form signed by the manager of the mine at which the student has been employed, stating the exact nature of the employment during the period.

The Indian scholars in mining find that they are unable to obtain employment in mining on their return to India. The reason is largely due to the defective system of selection. The students are recruited from candidates who are in no way associated with mining before leaving India, are not known to any mine owners or mine officials, and indeed, in many cases, have never seen or been connected with a mine before taking up the scholarship. A student in these circumstances has no direct connection with Indian mining, and has no friends or employers who would be prepared to obtain his services on his return.

It is my opinion that if the students were recruited from persons actually connected with Indian mining, there would be no difficulty in their obtaining re-employment on their return. From the list above it will be seen that of all the candidates, only those who have been actually associated with mines before taking up the course have obtained direct employment in mines on their return.

No doubt you have obtained evidence from Sir Thomas Holland, and if he has expressed himself as he did in a speech recently delivered on the education of Indian scholars, I should like to allude to his suggestions, as I am directly opposed to such views.

I attach a press cutting on this subject.

Report of a speech by Sir T. Holland K.C.I.E., at the 3rd Annual Dinner of the Indian Mining and Geological Club. (Extracted from the "Colliery Guardian.")

"Sir Thomas Holland, who was warmly received, after a few much appreciated humorous remarks, alluded to the appointment of a committee by the Secretary of State for India to investigate the question of State technical scholarships. It would be out of place to discuss the matter in detail; but there was one criticism that ought to be made now or never. The committee was composed of recognised educational authorities, who had a sympathetic attitude towards the difficulties of technical students, as well as the industrial needs of India. But it seemed to him that, in summing up the evidence which it would collect, such a committee ought to be influenced by members with practical experience of Indian industrial and commercial affairs—such a man, for instance, as Sir Percy Ashton, or their honoured guest Sir Dorabji Tata. The committee would also, he hoped, discover that the solution of the problem would not be found in evidence collected in this country, but in India itself, where we wanted, above all things, an army of efficient technical workers trained under Indian conditions to deal with Indian material. There was a related question of more direct interest to most of them—namely, the proposal to found a school of mines at Asansol, on the Raniganj coalfield. They knew that the

existing facilities to study the principles of mining were the chair of mining at the Civil Engineering College, Sibpur, near Calcutta, and evening classes at different centres on the coalfield for the assistance of young mine apprentices, preparing for the manager's certificate examination under the Indian Mines Act of 1901. While the classes on the fields had been singularly successful, those at Sibpur College had attracted very few students. In this country we had exactly the same contrast. The evening classes in mining at the colliery centres were generally successful; the University classes were generally failures. It seemed to him that this contrast must always exist in a subject like mining; and he hoped the reason would be examined carefully by the University authorities, who appeared to think that the modern University was not up to date without a brave show of technical education. A mine manager, like a master mariner, was made only by a long, and often painful, practical apprenticeship. The University life of freedom made a serious inroad on the unrelenting force of discipline which was essential for every man responsible for the lives of his subordinates. Although he was a University professor in a flourishing mining district, he had no hesitation in confessing that they ought not, and could not, compete with the evening classes of technical schools. The Government of Bengal would come to this conclusion also, if they attempted to build a school of mines at Asansol, or anywhere else. The out-of-shift classes would flourish so long as the mining industry lasted; only few, and he feared not the best, students would take what corresponded to our B.Sc.Tech. in mining. Yet there was a very necessary member of the mining community who could be trained only in institutions of University rank, and that was the mining geologist. While the training of the mine manager should be about nine parts of mining methods with one part of the scientific principles, in the mining geologist the proportion of these ingredients should be almost inverted. One was a technical man; the other a technologist. One was trained on the mine supplemented by evening classes; the other was trained at the University supplemented by sufficient experience at more than one kind of mine. Unfortunately, in our English Universities we were attempting to turn out men who were qualified either as mine managers or as academic so-called pure geologists. Neither understood the other, and both consequently were of less use in the world than they might be. It was with the idea of getting these two to run comfortably in double harness that Mr. Pickering and he joined in founding their institute. His advice to the Bengal Government would be not to found a school of mines, but to strengthen the evening classes on the coalfields, and to add a professor of geology at Sibpur. The latter should remain a residential college wherever it went, and whatever was done, its individuality should not be destroyed; it should be given a chance of maintaining a continuous history—of building up traditions which would give its students some excuse for an *esprit de corps*."

Whilst I am disposed to agree generally that it may be necessary to strengthen the Mining School in the Calcutta University, and that it is important that sound evening instruction should be given in the coalfields, I am entirely opposed to the view that efficient mine managers and mining engineers can be trained by evening instruction alone. Evening classes are, in my opinion, only suited, and indeed are eminently suited, for the instruction of subordinate officials, overmen, firemen, and deputies. Mine managers of the future must possess a sound technical training in all the branches of science applied to mining, which cannot be satisfactorily obtained at evening classes

during the time the students are working daily in the mine. After a hard day's work in the mine, it is idle to suppose that instruction can be given of the quality and quantity necessary for the complete education of a mining engineer.

I entirely and emphatically disagree with Sir Thomas that "a mine manager, like a master mariner, is made only by a long and often painful practical experience," and Universities "ought not, and could not, compete with evening classes of technical schools."

My experience has been entirely in mining in different localities in this country, and in many countries abroad. I have managed mines, and am still connected with the direct management of mines, and I say with absolute confidence that the successful mine manager and mining engineer of the future is the man who has a sound University education, together with a sound practical training. The Government of this country has seen the need for this, and has now given facilities by its legislation to enable this combination to be followed.

I would strongly advise the Indian Government to insist upon part of the training of mine managers and engineers being acquired at day classes at a University or college of equal standing.

India has to develop enormous fields of minerals; the geologist will locate these fields, but the efficient and economic development can only be undertaken

by a body of engineers, trained in a modern school, swept of those rule-of-thumb principles inherent to the class of men trained entirely in the school of bitter experience. Sound principles of science are as necessary to the successful management and development of the mine as they are to the efficient geological survey of a country, and I advise the Committee to beware of the mining geologist or expert. Both the geologist and the mining engineer, properly and efficiently trained, are indispensable and essential for the successful development of India.

In my opinion it is imperative that carefully selected Indian mining students should be sent to this country for instruction, particularly until such time as Indian mining is more fully developed. The selection of candidates would be well placed either in the hands of a committee composed of the two inspectors of mines, two members of the Indian Mining and Geological Society, and two colliery managers, or in the hands of the Examination Board under the Indian Mines Act. The present system of mining scholarships has entirely failed to meet the object the Indian Government had in view, and as the failure can be traced to the selection of unsuitable candidates, a remedy is at hand which I venture to suggest would ultimately produce efficient and capable mining engineers fully prepared to meet the policy the Indian Government formulated in promoting its scholarship scheme.

Note by Sir Thomas H. Holland, K.C.I.E., F.R.S. (Professor of Geology, and Director of the Department of Geology and Mining, Manchester University, and sometime Director of Geological Survey of India), on the Indian State Technical Scholarships.

In assuming that Indian students at present do not derive the maximum benefit possible from their training at British Universities and Technological Institutions, my conclusions are based on personal acquaintance mainly with students who have been sent to England for training in mining. In view of the fact that mining is already a well-established industry in India, offering abundant room for the employment of suitable men, it is fair to conclude that the results obtained for this subject have a wider application, bearing on the general question of the present system of sending technical scholars to Europe.

Of the mining students that I know personally, only one had had practical experience at Indian mines before being granted a scholarship, and he is among the small number, so far, who can be regarded as a success, as he is now holding a good position as an assistant manager in Bengal. He, however, like the others, was an anxious candidate for Government employment immediately after completing his course at the Birmingham University.

In drawing an inference from the consideration of mining students, it is important to remember that there are two distinct classes of so-called mining experts (the mine manager and the mining geologist or prospector), and that so far the scholarships have been utilised in a way intended to lead to the preparation of one class only, namely, the expert whose ultimate aim is to be a mine manager. So far as I know, only one scholarship has been utilised in a way which would tend to qualify the scholar to be a prospector or mining geologist, and that scholar is now completing his training at the Manchester University. As there is little doubt about his being a success, the utilisation of public funds for his assistance can be regarded as a reasonable investment on behalf of India.

Taking the failures first, it is easy to show why and how it is unwise to send raw students to England in the hope that the ordinary training at an English University will qualify them to be mine managers. Mine managers, to be qualified under the Indian Mines Act of 1901, are required to show evidence of practical experience in positions of responsibility underground, and to pass an examina-

tion in the principles of mining. Unless a student is apprenticed at a mine for some years, he is unable to take full advantage of training similar to that given in English Universities; it is possible for him to obtain a certain amount of familiarity with mining terms and with the machinery employed, but no University training can take the place of actual familiarity with the special conditions underground. A raw student, therefore, does not form a true mental appreciation of the principles of mining taught at a University, and, after obtaining his degree, he is too old, and is otherwise generally unfitted, to go through the heavy drudgery required of the ordinary apprentice. Most of the students who have returned to India with the B.Sc. in mining show an obvious awkwardness in practical affairs; they are unfitted to take charge of subordinates, and cannot be entrusted with responsible work, in which a mistake may mean the loss of lives as well as of property. In one case a returned scholar, with the B.Sc. in mining, failed to pass even the theoretical examination in India for the second class certificate. This last case illustrates my contention that even the principles of mining do not become a permanent part of the mental fibre of a student who has not had actual practical experience before coming home; for it must be remembered that, so far as the University examinations were concerned, this student was marked as successful.

The ordinary youth who is compelled to earn his living at mining cannot afford, as a rule, to cut out three years of his practical experience in order to go through the course for a University degree. He must obtain his knowledge of the principles underlying his practice by training at evening or out-of-shift classes; and, consequently, if the Government of India wish to recruit mine managers from Indians they must maintain in the country evening classes of the kind that we have in England. I conclude, therefore, that the present system of sending State technical scholars to Europe will never result in the production of mine managers.

My general knowledge of other industries leads me to a similar conclusion, modified, however, in some cases by the fact that managers of other industrial works have not the same responsibility

regarding the lives of their subordinates, and, consequently, require a less rigid training in matters of discipline. Nevertheless, it will be found as a rule that managers of industrial works obtain the necessary qualifications only by a long and uninterrupted practical experience. To such men, who have to be themselves expert workmen, the University and Technological Institution of University rank can ordinarily give little assistance; what they want, in addition to experience in works, is training of a kind given in purely technical and industrial schools.

In this class, however, there will be found a small proportion of individuals who are capable of obtaining benefit from the so-called higher training in science and technology. It should be possible, therefore, to find in India industrial workers who might be benefitted by a special course of training in Europe, either in technological institutions, or at works where the methods are, from a scientific and technological point of view, in advance of those in India. Such men will almost always be comparatively senior, certainly older than the average University student. They will benefit by their training in Europe because, having an intimate practical acquaintance with their industries in India, they will be continually forming, during their European experience, mental pictures of the way in which their newly-acquired ideas may be turned to account under Indian conditions; being also more matured they will be less distracted by the new life in English cities. This last point is one of the most important to consider, for I feel sure that our raw Indian students are seriously handicapped on coming to Europe by the enormous number of distractions put in their way. The methods of teaching now common in our Universities and Technological Institutions in themselves destroy all mental discipline. The students are provided with most expensive apparatus and are given illustrations by lantern slides, diagrams and lectures so carefully prepared that the only faculty brought into play is memory, and even that is largely destroyed by the quantity and variety of illustrations. In addition to the regular lectures and demonstrations, following one another at a rapid rate and in bewildering variety, the Indian student finds new distractions in the endless students' clubs, social entertainments and debating societies. Immediately outside the University walls he finds every possible form of inducement to forget the lessons of the day in the form of halfpenny papers, music halls, and cinematograph shows. It seems to me that it is unreasonable to expect a young Indian student, with no practical knowledge of the industry that he is supposed to study, and accustomed only to the simple life of an Indian village, to qualify as a disciplined expert after three years of such entertainment at the expense of Government. The English public school boy is not so easily distracted by University life, and knows how to keep the various forms of relaxation offered duly subordinated to the real object before him, while most of the English students who are dependent on scholarships are too poor to take advantage of these temptations to relaxation.

The object with which the Government of India instituted these scholarships will be more certainly attained by the development in the country of technical and technological schools. It should be easy to maintain a large variety of technical and industrial schools, but it may not be possible at present to provide in higher technological institutions in India every form of training required to assist existing and possible industries. It will be desirable, therefore, for some years to come to send a few select technical scholars to Europe for special training; but I think that in all cases these should be experienced and matured men, never raw, inexperienced young students.

This leads me to a consideration of the other class of mining students to which I have referred

already, namely, the class of prospectors of mining geologists. For the training of this class, better facilities exist at present in Europe; but even in this matter it would be comparatively easy to make India independent. The mining geologist requires more of the so-called scientific training and less familiarity with the actual methods of mining—he is more of a mineralogist than an engineer, but it is still necessary for him to have a clear appreciation of the methods of mining, both for metalliferous minerals and coal. His training can be given in technological institutions supplemented by a comparatively short experience in various types of mines, and the mining scholar to whom I referred above is being trained at Manchester on the distinct understanding that, while he will never be suitable as the manager of a large mine, he will be useful to a mining company which requires a more precise knowledge of its mineral-bearing lands, or is anxious to have an accurate survey of new concessions. For the assistance of Indian students likely to join this class, I admitted to my department, when Director of the Geological Survey, a certain number of young science graduates for training in economic geology, and if I had remained in India I should have attempted to develop this practice into a regular system, granting diplomas to those who showed the requisite proficiency; for I am convinced that it is the duty of the scientific and technical departments of Government in India to undertake their appropriate share of technical education. In this way numbers of private workers as well as useful assistants can be trained in the country to take the place of the more expensive imported expert; it is the duty of the officials to turn to the fullest account possible in the public interest the people as well as the raw materials. There has been a tendency hitherto for the educational department in India to be an institution apart, attempting to teach all forms of science and technology, while the scientific departments occupy themselves with their technical work without considering it a part of their duties to undertake a share of the work of teaching. As a result, the products of the education department are not often fit for employment, while other departments are undeniably dependent on recruits from Europe.

The second question offered by the Committee regarding the possibility of admitting Indian students to English works will presumably be answered by other witnesses; but it is obvious that it will always be difficult to persuade owners of works that it is to their advantage to admit immature strangers whose object is to assist competitors in their principal market. In any case, owners of works will not be bothered with casual students, while they will readily accept regular apprentices; and this brings us to the same conclusion, namely, that Indian students must go through the ordinary practical apprenticeship like the average English boy: managers of industrial works cannot be manufactured out of raw students by two or three years of free living at English Universities.

If my estimate of the situation be correct, namely, that mature workers only can fully benefit by these scholarships from India, it follows that the subjects selected will be only those directly related to existing industries in India. My reasons fall into two classes:—

(1) Only experienced practical men can fully appreciate the meaning of technological science as an aid to industrial development; and

(2) Only such students can find suitable employment on their return to India; for new industries cannot be inaugurated without capital expenditure, and financiers will not put their money on students with nothing more than the ordinary B.Sc. Tech.

As the technical scholarships were instituted with a view of assisting the industrial development of India, it is necessary briefly to consider the main

features of those industries which European technological science might assist. They fall into two main classes :—

(1) Distinctly new industries and those which can now be worked profitably only on a large scale and on European lines like most of the metallurgical industries ; and

(2) Those now existing under conditions that might be improved without an immediate expenditure of additional capital on any considerable scale.

For the first class European experts will be necessary, some or all being ultimately replaced by Indians, who will be either trained entirely on the works, assisted by evening classes, as in the case of furnace men, refiners, and founders, or obtained from technological colleges, as in the case of chemists and surveyors. The Indian assistants at such works can thus all be trained in India.

For the second class of industries the chief requirement of the assistant is familiarity with present methods and local conditions. The methods and conditions may be improved (1) by research work in Indian technological institutions, such as that now established at Bangalore and that proposed for Cawnpore ; (2) the direct utilisation of ideas obtained from more progressive works elsewhere ; but only experienced men are capable of recognising those among foreign methods which are capable of advantageous application to Indian industries.

In my opinion the principal present educational needs of industrial India of a kind that Government could appropriately finance are :—

(1) A large number of elementary industrial and purely technical schools, with evening classes in the main industrial centres.

(2) A first-class technological college for each large province or appropriate group of small provinces, provided with staff and equipment for research work on local existing or obviously possible industries.

(3) An Imperial industrial exhibition every year, held at the larger cities in rotation, in addition to the smaller local shows.

(4) Scholarships tenable in Europe and America for the assistance mainly of (a) those who intend to return as teachers to the technical schools, and (b) those who could not otherwise leave their industrial employments for higher training.

Supplementary Note by Sir Thomas H. Holland on the Indian State Technical Scholars.

In accordance with the wishes of the Committee, I have examined the Statement supplied regarding the State technical scholarships granted between 1904 and 1912, and this Statement enables me to distinguish these scholars from other Indian students who have come to England for training. As before, I confine my remarks to the subject of mining, but my knowledge of students in other departments forces me to the conclusion that the inferences drawn with regard to mining are capable of very wide application.

Of the 18 students who have been granted scholarships in mining, seven may be classed fairly as non-successes. Of the remainder, four are still undergoing training, three are students unknown to me, and four I know to be successful. Of these four successful students, three were selected and recommended by myself for appointments in India.

The expenditure on these 18 students between 1904 and 1912 amounts to just over 10,000*l.* It seems to me that the results are of far less value to the Indian mining industry than those obtained during approximately the same period for an expenditure probably not in excess of this sum on mining education in Bengal.

In Bengal mining education has been undertaken since 1904 along two principal lines : (a) lectures under the control of local committees at four centres on the coalfields of Raniganj and Jherria, and (b)

a mining department in the Civil Engineering College at Sibpur. For the classes on the coalfields I have figures only for 1908 to 1910. In 1908, 417 students were enrolled up to the end of the year, and the average attendance at each lecture was 80. In 1909 the students registered up to the end of the year numbered 230, the average attendance at lectures being 28. In 1910 the students enrolled numbered 325, the average attendance at lectures being 20.

Up to the end of 1909, of the 105 persons who had been granted certificates of competency as managers after examination, 88 had been students at these evening classes ; and it is important to remember that, in addition to those who thus obtained the manager's certificate, the remaining students, who either did not compete or were unsuccessful, were nevertheless better workers on account of their training ; the advantage to the industry secured by local classes is thus greater than that indicated by the mere number of certificates granted.

At the Sibpur Engineering College, five students obtained diplomas in 1908, one in 1909, and six in 1910. Of these 12, 11 secured good appointments on the coalfields, and, in addition to these, other students who failed to obtain the diploma found satisfactory employment.

Of the State technical scholars in mining who have returned to India, I can find only two who have obtained the mine manager's certificate, these are, H. C. Read, who is now one of the four lecturers at evening classes on the Raniganj coalfields, and C. E. Ashcroft, who obtained the second-class certificate by examination on the 20th December 1909, followed by the first-class certificate on re-examination on 30th March 1910. I have no complete statement regarding the number of certificates granted to Sibpur students since the class was started, but, in the lists of certificates published annually by the chief inspector of mines, I recognise the names of several Sibpur students whom I met before leaving India in 1909. The Sibpur College shows a record distinctly better than that due to the 16 scholars who were sent to the Birmingham University ; for the Sibpur College has not only a long list of practical successes as tested by the Government examination for competency, but numbers of other students less successful have turned out to be useful workers in the mining community. Another fair test is the membership of the Mining and Geological Institute of India, to which only one State scholar, namely, H. C. Read, appears to have been admitted.

It will be noticed that the evening classes on the coalfields and the full-time mining class at Sibpur show a relationship as regards numbers of students somewhat similar to that between the evening classes in this country and the University departments in mining. The evening classes more perfectly suit the conditions required by those who intend to be ordinary managers ; the classes of University standard more fully meet the requirements of the smaller number of students who become mining geologists or prospectors. The contrast between the results obtained in Bengal with those due to the maintenance of scholars in Europe is accentuated by the fact that the technical scholars, who get stipends larger than anything known among English scholars, were, or ought to have been, picked men. The experiment, however, is complicated by the circumstance that 16 of the 18 mining students were sent to Birmingham, the other two having not yet returned to India. Of these two students, one is now at the Royal School of Mines, and the other has just been granted the M.Sc. after a course of great distinction at Manchester. This student was selected by me in India, and will be offered a lucrative post under one of the mining companies after his return to India.

Whilst better results might have been obtained by more careful selection of the scholars, and by training in other mining schools, I feel sure that, so far as mining is concerned, the education of Indian students could have been more efficiently and

economically undertaken in India itself. The Sibpur College, being residential and controlled by thoroughly practical men, gives a far more satisfactory training for Indian students than is obtainable at any of our younger Universities in this country. The disadvantages due to students' life in Calcutta, where the larger colleges are non-residential, and to an even greater extent in our northern cities, do not exist at Sibpur, and I think the Government would be wise in supporting that and other institutions of its kind rather than in spending money on sending technical students to Europe. It is a mistake to encourage the idea that Indian institutions are necessarily inferior to those in this country. There are various kinds in each country, and colleges like that at Sibpur might be turned to much more valuable account if they were supported in such a way that the students themselves could look upon the institutions with pride.

I understand that some witnesses considered that research work could be better undertaken in English institutions so far as the immediate requirements of science are concerned. This may be true; but, if research work be undertaken with a view of improving Indian technical industries, and of training Indian students for practical work under Indian conditions, there is not the slightest doubt that the research work should be undertaken in India itself. Even gauged by the output of pure science, research work on Indian material would be more productive in India than in Europe, if the college professors were not forced by the present absurd system to give as many as three lectures a day to various classes of students. This system not only bars absolutely any attempt to undertake research work, but it results in a serious degeneration in the quality of the lectures given, while the students, being over-lectured and over-tutored, become absolutely incapable of independent thought. That research work of the highest quality can be done in India is shown from the results of the Geological Survey Department, and by the scientific sections of the agricultural department. The organisation of the Indian Institute of Science at Bangalore has been drawn up with a view of avoiding the old evils which characterise the colleges, and I have no doubt that research work of the highest quality will be conducted there both by the professors and students.

My views regarding the subjects other than mining are not based on mere casual observation, for I have had to consider many questions outside geology and mining as Dean of the Faculty of Science

in the Calcutta University, as a Member of the Board of Scientific Advice, and as a member of various committees of inquiry, including the Conference at Naini Tal in 1907, when the general question of technical education in its relationship to the industries of India were very thoroughly discussed by widely representative authorities. The end result of my consideration of the whole question points, as before stated, to the great advantage of completing the average student's education in India itself, modifying and extending local institutions to meet this end. At the same time I agree that in a small number of subjects, for which regular and continuous training cannot be provided in India, a certain number of carefully selected, and almost always senior students might be sent as scholars to Europe. The inquiries that should be instituted before a student is selected for training in Europe should extend well beyond those that determine his scientific qualifications and ability, for it is important to remember that the Indian student has generally family obligations and encumbrances of a kind that are unknown to the English youth. Technical efficiency will be dearly bought if it incurs serious disturbances of domestic and social customs regarded as sacred by the people. Modification of these, like all other delicately adjusted systems, can be made but slowly.

Whilst I think that it is difficult to counter-balance the advantages of training in India, I should be always glad to receive Indian students at Manchester, and to use my influence in securing for them afterwards suitable posts in India. I receive many more applications for students than I can satisfy from my own classes, and many of these applications are of a kind that I consider could be most efficiently met by the appointment of qualified Indians. We are making special arrangements now in our University work to absorb the mining into the geological department with a view of turning out mining geologists rather than mine managers. Such men will be useful to companies wishing to extend their operations over new areas; they will also be suitable for appointment to the Geological Survey and to educational posts. We consider at Manchester that a mistake has been made in keeping the mining and geological departments distinct, the result being the out-turn of students of pure science and mining men who are trained more especially in engineering methods without knowledge of the questions of mineral economics so essential to officers of the Geological Survey and prospectors for mineral companies.

APPENDIX VIII.

LIST OF REPORTS AND PAPERS LAID BEFORE THE
COMMITTEE.

Reports of the Royal Commission on Technical Instruction, appointed 1882 (first Report presented to Parliament in 1882, C. 3171 of 1882; second Report presented to Parliament in 1884, C. 3981 of 1884).

"The Training of Engineers in the United States," a paper, written in 1903 for the Institution of Naval Architects, by Professor W. E. Dalby, M.A., B.Sc., with discussion by Mr. A. F. Yarrow, Sir Nathaniel Barnaby, K.C.B., Mr. Archibald Denny, Mr. Hans Renold, Dr. William Garnett, Sir William White, K.C.B., F.R.S., Professor A. Barr, Mr. James Rowan, Professor C. J. Lambert, Mr. C. E. Stromeyer, Professor R. L. Weighton, Mr. H. G. Morse, and Professor D. S. Capper. (*Reprinted as Appendix IX.*)

Report of the Indian Industrial Schools Committee, and Resolution of the Government of India thereon, No. 31 (Home Department), dated 14th January 1904.

Report of a Committee appointed by the Institution of Civil Engineers in 1903 to inquire into the subject of the training of Engineers. (Printed in the Minutes of Proceedings of the Institution of Civil Engineers, Vol. CLXVI., 1905-6, Part V.)

"The relation of Science to Industry and Commerce," a paper read before the British Association by Mr. R. Blair, M.A., B.Sc., 5th September 1910. (Printed in the *Educational Times*, October—November 1910).

Report of "the Recess Committee" on the Establishment of a Department of Agriculture and Industries for Ireland (first published in 1896; republished 1906).

"Technical Education in Ireland," a paper read before the Society of Arts by Mr. George Fletcher, F.G.S., on 24th April 1912. (Printed in the *Journal of the Society of Arts*, Vol. LX., No. 3101, 26th April 1912.)

"Education for Industrial Purposes," by the Superintendent of Education for Ontario; printed at Toronto, 1910. (A study of the experience of Great Britain, France, Germany, Switzerland, and the United States of America.)

"Industrial Education in the United States," being the subject of the Twenty-fifth Annual Report of the Commissioner of Labour. Washington, 1911.

Address by Mr. D. Home Morton, M.Inst.C.E. (of Messrs. D. and A. Home Morton, Civil Engineers, Glasgow), as President of the Glasgow Association of Students of the Institution of Civil Engineers, dated 21st November 1911. (Printed by McCorquodale & Co., Limited, Glasgow.)

"Report on the Inquiry to bring Technical Institutions into closer touch and more practical relations with the Employers of Labour in India," by Lieutenant-Colonel E. H. de V. Atkinson, R.E., and Tom S. Dawson, Esq. (Printed by the Government of India, 1912.)

Regulations for the admission of pupils to the works of Messrs. Yarrow & Co., Limited, 26th March 1903. (Reprinted in Appendix IX., page 151.)

The British Westinghouse Electric and Manufacturing Company, Limited, Trafford Park, Manchester. Scheme of apprenticeship courses.

Messrs. Hans Renold, Limited, Manchester. Rules for the admission of apprentices.

Messrs. Vickers, Sons, and Maxim, Limited. Scheme for regulating the admission of apprentices to the Engineering and Ordnance Departments.

The Daimler Company, Limited, Coventry. System of Engineering Scholarships and regulations for works pupils.

APPENDIX IX.

THE TRAINING OF ENGINEERS IN THE UNITED STATES.

By Professor W. E. DALBY, M.A., B.Sc., Associate.

[Read at the Spring Meeting of the Forty-fourth Session of the Institution of Naval Architects, 2nd April 1903; the Right Hon. the Earl of GLASGOW, G.C.M.G., LL.D., President, in the Chair.]

The object of my paper is to place before you a few facts with regard to the training of engineers in the United States—facts obtained during a visit last year to investigate and report on the subject to Mr. Yarrow.

I may state at the outset that the general opinion in the United States is that an engineering training must include a College course, and the apprenticeship rules are in general framed in full recognition of this principle, and the College-trained men pass without difficulty from the College to the works.

The subject naturally divides itself into two parts:—

(I.) The nature of the technical education given in the best Colleges.

(II.) The relation between the employers and the technically trained men graduating from the Colleges and Universities.

PART I.

TECHNICAL EDUCATION.

To fully understand the technical courses, it should be realised that the primary and secondary education in the United States provide a much better groundwork for technical training than is the case with us. Students at the leading Technical Colleges start their technical course with an advantage in this respect over our own students. The educational codes and regulations for primary and secondary education are as many as there are different States. There is, however, a general similarity in principle, and a good idea can be formed of their peculiarities by the consideration of the Educational Code in one of the older States. Some of the regulations from the education laws of the State of Massachusetts are given in Appendix I.

In addition to these State schools, there are, of course, many private schools and Colleges.

At the present time there is a widespread distribution of technical schools and Colleges, ranging in character from the evening schools where mechanical drawing is taught, to the great technical Universities like Cornell and the Massachusetts Institute of Technology. Technical education in America originated largely from the Land Act of 1862, the title of which runs:—“An Act donating public lands to the several States and Territories “ which may provide Colleges for the benefit of agriculture and the mechanic “ arts.”

The amount of land given to each State was fixed at 30,000 acres for each senator or representative in Congress. New York State, for instance, became entitled to 990,000 acres. There were certain conditions attached to the grant, the most important being that the land thus granted to any State must be located in that State alone, and not in any other State. A State in which there were no public lands left would have been in a quandary had the Act not provided that in such cases an equivalent in land scrip should be issued

by the Secretary of the Interior to the States so circumstanced. In this way each State became possessed of a large amount of public land, or an equivalent in land scrip. Both the land and the scrip had to be sold by the terms of the Act, and the proceeds invested at 5 per cent. per annum, the income so derived being devoted to the maintenance of at least one College, "where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts."

The income derived from this Act must be applied to the payment of teachers' salaries and to the purchase of scientific apparatus only. Every other item of expenditure, the erection and maintenance of buildings, general office staff, &c., must be otherwise provided for, thus leaving a wide field for municipal grants and private munificence.

Further assistance was given to technical education by the Federal Government through the Morrill Act of 1890, entitled "An Act to apply a portion of the proceeds of the public lands to the more complete endowment and support of Colleges for the benefit of agriculture and the mechanic arts established under the previous Acts of Congress approved 2nd July 1862." By this Act the United States Treasury was directed to pay 3,000*l.* to each State and Territory in 1890, and to increase the amount annually by 200*l.*, until a maximum of 5,000*l.* was reached in 1900, after which the grant was to remain constant at 5,000*l.* per annum. The total grant from the Treasury under this Act in 1901 was 240,000*l.* distributed between forty-eight States and Territories.

This grant is to be applied "only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural, and economic sciences."

It is noteworthy that the Act specially directs that none of the money is to be granted to any College where a distinction of race or colour is made.

These two Acts indicate the attitude of Congress towards technical education, and specify the help that has been, and is being, given by the Federal Government. The provision of funds for the erection and maintenance of buildings, and for the establishment and endowment of all branches of technical education outside "agriculture and the mechanic arts" falls upon the States themselves, and upon private individuals.

The States themselves have independently passed measures affecting technical education in their own Legislatures. Municipalities have also the power under their State Law to appropriate money for technical education. A Technical College may receive external aid, therefore, from three distinct sources:—(1) The United States Legislature under the two Acts quoted; (2) State and municipal appropriations; (3) Private gifts.

STATISTICS CONCERNING HIGHER EDUCATION OF THE UNIVERSITY TYPE
AND INCLUDING HIGHER TECHNICAL EDUCATION.—YEAR 1900.

There are 480 Universities and Colleges in America with power to grant degrees to persons of both sexes; 141 Colleges for women, and 43 technical schools. The majority of these have come into existence during the last thirty years.

For the year 1900 the number of students receiving instruction in these Colleges in Engineering subjects is given below, the column on the right giving the numbers of the total in the Agricultural and Mechanical Colleges, that is, in those Colleges receiving grants under the Land and Morrill Acts:—

	In all the Colleges.	In the Agricultural and Mechanical Colleges alone.
Mechanical Engineering -	4,459	3,938
Civil Engineering -	3,140	1,964
Electrical Engineering -	2,555	1,617
Mining Engineering -	1,261	822
Architecture -	459	292

The gross income of all these institutions for the year 1900. was 5,711,693*l.*, made up as follows :—

	£
U.S. Federal Government - - -	596,836
State and Municipal Grants - - -	892,881
Tuition Fees - - - -	2,234,225
From Endowments - - - -	1,409,096
Other sources - - - -	578,655
Total - - - -	<u>5,711,693</u>

The gifts from private individuals during the year amounted to 2,399,093*l.*

The total property possessed by these institutions amounted to the value of 72,118,919*l.* Of this, 33,238,706*l.* represents endowment funds, the rest representing the value of the grounds, buildings, &c., used for education and research.

Table I. indicates the financial position of a few of the leading Colleges in the United States.

The numbers of students are also given, and these numbers include both undergraduate and post-graduate students.

TABLE I.

Income derived from	Harvard.	Yale.	Columbia.	Cornell.	Mass. Inst.
	£	£	£	£	£
Federal Government - - -	—	—	—	7,700	1,665
States and municipalities - - -	—	—	—	—	5,000
Invested funds - - - -	108,314	51,194	100,217	77,188	20,702
Tuition fees - - - -	133,733	97,404	83,942	46,899	41,423
Other sources - - - -	33,287	5,321	10,428	935	723
Total - - - -	<u>275,334</u>	<u>153,919</u>	<u>194,587</u>	<u>132,722</u>	<u>69,515</u>
Gifts for 1901 - - - -	167,020	128,245	194,783	27,870	92,595
Number of men students - - -	4,090	2,343	2,450	1,930	1,125
Number of women students - - -	—	43	—	369	53
		<u>2,386</u>		<u>2,299</u>	<u>1,178</u>
Percentage of total income represented by tuition fees.	48 per cent.	63 per cent.	43 per cent.	35 per cent.	59 per cent.
	£	£	£	£	£
Tuition fees for undergraduate course	30	30	40	25	40
Tuition fee calculated from numbers of students given above, and the amount received from such fees	33	41	35	20	35
Cost of education per student calculated from number of students given above, and total income.	67	64	79	58	59

The figures in the Table refer, of course, to all branches of higher education. What proportion of income is derived from technical students I am unable to say. In the case of the Massachusetts Institute of Technology (right-hand column) all the students are "technical." It is interesting to note that at this famous Institute the cost per student is 59*l.*, of which each student pays on an average only 35*l.*, although the actual charge for undergraduate instruction is 40*l.*

The progress of professional education during the last ten years in the older Universities and the two modern schools of engineering which have

won such a standing for themselves in America, namely, Sibley College of Cornell University and the Massachusetts Institute of Technology, is indicated in the following Table.

TABLE II.
SHOWING NUMBERS OF STUDENTS IN ENGINEERING IN THE COLLEGES
STATED.

	HARVARD. Civil, Mechanical, and Electrical Students in the Lawrence Scientific School.	YALE. Civil, Mechanical, Electrical, Mining, and Sanitary Eng. Students in the Sheffield Scientific School.	CORNELL. Civil, Mechanical, and Electrical Students	MASS. INST Civil, Mechanical, Electrical, and Mining Students
1890-91	—	118	—	297
1891-92	31	127	640	310
1892-93	—	168	684	313
1893-94	—	186	687	338
1894-95	—	202	623	355
1895-96	—	209	617	357
1896-97	—	174	623	352
1897-98	—	153	645	356
1898-99	—	166	686	347
1899-00	—	162	774	356
1900-01	200	163	844	372

The above figures give a good idea of the work that has been going on in the States with regard to the training of engineers. So far as I can ascertain, these institutions stand highest in the regard of the profession, though there are many more of almost equal standing from a purely technical point of view.

COURSES OF STUDY AT HARVARD, YALE, CORNELL, MASSACHUSETTS INSTITUTE OF TECHNOLOGY (BOSTON), AND MCGILL (MONTREAL).

The undergraduate courses of study are very exactly laid down, and a student selecting his particular branch of work is put through a definite course. The principle underlying the arrangement of these courses is that the first two or three years shall be spent in the study of scientific principles, and the fourth year devoted to some specialised subject. Often, therefore, men may be going to qualify in very diverse special subjects, and yet work through precisely the same general course for three parts of their time. Considering the courses of the chief Universities in order, Harvard stands more or less alone in allowing much more freedom of choice than the more modern schools. A course is recommended for engineers, but a student can vary this course within wide limits, subject to the approval of the Professor.

At Yale the work in the Sheffield Scientific School is more exactly laid down. For the first two years of their three years' course the work is practically the same for all scientific and technical students, but in the third year a student can continue his work in any one of the subjects shown in the middle column of Table III. All these courses lead to the degree of

Bachelor of Philosophy (Ph.B.). Two years more of post-graduate study leads to the degree of Civil Engineer (C.E.), or Mechanical Engineer (M.E.), or in the less technical studies Master of Science (M.Sc.), or Doctor of Philosophy (Ph.D.). The complete course in engineering is, therefore, five years, the student having considerable latitude in his post-graduate work.

TABLE III.
COURSES OF STUDY AT YALE.

First and Second Years	Third Year.	Fourth and Fifth Years.
Common Studies.	Engineering in preparation for Mining. Sanitary Engineering Civil Engineering Mechanical Engineering. Electrical Engineering. Chemistry. Chemistry in preparation for Metallurgy Natural History. Mineralogy in preparation for Geology Biology in preparation for Medical Studies. Agriculture. Studies in preparation for Forestry.	Post Graduate Work.

At Cornell the undergraduate course of study is four years. Students of Mechanical Engineering and the allied branches do their work at Sibley College, a fine building on the Campus. There is a separate building for Civil Engineering and Architecture. The Sibley College Courses are identical during the first three years, except in the case of Naval Architecture, where specialisation begins to a certain extent in the third year. In the fourth year a student may specialise in any one of the following courses:— Railway Mechanical Engineering, Mechanical Engineering, Electrical Engineering, Marine Engineering, Naval Architecture. All these courses lead to the degree of Mechanical Engineer (M.E.). At Cornell a six years' course has been arranged, so that a student may take the academical course jointly with the engineering course, the conjoint course leading to the two degrees (A.B., M.E.), that is, Bachelor of Arts and Mechanical Engineer.

There is a four years' course leading to the degree of Civil Engineer (C.E.), and a six years' course leading to the two degrees A.B. and C.E.

At the Massachusetts Institute of Technology all first year students take practically the same course. There are certain divergencies in the second and third years, though all have to take French, German, political economy, and business law. In the fourth year there are fourteen specialised professional courses, each course containing within itself options of even narrower specialisation.

A general plan of the courses is shown in Table IV. on the succeeding page, the column on the right containing the "options" allowed in the fourth year. Options are also allowed in the second and third years in some courses. In order not to narrow the men too much, the courses are so arranged that one-twelfth of the time for the first three years is occupied in literary studies. This proportion of the time does not include French and German. All the courses lead to the one degree of Bachelor of Science (Sc.B.). All the first year students work on one definite course, and are not required to make their choice of subject until their second year at College. The total number of men at the College during this session was 1,415.

There is a tendency in the College to increase the time devoted to literary studies, and to decrease the time given to the workshops.

TABLE IV.

COURSES OF STUDY AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

First Year.	Second Year.	Third Year.	Fourth Year	Options.
			Civil Engineering	{ Civil Engineering. { Highways and Railroads. { Geodesy and Topography { Marine Engineering. { Locomotive Engineering. { Mill Engineering. { Heating and Ventilation. { Quantitative Analysis. { Engineering Lab. { Architectural Design { Construction for strength. { Engine Design. { Technical Analysis { Railroad Signals. { Electric Waves { Municipal Sanitation { Structural and Chemical { Geology. { Organic Chemistry. { Analytical Mechanics { Electro-Chemistry { This course is about to be { changed to a General { Science course { Hydraulic Motors. { Applied Chemistry. { Mining Engineering { Geology (experimental)
			Mechanical Engineering.	
			Mining Engineering	
			Architecture -	
			Chemistry -	
			Electrical Engineering.	
			Biology -	
			Physics -	
			General Studies	
			Chemical Engineering	
			Sanitary Engineering	
			Geology -	
			Naval Architecture.	
			Naval Architecture for Students from Annapolis	
	Common Studies			
Chemistry -	Physics -	Physical Lab.		
Mathematics	Mathematics	French -		
Drawing -	Drawing -	German		
French or German.	German or French.	Political Economy		
English -	Literature and History.	Business Law		
Military Science.				

At the McGill University there are six subjects of undergraduate study in the Applied Science Department, each leading to the degree of B.Sc. after four years' study. The first year course is practically the same for all students in this department. Small differences appear in the second year; the third and fourth become highly specialised. The six courses are: Architecture, Civil Engineering, Electrical Engineering, Mechanical Engineering, Mining Engineering, Practical Chemistry.

In all the Colleges I visited, degrees are not given on the result of an examination at the end of the course, but on the gradually accumulated results of terminal and sessional examinations, and a thesis at the end of the course on a subject usually suggested by the Professor. There are no external examiners in the sense that we have them, and there is only one class of degree, and not, as with us, an Ordinary and an Honours degree.

ENTRANCE EXAMINATIONS.

The standard for entry is about that of a high school education, and is gradually being raised. The subjects demanded by the Colleges under consideration are shown in Appendix II.

DIVISION OF THE WHOLE COURSE BETWEEN THE DIFFERENT SUBJECTS OF UNDERGRADUATE STUDY IN THE MECHANICAL ENGINEERING DIVISION.

In order to give some idea of the relative importance attached to the subjects forming the Mechanical Engineering course at the different colleges under consideration, I have estimated in Table V., on the following page.

as near as possible the total hours of instruction given during the whole course, grouping the subjects as far as possible in the way we do in this country. The computation is based on a college year of 30 working weeks. This Table is only to be regarded as approximately correct, but the figures given are sufficiently accurate to bring out the peculiarities of the several courses.

TABLE V.

SHOWING THE TOTAL NUMBER OF HOURS OF INSTRUCTION GIVEN IN THE MECHANICAL ENGINEERING COURSE AT THE FIVE COLLEGES STATED.

	Harvard	Yale.	Cornell.	Mass. Inst.	McGill.
Mathematics - - -	225	330	150	232	540
Physics - - -	270	120	225	150	435
Chemistry - - -	135	135	210	195	150
Freehand - - -	—	90	—	45	180
German - - -	90	270	90	90	—
French - - -	—	—	—	180	—
English - - -	150	60	—	135	60
Applied mechanics - - -	285	120	285	210	210
Mechanism - - -	45	60	—*	105	270
Steam engine - - -	135	165	165	172	180
Machine design (including drawing and descriptive geometry).	540	330	600†	675	930
Engineering laboratory - - -	390	—	255	150	720
Electrical engineering - - -	80	—	60	60	60
Workshops - - -	360‡	30§	900	405	720
Business law - - -	—	—	—	15	—
Political economy - - -	—	—	—	45	—
Total - - -	2,705	1,710	2,940	2,864	4,455
Duration of course -	4 years	3 years	4 years	4 years	4 years
Average instruction hours per year	676	570	735	716	1,114
Average hours per week -	23	19	24	24	37

* Mechanism included in applied mechanics.

† Includes freehand drawing

‡ Taken during the summer months at the neighbouring Rindge Manual Training School.

§ Chiefly "workshop visiting."

In comparing the total number of hours of instruction forming the courses, it is noteworthy that whilst Harvard, Cornell, and the Massachusetts Institute each give about 2,800 hours of lectures, recitations, laboratories, and workshops during the four years, McGill gives 4,455. A large amount of private study is always necessary if a student is to keep up with his lectures, and all this has to be done in addition to the hours given in the table.

At the Massachusetts Institute the courses are so arranged that a student can do his work in 48 hours per week. Half this time is given to lectures, &c., at the College, the other half is assumed to be spent in private study. The same method appears to be in operation at Cornell and Harvard and Yale.

I think this basis of arranging the work at a college is a very good one. A student overloaded with lectures, &c., has little time left to keep abreast of his work if much more than 24 hours a week are taken up in purely college work. A good man will take more, of course, but the average man gets behind and gets discouraged.

A very striking feature in the Cornell course is the large amount of time devoted to the workshops.

Considering the above Table, an average course for a mechanical engineer may be taken to consist of 3,000 hours' instruction, distributed in the following way :—

	Per cent.
Mathematics - - - - -	10
Chemistry and physics - - - - -	15
English - - - - -	4
French or German - - - - -	3
Applied mechanics, mechanism, steam engine - - - - -	17
Electrical engineering - - - - -	2
Mechanical drawing - - - - -	20
Engineering laboratories - - - - -	10
Workshops - - - - -	16
Freehand drawing - - - - -	3
	100

It will be seen from the foregoing analysis of courses that what is understood by a technical education in the States is really four years of continuous hard work at a College equipped with engineering laboratories and workshops, and with all the educational apparatus necessary for giving a scientific education.

INSTRUCTION IN NAVAL ARCHITECTURE.

There have been courses in Naval Architecture and Marine Engineering at Cornell University since 1891. These are organised in connection with the Mechanical Engineering course at Sibley College. In fact, they are the same as the mechanical engineering with specialisation in the third and fourth years. A student may choose a course in Marine Engineering, taking the lectures on Naval Architecture, Shipbuilding and Marine Engineering, or he may choose the course arranged for those about to become Naval Architects, taking the lectures in Naval Architecture, Shipbuilding, and Ship Design. Men who have graduated at other colleges are allowed to come and take a post-graduate course at Cornell in these subjects. In connection with this department there is an experimental tank about 400 ft. long, complete with travelling gantry and all the necessary apparatus for making towing experiments, though at present it is arranged for making experiments on propellers.

The course which has been provided at the Massachusetts Institute of Technology since 1891 provides instruction for those who expect to enter the profession of shipbuilders and designers. There are thirty-nine students in the course at the present time. The Boston Navy Yard mould loft has been placed at the disposal of the College for teaching purposes, and instruction is given there to all third year students in Naval Architecture.

The Massachusetts Institute have very recently organised a post-graduate course in Naval Architecture in addition to the above, for the training of men from the Government College at Annapolis.

Courses of Naval Architecture have just been established at Columbia University, Lehigh University, and at Michigan University.

PART II.

RELATION BETWEEN EMPLOYERS AND TECHNICALLY TRAINED MEN GRADUATING FROM THE COLLEGES AND UNIVERSITIES.

It is generally recognised by employers in America that a man with technical training makes a better apprentice, and develops into a better officer than a man with only an ordinary education.

The present trend of opinion amongst employers concerning College graduates is well illustrated by the apprenticeship rules in operation at the Motive Power Department of the Pennsylvania Railroad Company, and at the large private concern in Philadelphia, Baldwin's Locomotive Works.

Considering the Pennsylvania rules first, they distinguish two classes of apprentices :—

(1) Regular apprentices. These are young men who have received a common school education, and are about seventeen years of age. They go through the regular course in the shops, and eventually become journeymen.

(2) Special apprentices. These are, as a rule, College graduates entering between twenty-one and twenty-three years of age, who after working through the regular course frequently become officers.

The rates of pay per week are as follows :—

	1st Year.	2nd Year.	3rd Year.	4th Year.
Regular apprentices -	12s.	17s.	22s.	34s.
Special apprentices -	34s.	38s.	43s.	48s.

The General Manager of the Railroad informed me that:—"College graduates, except with regard to their wages and the departmental work required of them, are received on the same terms as other employees. The Company recognise by the increased rates of pay the fact that they have already spent some time in acquiring knowledge, which, while of little use to the Company during their apprenticeship, makes them of more value than the regular apprentices."

The rules in operation at Baldwin's works are more elaborate, though in principle they are the same. A College graduate is taken on at the end of his College course pays no premium, and receives enough to maintain himself. They have three classes of apprentices, the division being made on differences of educational attainment alone. There is no way into their works except through one or other of these three classes.

The First Class includes boys seventeen years of age who have had a good common school education, and who will bind themselves by indentures to serve for four years, and to attend, during the first three years of their apprenticeship, evening schools at which elementary algebra and geometry and mechanical drawing are taught.

The Second Class includes boys eighteen years of age who have received a high school training, in which they have taken the mathematical course, and who will bind themselves to serve for three years, and to attend evening schools for the study of mechanical drawing.

The Third Class includes graduates of Colleges or technical schools, over twenty-one years of age, who have taken courses covering the higher mathematics and the sciences, and who desire to secure shop training. They are bound for two years.

The weekly rates of pay of the different classes are as follows :—

	1st Year	2nd Year.	3rd Year.	4th Year.
First Class - -	12s.	17s.	22s.	27s.
Second Class - -	17s.	22s.	27s.	—
Third Class - -	31s.	38s.	—	—

At the end of his apprenticeship each youth in the first class receives a bonus of 25*l.*, and in the second class 20*l.*

The apprentices in Classes 1 and 2 are usually put through the machine shops, fitting shops, and erecting shops. The college graduates in Class 3 are allowed to work in any department they may select. Thus a man can choose three months respectively in the pattern shop, the foundry, the forge, the erecting shop, the machine shop, and the fitting shop, filling in the remainder of his time in any shop he prefers.

At the present time there are 215 apprentices in the first class, 68 in the second, and 35 in the third class. There are a good many more apprentices in the works than these, but they were taken on before the present rules came into force two years ago. A superintendent has been appointed to look after the apprentices and administer the rules relating to them, one of which is that no youth is to be kept more than 90 days on any one job or machine. This affects those in Classes 1 and 2 more particularly, because men in Class 3 can go to the superintendent at any time and get what shifts they want.

VACATION APPRENTICES.

The students at the Technical Colleges have no difficulty in finding employment during their vacations. Baldwin's receive them freely, in fact they encourage them to come by allowing any vacation time to their credit if they subsequently come to them in Class 3, that is, after they have taken their degree at their respective Colleges.

They also take them at Altoona, in the Pennsylvania Railroad Company's shops, but they rather object to the practice because in some respects it is inconvenient to them in the operation of their shops. On the other hand, the Baltimore and Ohio Railroad wrote to the Massachusetts Institute of Technology this summer asking them to send some engineering students to work in their shops during the vacation with a view to receiving appointments after graduation.

The Central Railroad of New Jersey has now four students from Cornell and two from Purdue University working their summer vacations in their shops, and they pay them 15 cents per hour (equivalent to 36s. per week). They take college graduates as regular apprentices, starting them at any age between 21 and 26, paying them about 42s. per week to start.

A special point with regard to apprentices in the States is that no premiums are charged and substantial pay is given at once. As a consequence the "gentleman apprentice" or "pupil," as we understand the term, appears to be unknown in America; the only qualification required is a sound technical education.

Another point in which the American practice is remarkably different from ours is that age is no limit to a man who wants to get practical work in the shops, providing he is a college graduate. I am not sure if they would take on an apprentice after 21 years of age if he were not a graduate. College graduates in America never find that, whilst learning the scientific principles of their profession, they have grown too old to enter the workshops to learn the practical part. The general opinion seems to be that the educated man picks up his practice much quicker and more intelligently than the younger man with only an ordinary education. Generally speaking, the attitude of the American employer towards the college graduate is one of distinct encouragement, and of advantage to both. The employer gets the advantage of a trained intellect, the employee gets the advantage of his employer's shops and business experience. The American employer keeps an "open door" for the technically trained man, whilst with us in England the door is too often closed by rules regarding age and the like, and by the would-be apprentice not having sufficient means to pay a premium in addition to the amount he has already paid for his education. In cases where college graduates are taken on in England they are, as a rule, expected to go through the same course in the shops as a boy entering straight from school. The Americans are more yielding in this respect, and do not insist upon the drudgery of the first few years.

Whether the American system would succeed with us is an open question. The conditions in this country are somewhat different. I venture to think, however, that if employers would carefully consider the question in relation to the future of engineering in this country, there would result a greater co-operation between them and our technical colleges. The rules of apprenticeship would be altered so that the technically trained man would find an opening, and in this way employers would provide the opportunity without which the best man has no chance of showing his genius. In conclusion, I should like to take this opportunity of thanking my many friends in America for their patient assistance, always most kindly and courteously given.

APPENDIX I.

PRIMARY AND SECONDARY EDUCATION IN THE STATE OF MASSACHUSETTS.

The primary authority for the management of educational affairs in the State is vested in a Board consisting of the Governor and Lieutenant-Governor of the State and eight persons appointed by the Governor.

Every town in the State appoints a school committee at its annual meeting, which committee has general charge of the public schools in the town. Each member of the committee is paid. The committee has to appoint teachers and generally administer the Educational Code in their town. Thus every year the committee is elected on educational questions alone, and the people have, through their committee, complete control of their schools.

Some of the provisions of the Code are as follows:—

All children between the ages of eight and fourteen must attend school, otherwise their parents are fined.

No child under thirteen may be employed in any workshop or factory or mercantile establishment.

Instruction must be given on the effects of alcohol and narcotics.

Every town must provide schools giving a good English education, including, amongst other things, algebra, music, agriculture, physiology, hygiene. The Bible shall be read without comment.

Every town containing 500 householders must provide a high school in which general history, book-keeping, surveying, geometry, natural philosophy, chemistry, botany, and Latin shall be taught in addition to the ordinary subjects, and if the town contains 4,000 inhabitants the teachers must be competent to give instruction in Greek, French, astronomy, geology, rhetoric, logic, intellectual and moral science, and political economy.

Every town of 20,000 inhabitants shall maintain as part of the high school system the teaching of manual training.

Every town of 10,000 inhabitants shall maintain evening schools for the instruction of persons over twelve years of age.

Every town of 50,000 inhabitants shall maintain an evening high school.

Every town of 10,000 inhabitants must make provision for giving free instruction in mechanical drawing to persons over fifteen years of age in either day or evening schools.

The several towns are bound to maintain proper school buildings. The funds for the maintenance and working of these schools are derived partly from interest from the Massachusetts School Fund, and partly by taxation levied and collected by the several town committees. The capital amount of the School Fund is about 800,000*l.* The interest from this is distributed by the State authority in different proportions to the various towns, the grant being contingent upon the proper fulfilment of the State Code by the town.

APPENDIX II.

ENTRANCE EXAMINATIONS.

A cross, thus "×," in a column signifies that the corresponding subject is required.

—	Harvard.	Yale.	Cornell.	Mass. Inst.	McGill.
1. English Grammar -	×	×	×	×	×
2. American History -		× or 5			
3. European History -			× or 2 or 5 or 4		
4. English History -	×	×		×	×
5. Ancient History -					
6. Latin -		×			× or 7 or 8 or 9
7. Greek -					
8. French -	×	× or 9	× or 9		
9. German -	×				
10. Algebra -	×	×	×	×	×
11. Plane Geometry -	×	×	×	×	Euclid to Book VI.
12. Solid Geometry -	×	×	×	×	
13. Trigonometry -		×	×		×
14. Chemistry -	× or 15	× or 15 or 19	×		
15. Physics -			×		
16. Physiography -	Any two of			Any one of 6,	Any one of
17. Anatomy -	16, 17, 18,			8, 9, 14, 15,	16, 19, 14,
18. Zoology -	19, 20.			or 1 and 4 additional papers or	15, or a Language.
19. Botany -				Mechanical Drawing or	
20. Astronomy -				Mechanic Arts.	
Age at Entry -	?	16	16	17	?
Duration of Examination	6 days	6 days	5 days	5 days	5 days

The subjects specified for Harvard and Yale respectively are those required for admission to the Lawrence and Sheffield Scientific Schools, the respective scientific departments of the Universities.

The examinations usually take place in June and September, so that a man failing in June may have another chance in September. Cornell, however, has only one examination (in September) for the Sibley College students.

Under certain conditions, school certificates are accepted in lieu of some of the subjects of examination.

DISCUSSION.

MR. A. F. YARROW (Vice-President): My Lord and Gentlemen, I think we must all admit that we are under a very great obligation to Professor Dalby, in the first place, for bringing this very important subject before us, and, secondly, for taking such an enormous amount of trouble in collecting all these particulars and putting them before us in a form we can so easily grasp. I venture to think that we may, with advantage, consider whether the information he has, at so much trouble, put before us can be turned to profitable account for ourselves. One marked difference between the system of apprenticeship in the United States and that adopted by many firms here is that, in order to get into workshops in America, young men have only to show that they come up to a certain standard of knowledge, while in England, on the other hand, poor men's sons, although clever, are in many cases shut

out from getting a thorough practical training either from want of influence or on account of the premium demanded. This narrows the field of selection from which to draw for our future leaders. The premium system in this country is very much the same now as it was fifty years ago. It seems to be a plan drawn up apparently with the object of keeping out of the profession men who have brains but have no money. A young man, to be brought up as an engineer, is supposed to serve five years in the workshops, and an insufficient provision is made for scientific instruction. Although public opinion seems to demand what is called "technical education," whatever that may mean, there seems to be no definite view as to how science and practice are to be combined to the best advantage. I think this is due principally to the want of appreciation of the value of this combination by firms, most of whom seem to take but little interest in this subject. Sometimes in discussing this matter with the heads of firms of the highest standing, one is met by the statement that they do not see the object of scientific instruction at all, and that they have got on very well without it. The self-evident answer is that when they were brought up there was practically little scientific knowledge, and that if they were to start in life at the present time with no better training than they had in former years, and in competition with firms in this country and abroad controlled by men combining scientific knowledge with practical experience, they would find themselves at a serious disadvantage. Although one must admit that by actual experience with practical work, an engineer will gain the most valuable part of his professional education; nevertheless, in the present day, both scientific and practical knowledge must form the mental equipment of every engineer who aims at a high position in his profession. Again, it is often pointed out that the great men of the world have sprung from the working classes, and that they had no means of getting any proper training; therefore, it is argued, education is not necessary for success. The fact is, that the comparative poverty of such men involved a struggle for existence and to overcome difficulties, which developed their character, and this, combined with their genius, enabled them to fight their way to the top. Nevertheless, they themselves fully realised that their want of education was a serious handicap. Again, it is urged that many young men who have passed through a University or Technical College do not make competent engineers. Of course, their success at college only indicates that they made good students. It does not in the least degree prove that they have any aptitude for the engineering profession, that they are clever with their hands, that they have the power to control men, or that they have any inventive faculty. It does not follow that a scientific man will make an engineer; but, nowadays, to occupy an important post, an engineer must be a scientific man. It often happens that the training at our public schools is not such as to develop the thinking powers of young men, which should be the first object in view; and, in dealing with this subject recently in the *Nineteenth Century*, it has been well said that "the natural thinking power and common sense of students are often crowded out of existence by the absorption of a huge store of book-learning involved in cramming to prepare for an examination." The education to be obtained in this country in our large public schools deserves careful attention, so that the best foundation may be laid for the Technical Colleges to build upon, and above all, the training should be such as to develop the thinking powers of the students. The cramming process of working up for an examination is, to the mind, what the taking of a lot of indigestible food is to the body. Not only does one not get the benefit that is desired from its assimilation, but it occupies a space which might otherwise be filled with good wholesome nourishment. Assuming that a suitable public school education is available, together with a course in a Technical College or University, combined with practical work in a workshop, I submit that that training will produce the best men for occupying high positions in the engineering profession. Leaders of industry cannot devote too much attention to this subject, as the future prosperity of their business depends upon their training up a suitable number of first-class men from whom to select the members of their staff; and I would venture to say that it is the neglect of this in the past that has caused so many firms of eminence to sink

into obscurity. Now the question arises, how can this combination of scientific and practical knowledge be best arrived at? Some young men, after leaving public schools, go direct into the workshops, where they remain, say, five years, during which time it is often found—I found it so in my case—that they forget much that was taught them at school and, above all, they seem to lose the power of study. It is sometimes said that scientific training can be continued by evening classes; but it must be admitted that if a young man starts work at six in the morning and leaves off at five, he is not fit for much serious mental exertion in the evening. Again, if with a view to study in the evening, a lad starts work after breakfast at nine, that also is bad. It tends to disturb workshop discipline, and it certainly does not gain for him the respect of the men. Often he will find himself shut out from the most instructive and profitable work, because no foreman likes to see a machine or job standing idle. There is another alternative, that is, to go to the University or Technical College immediately after leaving school, for, say, a three years' course. In that case, a lad afterwards enters the workshop, and then often finds, when it is too late, that he is not adapted to the profession of engineering. As I have said before, success in college life only indicates that a young man is a student, and not that he is fit to become an engineer. There is a third alternative, and that is the one that has been adopted in Scotland to a limited extent, and it is substantially in accord with the method that for many years has been carried out by the Admiralty, of working in the shops in the summer and in the college during the winter. This plan, in the opinion of many leading authorities, offers the best combination. The two classes of study go on more or less simultaneously, which is very desirable, having in view the fact that the one is so dependent on the other, workshop practice enabling a student to better appreciate the value of the college course. To express it in the words of a friend: "It involves a proper simultaneous education in the properties of materials, the use and capacity of tools, and the development of the intellect in abstract matters applicable to the profession." Again, those whose home is in London, and who, perhaps, would gain their practical knowledge in factories on the Clyde or the Tyne, would have the great advantage of returning home during one half of each year and thus retaining the influence of home life by not being away for lengthened periods. Further, it enables a young man who is not suited for the profession, to be made aware of the fact as soon as possible. From the point of view of health, it would certainly be beneficial for anyone who is continuously studying during six months in the winter to have physical exercise during the remainder of the year, and, without giving offence to my athletic friends, I would venture to suggest that bodily exercise obtained in the workshops is as good as football or cricket, and possibly, at the same time more instructive. Again, this system gives the professors an opportunity of doing private work, which is necessary for them, if they are to keep in touch with modern progress and be always abreast of the times, and research work can be carried on during the summer months. By this system the professors are enabled to devote their undivided attention to their pupils during the winter, and it also gives a favourable opportunity to students to do post-graduate work. Should the system be considered the best to adopt, it only rests with the educational bodies and the heads of firms to work in harmony, in order to carry it out to a successful issue. When discussing this point the question is often raised whether firms will be found to take young men for, say, six years in alternating periods of six months; but I apprehend no serious difficulty on that score when the object in view is pointed out. Out of about twelve eminent firms whom I have consulted about such a scheme, at least eight have most readily fallen in with it, and among them I may mention Messrs. Humphrys and Tennant, of Deptford; Messrs. Wigham, Richardson, & Co., of Newcastle; Messrs. Rowan, of Glasgow; Messrs. Ferranti, of Hollinwood; and Mr. Hans Renold, of Manchester. It is also gratifying to find that some of the leading locomotive superintendents have already started schemes to secure for their lads a combination of scientific and practical training. If this alternating plan is considered superior to any other, my firm conviction is, knowing what the custom is in the United States, in Germany, and in Switzerland, that if it were generally adopted in this country in combination

with good public school training, we should have a system superior to that available in any other part of the world. In conclusion, in order to spread our net to the widest extent, we must give the sons of workmen, as far as practicable, the same educational advantages as are enjoyed by those who are better off, and there should be some well-thought-out scheme for the advancement of the cleverest lads. The importance of this is self-evident when we consider that the inventors and creators of industry have mostly come from the working classes: such men, for example, as Arkwright, a barber, the first cotton manufacturer; George Stephenson, a pitman; Faraday, a bookbinder, and others. Therefore, whatever plan is adopted, the fundamental principle we should have in view is to widen the field of selection, and give the same educational advantages to all, irrespective of wealth or influence.

Sir NATHANIEL BARNABY, K.C.B. (Vice-President): My Lord and Gentlemen, I rise to follow Mr. Yarrow, because I wish to end my few remarks with a proposal which will place before us some of Mr. Yarrow's views in a more complete form than he has given them to us this morning. Having been in correspondence with Mr. Yarrow, by his favour, for some months on this matter, I have been greatly impressed with the importance of the report which Professor Dalby has brought us from the United States, and of which he has given us the result this morning. I feel that the plan which is proposed by Mr. Yarrow, in order to give effect to this, is one which is bound to give us in our industries an advance such as we have not had for a good many years. No doubt it would seem at first as if this is a provision for putting into our industries highly educated persons at the expense of those who are apprentices, and who are looking forward to higher places. To a certain extent this is true, but one must remember that we have amongst us here men who have been thus let down, as it were, from above into our industries, and who have made a very great success of their work. I may mention, for instance, the cases of Sir William White and Mr. Watts, both of whom may be said to be men who have been, so to speak, let down from above, to the great advantage of the industrial world in general and the Admiralty in particular. The plan of training engineers in one way and training artificers in another, and letting down the engineer, as it were, from above, and lifting the artificer from below is a plan which seems to work well in the Navy. I was present with some gentlemen who are also here at a complimentary dinner recently given to Sir William White, and I was very much struck with the fact that he was surrounded by a number of men representing different departments of natural science and mechanical arts. Among the Chief Constructors of the Navy whom I have personally known there was one who, 60 years ago, was an exceedingly able sailor, and not only an able sailor, but who also had a great deal of mechanical skill, and for some years held the post of Chief Constructor of the Royal Navy, although with the title of Surveyor of the Navy. I remember very well then (60 years ago) that he was greatly opposed to the proposal which a civil engineer was pressing on the Admiralty to put a screw propeller into a ship of war; but facts eventually overcame the resistance of the Surveyor of the Navy—and the civil engineer was asked to go to the Dockyard and fit one of Her Majesty's ships with a screw. That engineer was Mr. Isambard Kingdom Brunel, and a very great success we know it was. But fancy Sir William Symonds, the gentleman of whom I am speaking, looking into that assembly the other night. He would have seen men round his successor, the Chief Constructor of the Navy of to-day, representing all kinds of science with which he has to be more or less familiar, and it is for this reason that it seems to me to be of extreme importance that we should get, as far as we can, something like what the Americans are getting in the direction of introducing as much of the general knowledge of natural science and mechanical arts as we can into our mechanical industries. In carrying out, or attempting to carry out, the proposal with which Professor Dalby concludes his paper, Mr. Yarrow has actually prepared, and prepared with very great care and consideration, a scheme which I am quite sure you will feel embodies in a very excellent manner the best of the plans which we have had before us this morning.

Therefore, my Lord, I propose, if this meets with your approval, that Mr. Yarrow should be asked to let the meeting have the proposals to which I refer, which are brief and extremely important. I cannot say how deeply I feel the value of the report and of Mr. Yarrow's action in the matter, and I should like to propose our hearty thanks to Professor Dalby and to Mr. Yarrow for it.

Mr. ARCHIBALD DENNY (Member of Council): My Lord and Gentlemen, I am extremely glad that Mr. Yarrow and Professor Dalby had the thought to go over to America and bring back this quintessence of all that is being done there. I share the late Cecil Rhodes' idea that in education there should be frequent communication between the two countries. I think that students of both nations would learn much from rubbing shoulders with one another, both in work and play. Now, with regard to this question, Professor Dalby has wisely divided his paper into two parts, and he has also wisely stopped at considering the training of those who are to be the captains of industry. The training for those men is naturally quite different from the training of a man who will be a hewer of wood and a drawer of water all his days. The present system here means that nearly always in engineering, and generally in shipbuilding, a lad goes through precisely the same mill as the ordinary apprentices. He is expected to keep even better time than they are, and the dirtier his face and hands the more he seems to be respected and thought highly of. Now, I cannot help thinking that, while this system is still largely the rule, and is still applied by many men for whose opinions I have the greatest respect, it is not quite the one for training our captains of industry, and I have the very warmest appreciation of Mr. Yarrow's proposed scheme. Coming back for a moment to Professor Dalby's paper on American training, I had lately to consider the American system in reference to a young man in whom I am deeply interested, and I got the programmes of the four Universities mentioned—Harvard, Yale, Cornell, and the Massachusetts Institute of Technology. Harvard and Yale, for naval architects, do not seem to me so desirable as Cornell or the Massachusetts Institute, and, after the most careful thought, I came to the conclusion that the Massachusetts Institute was the better of the two. It has, however, one defect in my eyes, namely, that it is not a residential college. I think that a residential college is one of the best training grounds for young men. As to the course at the Institute I thought that the specialisation began somewhat earlier than the fourth year. I notice that Professor Dalby has modified that statement in the latter part of his paper, but I rather thought that naval architecture was introduced into the course for naval architects in the second term of the second year.

Professor DALBY: Yes, it begins then.

Mr. ARCHIBALD DENNY: Now, in the Scotch system of College education, the University course is from five and a half to six months long, and it could only be under those circumstances, I think, that Mr. Yarrow's scheme would fit in, or the University course, if longer than that, would require to be shortened, and, personally, I think that five years' apprenticeship on the system that Mr. Yarrow mentions would be excellent. At present, in Scotland, the course is usually of four years' duration, but I think that five years would be better and less crowded. Mr. Yarrow did not include us among the eminent firms in his invitation to discuss this matter, but perhaps I can give some information as to what we have been doing, which may be of interest. I will deal with the yard. The drawing office is recruited as largely as possible from the sons of our own workmen or others, who enter the works as ordinary apprentices. There is an examination held from time to time under the guidance of Professor Lambert, of the Royal Naval College, who sets the papers and examines the work. If there are not a sufficient number of applicants from the yard then outsiders can also sit; but if a boy enters the drawing office from the yard he is allowed one year off, or four years' apprenticeship in the drawing office. If he comes fresh from school he has to go through five years, and he does not get any yard training. I induced my firm eleven or twelve years ago to take advantage of bursaries, which belong to the Burgh Academy at Dumbarton, and my two firms—

engineers and shipbuilders—agreed that any boy who took the bursary at the Glasgow University examination would be allowed to work six months during the winter in the College, and six months during the summer in the yard, the time he was working in the College counting as part of his five years' apprenticeship. This, I think, is precisely the system that Mr. Yarrow is advocating. We have passed through that course some five or six lads with great advantage. Not only are the bursaries direct from the academy, but there are also bursaries belonging to the School of Science and Art, and any young man who gains one of those bursaries can go either to the Glasgow University or to the West of Scotland Technical College, and in this case also we give him the privilege of working in the yard during the summer and taking his course in the winter. So that I think, perhaps, I might be able to assist Mr. Yarrow by giving him accurate results of the system which he is advocating. I think the old system of making a growing lad, who has not been accustomed to it, get up at six o'clock in the morning, brew himself a cup of tea over the gas, and eat a hard biscuit as he runs to the yard to escape being quartered, is certainly not the best system. With six months in the yard or the engine works and six months training in College, the boy would profit much more than by being two or three years in the yard after he had been three or four years at the College. I do not like the idea of taking the College first or afterwards; I think they ought to be combined right through the training.

Mr. HANS RENOLD (Visitor): My Lord and Gentlemen, the few remarks I have to make must begin with the excuse that I am here, not as a member of your Institution, but as a mechanical engineer upon the invitation of my friend Mr. Yarrow. This paper upon the training of engineers by Professor Dalby touches upon a very important problem; in fact, no weightier subject can be brought before an English engineering society at the present time. Some years ago, having visited, in company with the Principal of the Manchester School of Technology, most of the American institutions to which Professor Dalby has alluded, I can fully endorse almost all he says about the splendid opportunities young American engineers have for making themselves fit to deal with those mighty engineering problems we so often meet with in America. I am so convinced of the superiority of the American engineer's training that to-day my eldest son, twenty years of age, is studying at the Cornell Technological Institute. Whilst, in England, great efforts have been made during the last few years to bring our Technical Schools into a more efficient state, many years yet will be required to make them what the American and a great many Continental Schools are. At the present day our English Technical Schools lack two things before they can prosper as these foreign schools do. First, they lack students already provided with a general education before they can think of starting them on the study of special subjects, such as engineering, architecture, &c.; and, secondly, until very recently, few masters and managers of our large engineering works could see that it is to their advantage to have in their concerns, as leading men, past students of Technical Colleges. Machine building upon the old rule of thumb method did not require technically trained young men, but works which mean to keep abreast of go-ahead American and Continental concerns can no longer do without them. Now I have long felt that our want of efficient young engineers in England was not caused by the scarcity or inefficiency of most of our so-called Technical Schools, but by the unsympathetic reception given by most of our works owners and managers to young men who have given the necessary time and spent their money in Technical Colleges to prepare themselves for an engineer's career. Professor Ewing and Professor Stuart, late of the Engineering School in Cambridge, can confirm how hard it sometimes was to find places for their students when leaving College. Up to very recently there was almost no demand for such men, and if a few could find places, such miserable remuneration was offered, that it practically "did not pay" to go to a Technical College. I am glad to see signs, and know of efforts being made by several heads of large engineering works to put an end to this state of things, and Professor Dalby's paper and Mr. Yarrow's newly framed pupil regulations are most welcome steps in the right direction. By approving

and adopting a more liberal treatment of young beginners in our engineering works, such as Mr. Yarrow has sketched, this society of masters will take the first and by far the most important step towards introducing an effective system for the better training of engineers. Where there is a demand the supply will soon spring up. I feel sure that a nation which, only fifty years ago, had a Nasmyth, a Whitworth, and a Fairbairn, men who, although unschooled, produced such engineering masterpieces as they did, will again come to the front as soon as its youths can get the benefit of a nationally organised and well co-ordinated technical education. I am glad that Professor Dalby, in his paper, was careful to point out that it is not the training of the workman, but that of the foremen and leaders in our engineering industries that he is particularly concerned with. Anybody who is at all familiar with the management of our large engineering works will know how great is the want of able foremen, head draughtsmen, and works managers; and when one comes to realise what these men in a wide-awake concern are called upon to do, one cannot but wonder that we have so many able and resourceful men, under the present unsystematic and unorganised training of our young beginners. We sometimes accuse the workmen's Trade Unions of having rules which restrict the number of apprentices; but what are the masters doing to create a larger supply of able young foremen, draughtsmen, and works managers? Have they not for years demanded in ever so many large works a high premium, which made it possible for only rich men's sons to enter the higher walks of the engineering profession. I could never understand this foolish limitation put upon our supply of leading men, and I am very thankful to Professor Dalby that he has not omitted to mention in his paper that such system is totally unknown in America, and we have to thank Mr. Yarrow for having decided to adopt in his works more liberal conditions for young engineers, and for giving a substantial advantage to those with a Technical College education. Mr. Yarrow will not repent thus enabling College students to find work readily, and at a salary upon which they can at least keep themselves. In my experience this again is only what one finds to be the general rule in the States, and it pains me to think that with us it is rather the exception. The idea of making a little profit here and there by paying apprentices poorly, levying premiums on pupils, and paying low salaries to gifted young men is, unfortunately, far too often the case, especially in older engineering concerns. We all like to get money—so-called philanthropy has no place in business—nor should short-sightedness be allowed to have a place. But the economic results are far greater when the head of a firm aims at making money by turning out work with the help of an able, well-paid, and, therefore, contented staff, and not by paring the salaries of his leading men and those of his workmen. This question of paying our leading staff better than is the general rule has as much to do with obtaining more efficiently trained young engineers in the future as the establishment of more numerous Technical Colleges. If the masters demand better men and are ready to pay them, heads of Technical Colleges will not be slow to supply the market, and the members of an Institution like this are the very men to create such a demand, now that Professor Dalby and Mr. Yarrow have clearly shown the way.

Dr. WILLIAM GARNETT (Visitor): My Lord and Gentlemen, I thank you most sincerely for the opportunity you have given me of listening to this very valuable paper by Professor Dalby, and to the equally valuable discussion to which it has given rise, and I hope that both the paper and the discussion will bear useful fruit in the future development of engineering education in London as well as in other parts of the country. During my own educational career I have noticed two classes of students among genuine, earnest hard workers. I have noticed those who, having gone through the course of an ordinary public school are capable of studying engineering or some other technical subject to advantage without actually commencing to practice—of profiting by a three years' course in a Technical Institution or in a University, and afterwards of going into the shops and making real use of the instruction which they have previously received. The system by which advantages in engineering works are offered, especially in America, to the students who have passed through such a University course meets the needs of this class

of earnest hard workers. But I have noticed another class of students equally hard working, equally earnest, equally serious in their desire to profit, who, somehow or other, can never study a technical subject apart from the actual practice of the work. I have noticed in Cambridge among the students under Professor Stuart, who was just now referred to, men who utterly failed in University examinations so long as they were expected to learn from text-books and lectures; but when they got into what might, perhaps, be considered by many of you to be only a toy workshop, and came into actual contact with mechanical appliances, they brightened up immensely, and, after failing utterly in the University examination for a degree in applied mechanics, six months later obtained a first-class in the same examination. Now, how are we to deal with these students, who waste their time—not through their own fault, but through their constitution—unless they can combine this system of workshop practice and University instruction carried on almost simultaneously? I agree with almost every word spoken by Mr. Yarrow just now. Many attempts have been made to solve this problem, but I think by far the most hopeful attempt is that which Mr. Denny has referred to, which was adopted on a small scale by Sir Joseph Whitworth many years ago, and which has been carried on for many years past in Bristol in connection with the University College, and in some of the great engineering works in that district, namely, the system of combining six months' work in the summer in the workshops with six months' technical and professional training in academic institutions in the winter. When I first went to Newcastle I found myself in an institution which had been established very largely through the influence of the North of England Institute of Mining and Mechanical Engineers. Those engineers had come to the conclusion that they had responsibilities towards their pupils for training them, not only in the everyday practice of mining work, but in the scientific principles upon which their profession rested; but they were of opinion that they could discharge those responsibilities better by united action and by contributing towards the establishment of a Technical College, than by endeavouring to give the theoretical instruction in their own offices, and thus the College of Science in Newcastle-upon-Tyne was established, not exclusively by them, but largely by their help and influence, with the intention of allowing students to work for a certain time, say three days a week, in the mines in the immediate neighbourhood of Newcastle, and attending the remaining three days a week in the College. That, I believe, would have grown into a great educational system, but for certain difficulties, which I need not now refer to, arising especially from the Mines Regulation Act, which requires that students should work for the whole of five years "in or about a mine," and it was held by many that the work done in the College was not being carried on "in or about a mine." Happily, in naval architecture and in mechanical and electrical engineering, we are free from the restrictions to which I have referred. Now I have been asked to say a word or two about the work which is going on in connection with engineering education in London. We have, as you know, that splendidly equipped Central Technical College of the City and Guilds of London Institute at South Kensington. Then there are the mechanical and the electrical engineering departments at University College. There are similar departments of mechanical and electrical engineering at King's College, and stepping perhaps a little below the line of the schools and the University, we have institutions closely associated with the University of London. There is the Finsbury Technical College, over the engineering department of which Professor Dalby so ably presides. There are the engineering departments in the great London Polytechnics, the Northampton Institute, the Regent Street Polytechnic, the South-Western Polytechnic, the Northern Polytechnic, the Battersea Polytechnic, the Woolwich Polytechnic, and a number of other similar institutions, and in addition to those, the Technical Education Board of the London County Council is now expending something like 30,000*l.* in erecting an institute in Poplar, which is to be specially devoted to naval architecture and to marine and other branches of mechanical engineering. Another engineering school is being erected by the same body at Paddington. Now I hope that with all these schools of training we may come very closely into contact

with the manufacturing, mechanical, and electrical engineers and with the shipbuilders of London, and I hope that these institutions, heartily supported as I trust they will be by the engineers, will do something towards developing the shipbuilding and marine engineering of this, the greatest port in the world, and the port which ought to be the greatest shipbuilding centre in the world. If I were asked how we can best co-operate, I think I would say by such a system as Mr. Yarrow and others have foreshadowed, by which boys who have had a good secondary education shall be encouraged and helped to spend six months in each year in engineering works or in the shipbuilding yard, and the remaining six months in the institutions to which I have referred. I think that the engineers and shipbuilders of London will find in the London County Council and in its Technical Education Board men who are only too anxious to co-operate with them in every possible way for the development of these great London industries.

The PRESIDENT (the Right Hon. the Earl of Glasgow, G.C.M.G., LL.D.): I think, gentlemen, I ought to ask Mr. Yarrow to answer the question put to him by Sir Nathaniel Barnaby.

Mr. YARROW: My Lord and Gentlemen, Sir Nathaniel Barnaby has asked me to place before you the regulations which we have framed in concert with a number of our friends, after considering, among other things, the information that Professor Dalby has given, and I want it to be clearly understood that these regulations are based upon sound business principles, that is, we believe they will ultimately pay.

Poplar, March 26, 1903.

REGULATIONS FOR THE ADMISSION OF PUPILS TO THE WORKS OF
MESSRS. YARROW & Co., LTD.

Candidates who have obtained first-class Certificates after a complete course of instruction, extending over at least three years, at an approved Technical Engineering

Scheme A. College or who have a first-class Honours degree or its equivalent in an approved Engineering course at a University, may be admitted. They will receive pay at the rate of 20s. weekly on entry, with an annual increase of 5s. per week. Candidates who have received a similar training, but have obtained lower class certificates, may submit their names to the firm for admittance if they can be strongly recommended by the Professors; but, in any case, those who have obtained the highest honours will have the preference. The time to be served will be three years, the third year being spent in the Drawing Office if the workshop record has been satisfactory.

Candidates who have not obtained University or Technical College Certificates must be between the ages of 16 and 19. They must be examined before entry by a competent examiner chosen by the Firm, in the following subjects:—

Arithmetic and Mensuration.

Algebra to Quadratic Equations.

Geometry, up to the standard of the first four and the sixth book of Euclid.

Theory and use of Logarithms.

Trigonometry to the solution of Triangles.

Elementary Theoretical Mechanics, Heat, and Electricity.

Freehand and Mechanical Drawing.

The Matriculation examination of an approved University or the "School Leaving Certificate" of the University of London will be accepted in so far as the subjects above have been covered. Any candidate who has a more advanced knowledge of mathematics or science above the standard indicated by the foregoing list will be at liberty to submit a statement of the additional subjects in which he might desire to be examined. The rate of pay will be 10s. a week on entry, with an annual increase of 5s. a week. Recognising that a scientific education is an essential factor in a young engineer's

training, every facility will be given to pupils entering under Scheme B for attending evening classes, and it is required that at least two evenings a week shall be devoted to study. The time to be served will be four years, the fourth year, if the workshop record has been satisfactory, being spent in the drawing office.

It being the firm's strong conviction that the best course of training for engineer pupils consists in spending the

Scheme C.

winter months at a University or Technical College and the summer months on practical work in the shops, they are in consequence desirous of giving every facility for carrying this system into effect in the case of pupils entering under the conditions of Scheme B, if a complete and satisfactory continuous course, occupying six to seven months during the winter in each year, can be arranged at an approved Technical Engineering College. Under this scheme work in the shops may be combined with a University or Technical College course. The rate of pay while in the shops will commence at 10s. per week, rising gradually to 30s. per week. This scheme may be extended to pupils who are doing post graduate work, having entered the workshop under Scheme A.

No premium is required under any of the above schemes. Candidates under Schemes A, B, and C, must give proof that

General.

their school and college career has been satisfactory as regards diligence, punctuality, and general conduct, and they should give an account of any prizes or other distinctions they may have obtained. Pupils will be required to serve three months on probation. All pupils will be required to start work at 6 a.m., and to conform to the regulations of the establishment; they may be dismissed at any time if their conduct is not deemed satisfactory. It is desirable that pupils should reside within a two-mile radius of the works. All pupils must enter into an undertaking jointly with their parents or guardians to remain the full term specified, in the event of the firm desiring to retain them, and their admission depends upon there being vacancies. The firm reserve to themselves the right to ask any pupil to retire from the works should he not be considered by them suitable for the profession of an engineer, or should he be irregular in his attendance, or have indifferent health. It being very desirable that pupils should visit manufactories, works in progress, &c., every facility will be given to take an afternoon off, not, however, more frequently than once a month, with this object in view. The firm reserve to themselves the power to modify these schemes in exceptional cases, at their discretion, but no personal influence will in any case be allowed to affect their decision.

Assuming a lad's school training terminates prior to his arriving at the age of 18, under Scheme A he can get his college qualification at 21 and finish his workshop experience at 24; under Scheme B he can complete his workshop time at 22; under Scheme C he can finish his technical and workshop experience at 23.

Scheme A is adapted to young men who go through a University course after leaving school. It is based upon the American system. We believe that young men who have distinguished themselves at college have thus shown that they have perseverance, industry and intelligence; but whether they will turn out engineers or not remains to be seen; but as a rule, they are worth more than those who have not passed successfully through a college course. Under Scheme A, candidates have three years in the college first and then three years at our works. Scheme B is for a less well-educated class. Under Scheme B, one object throughout is that the last part of the time shall be spent in the drawing office, so that the firm, if they desire it, can retain the services of those who are most efficient. And there is also Scheme C. As to when a lad will finish his time, that depends upon what age he leaves school with sufficient knowledge; but, assuming he starts between 17 and 18; under Scheme A he ought to finish up with the two courses at 24 years of age; under Scheme B he ought to manage it

at 22; under Scheme C he should manage it at 23; and at the end of Scheme C he ought to know as much as at the end of Scheme A. But it will be seen he saves a year by Scheme C, because at the University he only works about eight months in the year; so that four out of twelve months are lost: thus by Scheme C he saves three periods of four months. I think it very desirable that some competent member of the staff should, among his other duties, keep a watchful eye on pupils and apprentices; he should keep in touch with them, look after them, and give them what advice they want. This would enable him to pick out the brighter lads quite apart from any kind of examination. As to the time of starting work, or the wages paid, and so on, we have decided upon what we think suitable; but that is quite distinct from the alternating system of work and study which I find receives very general approval. I should like to take this opportunity of thanking many of my friends who have kindly assisted me in the preparation of these schemes—Sir Nathaniel Barnaby, Sir William White, and many others. With regard to the mechanics' sons who enter the factory to be brought up to a special trade, care must be taken not to let them be shut out from any advantage if they are specially bright. The scheme for the admission of those lads is this:—Those who at any time can pass the examination required by Scheme B would come under the regulations for pupils, so that the smartest lads who enter the works merely to be brought up as mechanics can be thus selected and transferred to the other class, and reap the advantages of a more extended system of training.

Sir WILLIAM WHITE, K.C.B., LL.D., Sc.D., F.R.S. (Vice-President): My Lord Glasgow and Gentlemen, it is well known that I have taken a great personal interest in this matter of the technical training of engineers for a very long time. In season and out of season I have maintained the view, which Mr. Yarrow endorses, that concurrent, or as nearly as possible concurrent, practical and technical scientific training is the best solution of this question. Mr. Yarrow has incidentally referred to what the Admiralty has done: Admiralty experience extends over nearly forty years' continuous working, and is eminently satisfactory in its results. It cannot be supposed, therefore, that in proposing a general adoption of that system, as Mr. Yarrow does, any great experiment is to be made or any great risk run. The Admiralty founded the Royal School of Naval Architecture and Marine Engineering on the recommendation of this Institution in 1864. In 1873 it was transferred to the Naval College at Greenwich, becoming a section of that establishment; so that, as I have said, for nearly forty years there has been continuous working and absolute proof of the success of the system. I do not say it is perfect, but its distinctive features are worth consideration. Before being admitted to the higher course of training, students have to satisfy certain conditions as to preliminary mathematical and technical training. The course of study extends over three years, and students are alternately employed at the college and in the dockyards. There are, no doubt, some difficulties in the way of the absolute and general application of that system; but if employers will do their part, I feel confident that there will be little, if any, difficulty on the part of the Technical Colleges and the Universities. It seems to me that the attitude of employers towards this matter is the determining factor at the present time. Employers are not wanting in intelligent appreciation of what makes for their interest, and I have every hope that many of them will give the suggested system a trial. The movement which has been going on for many years in favour of technical education has involved much expenditure, has been exceedingly well meant, and is a recognition of the importance of proper training. In such a new departure it was natural that there should be unwise things done at first and some waste. But now, taking matters as they stand, there is no doubt that we are recognising more clearly the necessity of distinguishing between two systems of training, both of which are wanted. Personally, I sympathise most thoroughly with what Mr. Yarrow has said, and I trust that nothing will ever be done in this country to shut out from the chance of the highest advancement those who happen to be born in the working classes. On the other hand, no one can doubt that there ought to be provision for the proper education of those

who are in better circumstances; and I think the scheme of pupilage, of which Mr. Yarrow has given us particulars, provides for both those conditions. In the national interests it is necessary to get the best brain, wherever it may happen to exist, and to give it full chance of benefiting itself and serving the country. We owe to Professor Dalby a great debt for so clearly setting out the distinguishing features of the American system—the better preparation for technical training, the more moderate cost to the students, the longer period of training, and last, but by no means least, the attitude of the employers towards the men when they are trained. I feel strongly that there is a great need in this country for imitation of what prevails so largely in the United States; that is, the benevolent support, by those who have the means, of institutions for training engineers. I notice on page 3 of this paper that whereas the gross income of the institutions in America is shown to be about 5½ millions, only 1½ millions come from the State or municipal funds. It would be very interesting if we could have the corresponding figures for the revenues of British institutions. Perhaps Professor Dalby can give them. It is quite clear, however, that the cost to the student—and that is the point I wish to make—will be kept down when private generosity as well as State aid supply so much financial help. It is not only in the United States that this is true. It is true also in Germany and other countries. We do not want to discuss Continental systems to-day, but it is a very important fact that engineering students can obtain their technical training abroad at much less cost than in this country. This question of expense has probably had to do with the fact that some British students have gone to Germany to study naval architecture, and it also accounts in part for the larger number of students in foreign institutions. For instance, in Berlin a few months ago I was informed that there were about 350 to 400 students of naval architecture and marine engineering in the Technical High School at Charlottenburg. What is the total number of students of naval architecture and marine engineering in corresponding institutions in this country at the present day? Students do not merely attend in greater numbers, but they remain longer, because the cost is so much less. If the institutions which afford training for engineers in this country can reduce their fees, there will obviously be a greater chance of drawing in all the classes that we wish to help. I think, sir, that if this discussion has the effect of enlisting on the one side the active support of employers, so as to give facilities for carrying out this idea of alternate study and practical experience, and if, on the other hand, it should lead to the discovery of pious founders who are prepared to do for English institutions something like what has been done in America, we shall all have great reason for gratitude to Mr. Yarrow for suggesting to Professor Dalby that he should ascertain the facts and place them before us, and to Professor Dalby for the manner in which he has carried out that task.

Professor A. BARR (Associate): My Lord and Gentlemen, I have personally to thank Professor Dalby and Mr. Yarrow for bringing this important matter before the Institution of Naval Architects. As Professor Dalby has said in the last paragraph of his paper, it is a question of national importance. I believe it is also one having a direct bearing on the future success of individual firms, but that is, of course, a narrower aspect of the subject. There is only one point in Professor Dalby's excellent paper upon which I should like to say a word in other terms than complete approval, and that is as to the use of the word "technical." I share the view held, I believe, by most engineers, that, properly speaking, the function of the College or University is to give a scientific training, and that the "technical" training in the proper sense of the word can only be acquired in the workshop. It is, perhaps, merely a question of words; but sometimes words help to clear or confuse our ideas. In the Scottish Universities, keeping this point in view, we have set ourselves against giving degrees in "engineering." We do not give such degrees as "Mechanical Engineer" or "Civil Engineer," referred to in the paper, only degrees of Bachelor and Doctor of Science. A great deal that professors have said upon the training of engineers has been disconnected, and perhaps properly so. As Mr. Renold remarked, this

is largely a master's question, and I am indeed glad to hear it discussed as such in this room. The old idea in this country was that a boy had to begin at fourteen or fifteen and go through the mill, with no time for a thorough study of the scientific basis of his work. Undoubtedly, most of the engineers of to-day have done so; but I think, if you look into the history of our profession, you will find that it is much less so in regard to the men who have made the profession what it now is than most people suppose. To take one example only; if you study the history of iron and steel manufacture from 150 years ago up to to-day, you will find a very remarkable fact, viz., that not one single *great* improvement has been made by a man who has been trained in the usual way to that trade or profession from an early age. Take Huntsman, Cort, Mushet, Bessemer, Siemens, Thomas, and Gilchrist, and many others one could mention; there is not one of those men who was trained in the usual way to iron or steel manufacture. On the other hand, you will find that every one of them had studied the science on which his practice must be founded. The case is similar also with regard to many of the great engineers of past times. Mr. Renold has instanced George Stephenson as a man who had no scientific training. He was a student of science all the same, and, recognising his own difficulties, he sent his son Robert to Edinburgh University to study there. And that brings up another aspect of the case. One important reason why Robert Stephenson was sent to Edinburgh appears to have been because the cost of education was too great in most other places. Professor Dalby has properly pointed out that the cost of education in America is not at all met by the fees. Neither is it, I believe, in any institution in this country. America has looked at this question in a different way from that in which it has been looked upon here, and the American Ambassador, a few years ago, speaking in London, made the remarkable statement that "the greatest industry of America is education." There is more truth in that, I think, than one is usually apt to suppose. Now, in the University with which I am connected, the fees are much less than any that have been mentioned here to-day. A student takes his University course at Glasgow, paying something like 12*l.* or 14*l.* or up to 16*l.* a session, and about 55*l.* will cover the class and matriculation fees for the whole course; and for Scottish students who require such aid and can pass the preliminary examination, the whole of the fees are paid from the funds of the Carnegie Trust. Sir William White has referred to the forty years' experience at the Admiralty of the "sandwich" system of training engineers. I think I may say that in Glasgow we can appeal to sixty-three years of similar experience. For the whole time that the chair of engineering has been in existence the session has only been one of six months, and in this room to-day I have seen quite a number of men who have had scientific training there under that system. It is, therefore, not one that has not been well tried, and I think we at least will not think of going back upon it. And I may also say that I do not know a case in recent years of a student who desired to get into works on the six months' basis failing to find an opportunity of doing so. Something like 80 or 90 per cent. of our students take their course on the "sandwich" system. I am very glad indeed that Mr. Yarrow has taken this subject up. His position gives his words and his actions the greatest weight, and I know also that the appreciation in which he is held will be a strong incentive for others to follow where he is so kindly and so ably leading.

Mr. JAMES ROWAN (Member): My Lord and Gentlemen, I should just like to refer to a proposal which we are drawing up in connection with our works to forward and develop a scheme such as Mr. Yarrow has proposed. Our proposal is that every apprentice should be given the opportunity of attending the University or Technical College for three or four sessions whilst he is serving his apprenticeship. He will require to work in the workshop for at least a year. There will be an examination, which will be equivalent in value to some standard examination, and selected by a Professor to meet our requirements. If the boy passes this he will be allowed to attend the University for three sessions, which will be included in the time of his apprenticeship of five years. If he takes four years to pass his final examination he will require to serve an apprenticeship of six years. The

boys who pass the examination will be given a substantial increase of wages. If necessary their wages will be paid them while attending the University, and every encouragement will be given to these boys. Entrance to our drawing office will be as at present, viz., a boy must have been for at least two and a half years in the workshop, and have kept to within two and a half per cent. of perfect time-keeping. Entrance is then gained by competitive standard examination, and a substantial increase of wages is given to those lads who pass this examination. The parents of one of the last 50 apprentices we have given employment to are in a position to give the lad a University education. The parents of about three or four would, with some assistance, be able to give their sons a University education. The other 45 are boys who have left school at about fourteen years of age, commenced their apprenticeship when about sixteen years of age, and, during these two years have all, without exception, been working. Not one of them had attended evening classes during this period. The bright and clever lads will come to the top under any circumstances, but there are quite a number of those we have in our employment who can be greatly assisted, and who, with a little encouragement, will be vastly better for a University education. I wish to emphasise the fact very strongly that we are decidedly of opinion that the best we can do to assist young men is to enable them to attend the University in winter and to work in summer. We have come to this decision after a good deal of discussion with those on our staff who are well able to speak from their own experience.

Professor C. J. LAMBERT (Associate): My Lord and Gentlemen, I should not have ventured to come forward here except that I have been asked to do so, as I fancy it may appear that the professorial element has been already sufficiently in evidence. It is natural that we teachers should be looked upon with a certain amount of suspicion when we come to talk about matters connected with the education of engineers. I had the pleasure and advantage of consulting with Professor Dalby on the subject of his paper, and I must confess that I was very much struck with the contrast of the American practice with what has been for so long the custom here in England. It seems to me that when an American employer desires an addition to his staff, he simply writes to Cornell or one of the other Technical Colleges and asks for a college man. They appear to keep the article in stock, and they send on a theoretically trained and likely man at once. I understand he is supplied immediately with a living wage, and although, of course, it is not all those thus sent who turn out great successes in practice, yet the employers find it pays them to go to this expense with the hope—the certainty in fact—of ultimately getting good men by this means. I am glad to see that the masters are waking up, and, indeed, our own Government also. As you know, the Admiralty has gone so far as to appoint the very best professor of theoretical engineering they can find, a man, I may say, pre-eminent as a teacher and authority on all branches of scientific engineering. They have dignified him with a title exceeding that held by his predecessors at the Royal Naval College, he is to be called the Director-General of Naval Education. I think it shows that our leaders are beginning to feel that the question of scientific engineering education is vital to the country as a nation. The contrast provided by the American system seems to me very great in view of the obstinate adherence to the belief in the omnipotence of pure handicraft, and of the contempt for scientific teaching which has hitherto been so prevalent among the masters in England. My chief object in addressing you is to raise a point which has not been alluded to to-day (possibly because there is plenty to talk about), and that is, the question of the proper supply of instructors. My own impression is that it is harder to make a good teacher than to make a good engineer. A really successful teacher is a *rara avis*, and I think that, when once he is discovered, he should be encouraged and retained. The existing practice in all the Technical Colleges, and, I am afraid, also in many places of general education is, it seems to me, to appoint almost any one to teach, without first knowing whether he has that very rare and important gift. Now, speaking from long experience, I am sure that our boys do not get that accurate and sound teaching in elementary

mechanical laws at the Technical Colleges which they ought to receive from the junior staff, and I think it is for this reason: the instructors are appointed at a low salary and have no prospects to encourage them to make teaching their profession. A young, and probably clever, student, thus appointed, may be, and often is, utterly incapable of imparting his knowledge, and he does not find it worth his while to devote himself to the labour of learning how to teach. Now, this is all wrong. You may say, of course, that we cannot afford to do anything else. Then I say, gentlemen, if you make a scheme for technical scientific education, a very necessary part of it is that you should provide the proper tools with which to carry it out. I have heard a successful and eminent engineer say that he does not care in the least what a tool costs him, provided it is ten per cent. better than the one he will have to replace and throw upon the scrap heap. If that is the case, why do we practise this very serious false economy in the matter of the supply of good teachers. I am not speaking for myself or for others who, like myself, have no reason to complain of their position; but I am speaking more of the junior assistants at the Colleges who, after all, do the bulk of the teaching. I think you ought to pay them much better, and ought to give them encouragement to stay on to learn their profession of teaching, and not, after they have had some practice with their pupils and have learned to a certain extent how to teach them, allow them to go away in search of a better salary. That, I take it, is a very crying evil, and the cause of many educational failures. A thirty years' connection with the teaching profession convinces me of the urgency of reform in this direction, and I think the matter is worthy of serious consideration. With regard to the proposed system of "sandwiching," as it is called, the scientific and the practical education, I may say that I am heartily in favour of Mr. Yarrow's third scheme. I have some experience of the others, and the question as to whether you should first send a boy to the Technical College and afterwards for three years to the shops, or whether you should invert the order and put the shop training first, is very much debated. My own opinion is that neither method is right. I think, if you send a boy to a Technical College and let him study for three years, he will by that time, perhaps, have contracted a certain distaste for the practical roughness of the workshop and for the associations he would there have to make. And if, on the other hand, you send him to the workshop first, he may, in his three or four years there, lose all his student habits and the desire for study. I believe it is very common for both of those experiences to occur. I do not believe for one moment in the other plan of sending a boy to the workshops and encouraging or forcing him to try to acquire all the necessary scientific education in evening classes. I speak from an experience gained both as a teacher and a father, and know how difficult it is to get a boy, who has to get up at a quarter past five in the morning and work till five o'clock in the evening, to settle down to scientific thought after that time. It is as much as you can do to keep him awake. It seems to me that Mr. Yarrow's third scheme solves the difficulty entirely. I quite believe that the six o'clock attendance at the workshops is necessary, because I think it very important that a pupil in the works should go through exactly the same experiences for a considerable period as the workman whom he hopes to command in after years. I think that can be very well done in the six summer months, and that the six winter months should be devoted to scientific technical study. May I revert to the question of the provision of an efficient instructing staff, and express the hope that most of you may think as I do of the extreme importance of first carefully choosing your teachers and then giving them the opportunity to learn their work, and to adopt it as a profession (with sufficient leisure, of course, to enable them to keep in touch with modern progress), instead of encouraging them by actual need of a better income to go elsewhere.

Mr. C. E. STROMEYER (Member of Council): My Lord and Gentlemen, I need hardly add any words to those which have already been said, not only as to the value of the paper, but also as to Mr. Yarrow's proposals. The interesting discussion we have listened to shows the importance of the paper, and I think it would be very advantageous if this discussion could be printed and attached to the separate copies, for I believe that in this

particular case the discussion has been quite as valuable as the paper itself. I wish to make a few remarks about some points of the paper before dealing with the question of education generally. Our American cousins have several advantages over us in regard to technical education. First, their workmen are quite reconciled to the idea of automatic and labour-saving machinery, and, although it is perhaps not quite fair to say that the American engineer is more a machine tender than an engineer, I think to a very large extent that is the case. In England, engineers have to learn manipulation, but in America this is not so necessary. In some respects their conditions are similar to those in chemical works. If anything goes wrong with a process, a furnace, or a retort, or anything else, it is the manager or the sub-manager who is applied to for instructions, he being the one who knows all about it; but in an engineering works here one would hardly go to the manager for information about, say, a forging. The smith who manipulates iron all the year round is expected to know, and generally does know, more about forging than the manager, and there are hundreds of other operations in English engineering shops about which the men, through their intimate knowledge of the materials and of the work that has to be done, know far more than the manager himself, and the managers are, therefore, in England, at a disadvantage. But in America, where there is so much work done by automatic machinery, the managers themselves really have the control of the business. In that respect I think it is very much easier in America to draft men with scientific college training direct into the shops than is possible here in England. I do not believe that British students drafted into the works would acquire that command of the men which they do in America. There, a thorough knowledge of the latest devices is essential to a manager, so that he may be in a position to instruct his—often untrained—men; here the men won't be bothered with novelties. Now there is one point that has been referred to by Professor Lambert with regard to the teaching staff. I do think that every endeavour should be made to increase the salaries of the teaching staff, and thereby attract men who really know not only the scientific side of the question but also the practical side. It is quite impossible to get men who have had any real practical experience to go to Universities and Colleges and give the results of their practical experience in combination with theory to their students unless they are exceedingly well paid. If a man has a good combination of both theory and practice, he is worth ten times more in a shop than any salary that he can command at any College. I see by the paper that the fees paid by students in America are between 40*l.* and 50*l.* per annum, and in Scotland I understand they are now reduced to nothing. I studied in Germany, and, as far as I can remember, the fees which I paid for sixty hours of lectures and drawing, per week, were about 6*l.* for the whole year of three terms. As far as my memory serves me, the average fee was 2*s.* per hour per week for the three terms. My technical education in Germany, combined with town living, was much cheaper than the school education of my brother, who was six years younger than I, and who was at a public school there. On an average, my expenses for three years amounted to 120*l.* in Aix-la-Chapelle, and this, being a fashionable watering town, was naturally very much dearer to live in than most other towns in Germany. Scholarships are hardly known in Germany. There are a few, but nobody boasts of enjoying them. In my opinion, scholarships, especially the really valuable ones, tend to cause cramming, and this simply means learning by heart, which is fatal to the thinking powers. Boys who have the power of remembering words, win scholarships easily, whereas those who have the power of thinking, and who, more often than not, have only medium memories—the very boys we all wish to make engineers of—have no chance of doing so. These scholarships, in the case of engineering sciences, really encourage a class of boys who are unfit for that particular branch, or who become unfit through cramming. I fear that our English education tends very strongly to exaggerate our memories and, at the same time, to kill the thinking powers. The whole system of English preliminary education seems to be a thoroughly classical one. Consequently, only boys with good memories get on well at school. Those with common-sense thinking powers, if not crippled at school, get on in after life. The headmasters of our

schools are almost all classical scholars, and it is quite natural that these men, who are doing their best for the boys, will teach them what they think is best, and what they have always been taught to look upon as best for themselves, viz., Latin, Greek, and Euclid, which means learning by heart and how to live by rule, with less and less thinking requirements. To be successful at examinations the boys must know what is expected to be in the examination papers. The system requires that the memory should be trained, and, therefore, does not allow the boys to think for themselves. Such training, I think, kills all but the most exceptional faculties in a boy. The recent discussion about the engineers in the Navy has brought to the front a question which really hinged on their social position, and I for one thoroughly welcome the recent Admiralty scheme in which it seems that these matters may be altered for the better. If you compare the various professions, you will find, for instance, that lawyers and others who have to study the classics never come into intimate contact with workmen. This is true even of chemists and medical men, whereas engineers, if they are going to be successful, must go through the shops at an early age. I do not mean to say that a boy there is actually learning how to handle men, but he comes in contact with them, and in after life he knows how to deal with them better than does a youth who has been at College till he is twenty-two or twenty-three, and is then put into works. Now I come to this question, about the difficulty of engineers being both good engineers and gentlemen. Their contact with the workmen militates against them. Well-to-do boys (of, say, fourteen to sixteen years of age), going through the works, will have previously received what might be called a classical education. They know Latin and Greek and Euclid. These accomplishments make no impression on the men, but the knowledge that the men possess, their ability to forge and hammer and chip, to file, saw, plane, turn, &c., appeals to the instinct of young boys, and they very soon look up to their fellow workmen as being vastly superior to the schoolmasters who have been teaching them what now appear to be useless subjects. That admiration for the workmen's abilities will, in a comparatively short time, ripen into a feeling of admiration for the men themselves, to such an extent that their language and their manners will be copied, and by and by, if the contact continues, these well-to-do boys will be proud of being what they call "rough diamonds." I think it would be far better for boys going to shops at an early age that their education should have been such that when they go there, they should have knowledge which is superior to that of the men in their own particular line. Give them a little knowledge of physics and chemistry and mechanics—they need not know much, because the workman does not know much—they would then be able to estimate the workmen at their true worth, and would be able to see that these men do not know as much as would be thought by other boys fed on classics only, and the boys would not acquire that admiration for them which they do at present.

Professor R. L. WEIGHTON (Member): My Lord and Gentlemen, the subject which is before us at present is one which, to my mind, cannot be exceeded in importance for an institution such as this, raising as it does the whole question of the training of those who have to carry on engineering and its allied industries in the future. In discussing this matter, it has always seemed to me to be very important indeed to begin my making sure as to what classes we are to educate. With outsiders—in newspapers, and popularly—there is a great confusion of ideas between apprentices and those who are something more than mere apprentices. One might distinguish as between "apprentices" and "pupils," for instance; meaning by the former the young artisan or workman, the young rank and file of the engineering army, and meaning by the latter, the pupils, the young officers of the engineering army, the draughtsmen, the managers, the employers, and others who are to direct the labour and prepare the designs on which the others work. This point has already been emphasised to some extent, but I think we cannot emphasise it too much or too often, and I should therefore begin by observing that what I have to say refers entirely to the education of the latter class, the pupils. That class, I take it, is the only one referred to in the very interesting and instructive paper of Professor Dalby. I think it is

indisputable, and granted on all hands, that this country is vastly behind our great competitors, America and Germany, in the education of the pupil class, the officer class, in engineering—and in engineering I include naval architecture, of course. As regards the artisan—the British artisan—those who are generally considered to speak with authority tell us that he is second to none in the world, and my experience certainly bears it out. So long as he works, his work is very efficient. With regard to his education, important as it is, I think we need not trouble ourselves at this meeting. There is already sufficient provision in existence for his education. His five years' apprenticeship in the works, coupled with attendance at such evening classes as are to be found at any one of the very many efficient schools, polytechnics or colleges which have evening classes, will provide sufficient equipment for the efficient discharge of his duties; but when we come to the other and higher class, the pupils, then we come into a field in which, we must all admit, this country is lagging sadly behind. And this leads one to inquire why this should be. Why should the education in this country of the pupil engineer who is to direct others, who is to design and to scheme and to think, be behind that of other countries such as Germany and America? To my mind this question finds an answer in the second part of Professor Dalby's paper, and this is a point that I wish to emphasise, although I have been to some extent anticipated by Sir William White. He said something which, to my mind, has all along applied with very great force. I think an examination of this question will show that the reason we in this country have lagged so much behind in the higher technical education is due almost entirely to the general attitude of the employers towards the college-trained man in engineering. I do not say this as a reflection upon the employers. I think it is natural, in the history of engineering in this country, that such a state of things should have come about, but we have now reached a stage at which we ought to set about putting our house in order. If we do not do so, we shall certainly suffer in the immediate future, and ultimately we shall suffer very seriously indeed. There is, I think, no doubt about that. Professor Dalby has very well shown in his paper that in America—and I think the same thing may be said with regard to Germany—the employers look upon a thorough college training, obtained by an organised course of instruction in day classes, as essential to an engineering education, and, furthermore, that they are prepared to give privileges in the shape of access to the different departments of their workshops, and increased pay to young men who have had that training, thereby providing the best of all inducements for them to equip themselves in that way. Now what do we have in this country? Speaking with some experience both in the workshop and as a teacher of engineering and naval architecture, we find as a rule the very reverse. I am very pleased, however, to notice that this spirit is fast leaving the employers of this country. Since I came here this morning two or three cases have been prominently brought forward in which employers have changed their system, and are now prepared to look at college-trained men in quite a different light; but one swallow does not make a summer, and I fear that the great majority of our employers have still got the notion that a young man who has gone through an engineering curriculum at college is no better as a pupil than another who has come direct from school. That is absolutely the case with a great number of our employers, and they will therefore give no additional privileges or consideration to the man who has gone through a college training. Now it seems to me that this is the crux of the whole problem, and if we could only persuade engineering employers to offer inducements either similar to those offered in America, or other equivalent ones, we would have no lack of thoroughly qualified young men. It is not to be supposed that a young man should voluntarily undergo for three or four years' severe mental exertion such as is entailed by a University course in engineering science, or that he should deny himself many pleasures during his pupilage all for nothing, or when, at any rate in the immediate future, he can see no benefit. We cannot expect that, unless there is some direct and immediate inducement offered. That to my mind is at the bottom of the whole problem. The question then arises, how can we so arrange matters that this will not be so in the future? And that naturally leads us to the very instructive and

suggestive regulations which have just been presented by Mr. Yarrow. I do not think there is any one who has considered this question broadly, but will agree that those regulations, or something similar to them, are a very good solution of the question, and if we could only persuade engineers to adopt them, the problem would practically be solved. If employers say that it will not pay them to offer these inducements in the shape of increased remuneration to a college-bred student just because he has acquired a University education in engineering or naval architecture, that it will not pay them to allow him to absent himself to attend college, thereby to some extent disorganising the workshop, my answer to that argument would be, try it. If the Americans have found that it pays, I do not see why we should not, and Mr. Yarrow has told us that he at least has deliberately framed those regulations from the point of view of £ s. d. He considers they will pay. I should say it is one of the best investments that an employer could make. By and by (I should say within five or ten years) the return will come in the shape of a greater available number of well-qualified young men, capable of taking up the higher branches of engineering and naval architecture. My Lord, I should also like to mention, with regard to the regulations which Mr. Yarrow has presented, and which it seems to me, focus the whole of the matter presented to us by Professor Dalby, that they have been brought before several of the employers on the North-East coast of England, and I am authorised to mention that there are about half a dozen at least of the firms there who have already intimated that they are wishful of adopting regulations somewhat similar to these. Before sitting down I should just like to say, because I feel it very personally indeed, how much indebted I think the profession, and, indeed, the country generally, is to Mr. Yarrow for his disinterested initiative in this matter.

Mr. H. G. MORSE (Member): My Lord, not having heard the paper read or discussed, I am taken somewhat at a disadvantage, but I am much interested in the subject. For many years I have had under my direction a large number of engineers, and have naturally arrived at fixed conclusions as to the training best adapted to bring about results satisfactory both to the employer and to the engineer. The advantages of having an engineer with an education partly technical and partly practical are that his services become valuable sooner, he does not require excessive coaching by superior officers, and he rises to responsible positions at an earlier age, when information is more easily acquired. On the other hand, the time taken for practical training leaves less time available for theoretical education, and, consequently, the recipient is not prepared to reach eventually as high a position as others who have a more thorough theoretical training; for it must be admitted that only in exceptional cases does an engineer advance much in theoretical knowledge after leaving the Technical School. The advantage of spending the whole period of technical training in acquiring theoretical knowledge is that one is much better prepared to investigate and reduce to practical results whatever problems may present themselves, and no engineer can foresee in just what field he may have to work in the future. "A little knowledge is a dangerous thing," and the young man just out of the University is liable to think he knows much more than is credited to him by his employer. If his education has been purely theoretical, he soon has his conceit rudely destroyed, and only then is he in a position to acquire practical knowledge. Having had a thorough grounding in theory, he acquires practical knowledge rapidly; and, in the course of a few years, outstrips the engineer with a mixed education, and is prepared to go far beyond him. The conclusion I have arrived at is that the best results to the employer as well as to the engineer (and their interests are identical) comes from a purely theoretical training. The usual method pursued in the United States is to take on each year a number of young engineers and give them the opportunity of absorbing practical knowledge through supervision of and contact with those who are more experienced. The object sought for is not so much to get back the immediate value of their salaries as to push them along as rapidly as they can master their tasks, in order to get young men with energy and ambition into important positions. Such men may be

assumed to have courage, and this, coupled with confidence and a well-grounded education, brings success; and when success comes early in life, it lasts longer. The New York Shipbuilding Company built a large plant, organised the management, and was in full operation with four thousand men employed, all in three years. The problem, therefore, was different from the usual one, as we had not time to gradually train our engineers. We organised our corps with men selected as best we could to fill each grade, and made our promotion, much more rapidly than usual, owing to lack of suitability of many of the men selected. It was deemed advisable to partially organise our yard with men of technical experience. We therefore selected about twenty of our best draughtsmen, and placed them in charge of various departments as assistants to superintendents and foremen of practical experience; the result has been very gratifying, although only in operation one year.

Professor D. S. CAPPER, M.A. (Visitor): My Lord, I should like at the outset to add an expression of my own personal sense of gratitude to Professor Dalby for the succinct way in which he has put before us the system of training engineers which obtains in the United States, and I should equally like to thank Mr. Yarrow for the most excellent remarks which he has made as to the lines on which he feels that we want to amend our system of training in his country. In saying this I should like to take exception to one word which Professor Weighton let fall. I do not believe for one moment that Mr. Yarrow's motive in this is disinterested. I believe Mr. Yarrow appreciates the true interests of the nation, and that he identifies his own interests, in their highest sense, with those of the nation in suggesting this movement. You have had a good many professors speaking to you to-day. I should like to speak to you as a practical man, for, after all, an engineering professor ought to be a practical man, and if he is not a practical man he cannot rightly fulfil the functions of a professor. My experience—both from the practical and from the teaching side—is this. There are three orders in which you can train engineers. They have been referred to before, but I may perhaps put them in my own words. First of all, you may take a boy fourteen or fifteen years of age, trained in the sort of haphazard way which, I am afraid, passes for education in too many of our public schools. Then you send him into the shops and you give him five years in the works, where you expect him to pick up his information as best he can—and he does pick up a good deal of information and comes out at the age of nineteen or twenty with a training which is unsurpassed in its own way; for it gives a lad his professional training, or rather his trade training, if I may say so, as a native language, in a way which no other system can. He assimilates knowledge of the works' methods instinctively. But he is limited in this way, that he has never had to really think of the basis upon which his trade training has been erected, and, consequently, he has had no real mental training in the scientific basis of the profession which he is going to follow. He makes an excellent workman; he makes, probably, a pretty fair foreman, and possibly may make a very good foreman in exceptional cases. But I should like to emphasise the point that it is the exceptional cases that have made our great manufacturing industries. In the exceptional cases, under such a system as I have described, you get men of exceptional ability, who rise to positions of eminence by their own intrinsic merit, which those who are less gifted, though trained in a more efficient way, may perhaps, never reach. It is those men who have founded our manufactures, and, consequently, there has grown up the idea that the training they received is all that is necessary for the purpose of producing men capable of carrying out our industrial processes to the best profit. Now, we are confronted with foreign nations—I do not like to use the word "foreign" in regard to the United States, because it hardly seems to apply somehow—but we have, at any rate, other nations which have been trained in a different way, and with whom we have to compete. Our manufactories are far more numerous than they were in the past, and we cannot trust to intrinsic genius, but must train up men who will be able to lead on the industrial progress which we hope to make in competition with other nations. The defect for this purpose of the method of training I have

described is that when at works a boy forgets his school training. It is, moreover, very difficult to get a lad to go to college afterwards. If he has gone through the factory first, he falls under the notice of his employer, and he may get an appointment offered to him which is attractive at the time, and which he accepts. It is, therefore, only a small percentage of those who are trained in that way, and then only those who are least prominent, that return to the scientific college training, and then you spend the first year in reminding them of the knowledge they possessed before they went to the works. If you take the other order, and let a lad go to college straight from school, then the difficulty arises which has been referred to more than once, that he is, for the full college period of three years out of touch with the works, and he gets to think the training he is going through in the college is all the training required; and when he comes out first in the examinations, he thinks he is brilliant engineer, whereas we all know he has not begun to be an engineer, but has simply learned the scientific facts on which he can base his engineering knowledge and training. Then, when he goes to the works, he learns his mistake and is disheartened, and his employer and those above him treat him as a man who thinks he has knowledge that he has not really got. In order to correct that error, the only possible way, as far as I can see, is to combine the two and work them together. If you can only take the student and let him have six months—or say a portion of each year—in the college and a portion in the works, you get the two trainings blended together, and you do not run the risk of the man either losing touch with practice or losing his school knowledge, and you do not let him suffer from what has been called a “swelled head.” I should also like to urge the same course from another point of view. I think one of the most important persons you have to train is the teacher. He wants training as much as, or more than, the pupils do. For training a teacher the system, or want of system, under which too many work here is very bad. A nine months’ course is arranged in which the laboratories are filled with students every hour of the day. You expect your teacher to keep in touch with all the modern developments which are so rapidly taking place in his profession (for without such contact he cannot remain a practical man), and yet you do not give him one moment for original work nor for keeping himself in touch with those developments. He is kept hard at it all the time and is paid a salary—I am not speaking of the chief teachers but rather of the junior teachers and assistants—which is totally inadequate to keep him without his trying to do additional work of some kind or another to add to his pay, and he has neither time nor opportunity for doing work of the right kind which is essential to him to keep his teaching vigorous and active. The result is that too often a man who starts as a good practical teacher stays away from the practical and becomes a mere drudge. Under a system of six months in college and six months in the works, a teacher has an opportunity during the time his students are at the works of keeping himself in touch with his profession, and of working out original experiments which are so rightly considered as essential to the re-invigoration of a teacher. Anybody who has tried to make a research experiment in engineering knows that an hour here and an hour there in a laboratory full of students is an absolutely impossible arrangement for carrying through such continuous experimental research as is requisite for adding to our knowledge. At the same time, a six months’ alternating system will give employers an opportunity during the six months when the pupils are in their works, of suggesting to them: “Why should you not find out such and such a piece of information which is needed in our works, and on which no data are available?” You also give the student the opportunity by a post-graduate course of helping the employer to solve problems which he has no other means of solving. One is apt to wax enthusiastic when one finds what one has always looked upon as ideals which could never be reached, and which one has had diffidence in urging, because they are so clearly beneficial to teachers, now being urged from the employers’ side. I feel that it is tremendously to the teacher’s interest that this system should be adopted, but I believe with Mr. Yarrow that it is equally to the employer’s interest also. In the north, they have had this alternating system in the colleges and universities for many years,

as we have heard from Professor Barr and others. Here, in the south, one great difficulty has been the rigidity with which employers have exacted premiums. I constantly have students who cannot afford premiums, who are able and who ought to rise to the top. They come to us, perhaps, with scholarships. Very often I have found that two or three out of the best five men in a class are students who are not able to afford to come to college unless they have obtained scholarships. Those men never can get their practical training as engineers, because employers in London want premiums, and they have to go without the practical training which would enable them to rise without great difficulty to leading positions. We are ready at King's College, as elsewhere, to adopt this alternating system; but the requirements to make the change a real success are these: we want, in the first place, to get employers to encourage college training by receiving qualified students into their works without premiums. Secondly, we want to enlist the sympathy of some of the teachers; and, thirdly, we want, and perhaps you will forgive my alluding to it, the means to enable the London colleges to carry out the change without further financial strain. The people of this country have not realised that we cannot have real educational establishments unless they are properly supported. If one compares them with those in the United States, and thinks of the endowments, and gifts, and so on, made to those teaching establishments as compared with ours, one is apt to become envious and to almost desire to cross the water.

Professor W. E. DALBY, M.A., B.Sc. : My Lord and Gentlemen, anything in the nature of a reply is, I think, unnecessary. I should like to thank the speakers very much for the kind things they have said about my paper. The discussion it has caused is of considerably more value than the paper itself. The speakers are in general agreement that a change which would bring the employers and the Colleges into co-ordination is necessary, and that the proposed alternating six months' system is one way in which this change might be brought about. Mr. Yarrow has included this system in the Rules of Apprenticeship he has arranged for his works and which he has laid before the meeting. Beyond thanking you for the encouraging interest you have taken in my paper, I will not take up any more of your time.

The CHAIRMAN (Sir Nathaniel Barnaby, K.C.B., Vice-President) : Gentlemen, I am sure I may again, in your name, heartily thank Professor Dalby for raising this most serious and interesting question and Mr. Yarrow for the effort he has made to strike a new note in our national industries.

APPENDIX X.

SYNOPSIS OF REPORT AND SUMMARY OF RECOMMENDATIONS.

[The Numbers refer to paragraphs of the Report.]

INTRODUCTION

(1.) Constitution of the Committee; terms of reference—(2.) Preliminary meeting in London.—(3.) Proceedings at Glasgow.—(4.) At Leeds—(5.) At Manchester—(6.) At Birmingham—(7.) Summary of Provincial inquiries.—(8.) Proceedings in London—(9.) Further investigation necessary

Chapter I.

HISTORY OF THE TECHNICAL SCHOLARSHIP SYSTEM

(10.) Origin of the State scholarship system; the Simla Conference of 1901.

(11.) The Government of India's scheme of 1902. [See also Appendix I]

(12 and 13.) Despatch from the Secretary of State (Lord George Hamilton) in 1903. [See also Appendix I.]

(14.) Subsequent modifications of the scheme [See also Appendix I.]

(15.) Initiation of the scheme in India [See also Appendix II.]

(16.) Subjects studied by State technical scholars, and institutions which they have attended [See also Appendix III]—(17.) Summary of expenditure [See also Appendix IV.]—(18.) Working of the system summarised. [See also Appendix V]—(19.) Recent development of technical education in India. Influx of Indian students to centres of technical instruction in the United Kingdom

Chapter II.

REVIEW OF THE WORKING OF THE SCHOLARSHIP SYSTEM.

(20.) Three main questions for consideration—

(i) How do Indian students acquit themselves at British universities and technological schools?

(ii) Is practical experience in workshops and manufacturing concerns an essential part of industrial training? If so, are Indian students able to get it?

(iii.) Do Indian technological students succeed in finding employment on their return to India?

(21)—(i) Indian students at British Universities and technical institutions generally successful. Some failures and the harm they do.—(22.) Creditable record of the Government of India scholars, and of other picked students—(23.) Question of the sufficiency of the Indian students' preliminary training in India—(24.) Need for improving the teaching of drawing in Indian schools and colleges.—(25.) Paramount importance of previous Works experience.—(26.) Views of the engineering profession as formulated by the Institution of Civil Engineers (1903-05).—(27.) The same principle recognised in metallurgical and textile industries, and in tanning, dyeing, and mining.—(28.) Success of Indian textile students.—(29.) Failure of Indian mining students.—(30.) Contrast between Indian textile and mining scholars illustrates the signal importance of previous familiarity with the in-

dustry—(31.) The leather industry, two distinct types of student.—The man "with tanning in the blood"; and (32.) the research chemist in the leather industry.—(33.) Good relations between Indian students and their British class-fellows—(34.) Summary of conclusions on the question "How do Indian students acquit themselves at British universities and technical schools?"

(35)—(ii.) "Is practical experience in workshops and manufacturing concerns an essential part of industrial training?" Professors and men of business unanimous that it is—(36.) Indian students recognise the vital importance of Works experience—(37.) Extension of scholarship period necessary, so as to allow for whole-time apprenticeship.—(38.) Works experience for Indian students generally obtainable by organised effort, and the co-operation of broad-minded employers—(39.) Summary of conclusions on the question, "Is practical experience in workshops and manufacturing concerns an essential part of industrial training? And if so, can Indian students get it?"

(40)—(iii.) "How far have Indian technical students found employment upon their return to India?" Complete information not available—Immediate results not the true test of success—(41.) After-careers of returned Government scholars [See also Appendix V, column 6]—(42.) Government scholars who stay on in Europe or America, a contingency to be provided for.—(43.) After-careers of scholars of the Calcutta "Association for the Advancement of Scientific and Industrial Education of Indians" [See also Appendix VI]—(44.) Difficulties of the trained man on his return to India, some signs of progress.—(45.) Views of students now under training; prospects on the whole not bad, small concerns offer opportunities; "pioneering" of vast industries by returned scholars an impossibility.—(46.) Summary as regards prospect of employment for returned scholars

Chapter III.

GENERAL RECOMMENDATIONS FOR IMPROVING THE SCHOLARSHIP SYSTEM

(47.) General recommendations.—(48.) A standard of general education on the Science side laid down—(49.) Preliminary practical experience important in all industries, essential in mining.—(50.) Elasticity in the system of selection desirable; the principle of choosing the man rather than the industry.—(51.) Scholarships to be awarded after consultation with business men and Employers' Associations in India—(52.) Training after selection; period to be extended so as to include Works experience—(53.) Method of securing Works experience for Indian scholars; a matter of organisation, and dependent on the continued co-operation of British employers.—(54.) Responsibilities of firms holding contracts from the India Office.—(55.) Due notice to be given by the authorities in India of the grant of scholarships—(56.) Question of reducing the scholarship allowance—(57.) Revision of the rules for Government scholarships; obedience to the India Office, and to employers and foremen

during Works training, to be strictly enforced.—(58.) Return to India within a specified period to be required, security being taken before the scholarship is awarded.—(59.) Measures for assisting returned scholars to secure employment; existing Advisory Committees to act as Appointments Boards in India.—(60.) Record to be kept of the after-careers of Government scholars, and regular reports to be sent to the India Office.—(61.) Financial effect of recommendations; the ideal training for an industrial career long and costly; only the *élite* to be trained at the public expense.

Chapter IV.

RECOMMENDATIONS REGARDING PARTICULAR INDUSTRIES

(63.) *Engineering* General Summary—(64.) The ideal training for an engineer, as formulated by the Institution of Civil Engineers, 1903-05.—(65.) Training of Indian students must follow the approved practice of the profession in the United Kingdom—(66.) Preliminary workshop course in India recommended—The college course; a higher standard maintained in English and Scottish universities as compared with colleges in India. A thorough grounding in specified subjects (*viz.*, mathematics, physics, chemistry, mechanical drawing, and descriptive geometry), to be given before the scholar leaves India. Works experience as an integral part of an engineer's training, the practice in this country.—

Mechanical and electrical engineers, three classes distinguished:—(1) Apprentices; (2) Premium apprentices; (3) Pupils.

Civil Engineering, "the pupil system."

(67.) Application of the system to Indian students:—Mechanical Engineering; list to be kept by India Office of firms willing to train Indian students as apprentices, and to arrange, if necessary, for their college courses. (68.) Electrical Engineering, the same system applicable, but a more advanced knowledge of mathematics essential. (69.) Civil Engineering, better opportunities for practical training exist in India, especially on State railways; engineers in the Public Works Department might take premium-paying pupils. Sanitary and municipal engineering, special facilities available in England.

(70.) *Mining* controversy as to the comparative merits of University training and evening classes in mining centres—(71.) Opinion of His Majesty's Chief Inspector of Mines—(72.) Opinion of Professor Cadman.—(73.) State scholarships in mining to be continued, subject to more stringent conditions of selection.—(74.) Previous experience of work underground indispensable; a consensus of opinion—(75.) The effect of this test in eliminating the unfit.—(76.) Abundant facilities for practical training in English mines.—(77.) Further practical training needed to supplement the University course.—(78.) Summary of recommendations in regard to mining scholarships.

(79.) *The Mining Geologist* or Prospector: general qualifications required, and course of training outlined by Sir Thomas Holland.—(80.) *Metallurgical Industries*: Professor Turner on the record of past scholars, and the facilities available at Birmingham; the importance of physique and of previous connexion with some metal trade, however primitive.

(81.) Recommendations as regards scholarships in metallurgy.

(82.) *The Textile Industries*: definition of the term as including not merely spinning and weaving but the further treatment of the fabric that makes it marketable (*e.g.*, bleaching, finishing, mercerising, dyeing, printing).

(83.) *Spinning and Weaving*: the admirable record of Indian Government scholars.—(84.) Importance of previous Works experience; some examples of this among Government scholars.—(85.) Practice of German institutions.—(86.) Standard of general education and physical fitness prescribed.—(87.) The training given in Technological Schools and Universities of the United Kingdom; its practical character.—(88.) Sir William Mather on the value of the practical training given in technical school workshops.—(89.) Need for subsequent Works experience under business conditions, preferably in the United Kingdom.—(90.) Difficulty of securing admission of Indians to textile concerns in this country; the attitude of manufacturers—"Not a business proposition."—(91.) Textile machine makers helpful—(92.) Facilities offered by German firms of doubtful utility.—(93 and 94.) Facilities for a limited number of picked men probably obtainable in the textile industry; some offers of co-operation already secured.

(95.) Recommendations as regards scholarships in spinning and weaving.

(96.) *Bleaching and Finishing*: college training not the primary qualification.—(97.) No admittance, as a rule, to bleaching and finishing works in this country.—(98.) Conclusion as regards the grant of scholarships in the bleaching and finishing of cotton.

(99.) Some facilities procurable in the woollen industry.

(100.) *Dyeing*: experienced men selected as State scholars.—(101.) The training of a dyer; theoretical instruction and practical experience alike necessary; the former readily procurable by students, but the latter, as a rule, not.—(102.) Well-equipped laboratories in English institutions; special facilities at Bradford, Leeds, and Manchester.—(103.) Fair prospect of securing Works experience for well qualified Indians; a generous offer noted.

(104.) Recommendations as regards scholarships in dyeing.

(105.) *Tanning*: two types of student distinguished. Value in either case of technical training in the United Kingdom.

(106.) Firstly, the man with "tanning in the blood."

(107.) Previous working experience specially important, as there is no system of apprenticeship whether for English or for Indian students.—(108.) Special advantages at the Leathersellers' Company's College, Bermondsey.—(109.) Practical training possible in Government leather factories in India.—(110.) Recommendations as regards scholarships for hereditary tanners.

(111.) Secondly, research chemists in the leather industry; an ideal course of training indicated. Recommendations as regards scholarships in chemistry as applied to tanning.

(112.) Scholars of the first type above-mentioned likely to predominate at present

(113.) *Chemical Manufactures*: Works do not take students, whether British or Indian, as apprentices.—(114.) Salaried employment as a means of securing Works experience.

(115.) Grant of scholarships to Indians for the study of chemical industries in the United Kingdom of doubtful utility; training in India suggested.

CONCLUSION.

(116.) The scholarship system has yielded good results, and may be made to yield even better results in the future.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The main conclusions suggested by the working of the scholarship system may be summarised as follows:—

I. On the question "How do Indian students acquit themselves at British Universities and technological schools?" the Committee find that Indian students generally get on well at such institutions; that they are quite up to the average capacity of their classes; if they have read Science in India up to the standard of the B.A. or B.Sc. they are rather better equipped on the theoretical side than most of their class-fellows; if they have read up to the Intermediate standard on the Science side they can with hard work keep up with their classes; those who have only passed the Intermediate on the Arts side or the Matriculation examination of an Indian University cannot take full advantage of the instruction given. As a rule students who have had practical experience of an industry derive great benefit from the teaching given in this country and do well, while those who have had no previous acquaintance with an industry do badly; Indian students of engineering are handicapped by their general ignorance of machinery and by the inadequacy of the training in drawing which they have received in India (paragraphs 21-34).

II. On the question "Is practical experience in workshops and manufacturing concerns an essential part of industrial training, and if so, can Indian students get it?" the Committee find that practical experience in works is indispensable for a complete industrial training; that the period for which Indian students stay in this country is usually too short to permit them to take full advantage of such practical training as is open to them; that in those industries in which apprenticeship is the custom Indian students are accepted along with British students; that there are industries to which they are unable to get admission as apprentices by their own unaided efforts, but that a careful inquiry conducted by the India Office would probably disclose the names of some firms in almost every industry ready to offer to a certain number of selected Indians facilities for obtaining the requisite practical experience (paragraphs 35-39).

III. On the question "Do Indian technological students succeed in finding employment on their return to India?" the Committee could only secure scanty evidence; but from this it would appear that Indian technical students, provided they are properly selected and trained, usually do find employment in India sooner or later; and although the pioneering of large industries by inexperienced students is not to be expected, small concerns are springing up which do afford opportunities to returned scholars and which are likely to perform a very useful function in the industrial development of India (paragraphs 40-46).

The following are the detailed suggestions made by the Committee:—

General recommendations:—

(1.) That students sent to this country should ordinarily have read in India up to the standard of the B.Sc. degree, or the B.A. degree in Science subjects, or have obtained an equivalent diploma; but that exceptions may be made in favour of men who have an hereditary connexion with a particular industry, provided that they know enough English to follow lectures in this country (paragraph 48).

(2.) That previous practical experience of an industry should be recognised as an ordinary condition of the grant of a State scholarship, and that this rule should be relaxed only when it can

be proved that such preliminary experience is unnecessary. In the case of mining at least a year's work underground should be regarded as a *sine quâ non* (paragraph 49).

(3.) That as regards the system of selection the principle of choosing the man rather than the industry to encourage should occasionally be followed (paragraph 50)

(4.) That men of business, directors of industry, and Employers' Associations in India should be consulted as to the selection of candidates for scholarships (paragraph 51)

(5.) That practical training under business conditions be regarded as an integral part of the technical scholars' education, and that the period for which the scholarship is tenable be extended (up to five years if necessary) so as to include a spell of continuous works experience (paragraph 52)

(6.) That the present method of securing practical training for Indian technical scholars needs to be more thoroughly organised, and that it should be the duty of a special officer or Department of the India Office to invite the assistance of British employers (paragraph 53).

(7.) That in this way a list of firms willing on patriotic grounds to co-operate with the India Office should be prepared and kept up to date, but that if sufficient facilities cannot be thus obtained it may be possible to apply to firms holding contracts from the India Office (paragraph 54)

(8.) That notice of all scholarships awarded should be sent to the India Office at as early a date as possible by the authorities in India, and that in the case of an industry in which no Indian student has yet been trained, no scholarship should be awarded until it has been ascertained, by special inquiry, that facilities exist for giving a complete training in that branch of industry (paragraph 55).

(9.) That the amount of the scholarship allowance remain as at present (150*l.* a year), but that power be taken to reduce the amount during works-training, if the employer recommends this (paragraph 56).

(10.) That the "Rules for Government scholars" be revised, and that obedience to the India Office, and to employers and foremen during works training, be strictly enforced (paragraph 57).

(11.) That Government scholars should be required to give an undertaking to repay the value of the scholarship if they fail to return to India within three years of its expiry (paragraph 58).

(12.) That local manufacturers and employers should be asked to serve on the Provincial Advisory Committees in India which might perform the functions of Appointments Boards and assist returned scholars to find employment (paragraph 59)

(13.) That regular reports be sent to the India Office as to the technical scholars who have returned to India, showing how they are employed and what salaries they are drawing (paragraph 60)

(14.) That only men of quite exceptional capacity should receive industrial training at the public expense, but that when the best available men have been chosen they should be given the very best training (paragraph 61).

*Recommendations regarding Particular Industries**Engineering:—*

(i.) That the training of Indian engineers should follow the approved practice of the profession in the United Kingdom, and comprise:

(1.) An introductory workshop course of at least one year in mechanical engineering workshops for

all students, including those who intend ultimately to specialise in mining, electrical engineering, civil engineering, and, in fact, every branch of engineering; during this introductory course the student should be treated as an ordinary apprentice and should keep regular hours, be subject to discipline and be paid wages.

(2) A college course of normally three sessions: stress being laid upon the necessity of a sound and extensive knowledge of mathematics in all branches of engineering

(3) Two or three years' practical training, subsequent to the college course, in workshops, or on works, or in mines, it being particularly desirable that part of the time should be spent in the drawing office (paragraphs 63-65).

(ii.) That all Indian engineering students of whatever branch should receive a year's preliminary workshop course in a mechanical engineer's shop in India (paragraph 66).

(iii.) That Indians who come to the United Kingdom for their college course should have received in India a training in mathematics, physics, chemistry and engineering-drawing, of a sufficiently advanced character to enable them to join a second-year class at once; special instruction in mechanical drawing and descriptive geometry is required, and should be given in India (paragraph 66).

(iv.) That as regards practical training in mechanical engineering, a list be kept by the India Office of firms willing to train Indian students as apprentices, and to arrange if necessary for their attendance at college courses (paragraph 67)

(v) That in electrical engineering a similar system (apprenticeship by a firm which allows the apprentice to take a college course) should be adopted, and that the scholarship be extended so as to be tenable for five years or such other period as the apprenticeship lasts (paragraph 69).

(vi.) That in civil engineering opportunities for practical training should be sought in India rather than in the United Kingdom, and that it is for consideration whether greater facilities might not be provided by Government in India; in particular engineers in the Indian Public Works Department might be allowed to take premium-paying pupils (paragraph 69).

Mining:—

(i.) That scholarships in Mining (as distinguished from Geology, for which *see below*) shall only be given to men who intend to become mine managers or mining engineers.

(ii.) That in every case the candidate shall have actually worked for at least one year in an Indian mine—preferably in a paid position.

(iii.) That a specially strict test of physical fitness shall be imposed on candidates before selection.

(iv) That the candidate shall have reached at least the Intermediate Science standard, and shall have a competent knowledge of physics, chemistry, and mathematics.

(v) That the period of the scholarship shall be extended, when the Professor under whom the student is working considers it desirable, so as to include a period of continuous practical training in an English mine (paragraphs 70-78).

Mining Geology:—

That provision might be made in the scholarship system for the training in the United Kingdom of mining geologists, candidates being required

to possess a knowledge of economic geology and some experience of surveying and mining methods (paragraph 79).

Metallurgy:—

(i.) That scholarships be granted only to men who have had previous experience of metal industries, a knowledge even of primitive processes being valuable; and that candidates who lack such experience should be sent for some months to metal works in India before coming to this country for their training.

(ii.) That scholars should be physically well developed.

(iii) That if possible notice be given beforehand of the branch of metallurgy that the scholar intends to take up on his return to India.

(iv) That in special cases the scholarship be extended for a fourth year so as to allow a year of postgraduate specialised training.

(v) That, whether the University course extend over three or four years, it should be supplemented by a period of practical training in large manufacturing establishments (paragraphs 80-81).

The Textile Industries

Spinning and Weaving:—

(i) That the scholars should ordinarily have been educated up to the standard of the B.A. (on the Science side), or the B.Sc Examination of an Indian University, or have gone through a complete course of training in an Indian Technical College and have obtained a diploma such as the L.T.M. (Licentiate of Textile Manufacture) of the Bombay Victoria Technical Institute.

(ii.) That the scholars should in all cases have had considerable experience in one or more Indian mills, preferably through having served in a paid position.

(iii.) That the period of the scholarship should be extended to cover an adequate course of practical training in an English mill, subsequent to the theoretical or college course, whenever it is found possible to provide such facilities (paragraphs 83-95).

Bleaching and Finishing:—

That as regards the bleaching and finishing of cotton it is almost impossible for Indian students to obtain in this country anything more than the training given in technological colleges, and, in order that they may complete this by practical experience, efforts should be made to secure openings for a few carefully selected men in up-to-date bleaching establishments in India; but that in the woollen industry facilities for practical training are procurable to a limited extent in this country (paragraphs 96-99).

Dyeing:—

(i.) That the candidate should have had sufficient general scientific education in India to enable him to follow the specialised lectures here, *i.e.*, that he should have read up to the standard of the B.Sc. or B.A. with science in India.

(ii.) That no scholarship be granted to a candidate who does not possess some knowledge of the dyeing industry as carried on in India.

(iii) That when it is found possible to secure admission for an Indian student to a good dye works, the period of the scholarship should, if necessary, be extended up to five years in order to cover this practical experience (paragraphs 100-104).

Tanning :—

That students who aim at becoming managers or owners of tanneries must be distinguished from those who intend to take up scientific research as applied to leather industries. As regards the former class the Committee find:

(i.) That hereditary connexion with the leather industry is desirable, and a knowledge of Indian methods is essential.

(ii.) That where these conditions are satisfied, high academic qualifications need not for the present be insisted upon; a fair knowledge of chemistry, physics, and some knowledge of mathematics will suffice.

(iii.) That the scholarship should be granted for three years at least, and should include visits to American and Continental tanneries, when recommended by the Professor.

(iv.) That if, after inquiry, the India Office is unable to arrange for practical training in this country, arrangements should be made for supplementing the training given here by a period of practical experience in one of the Government leather factories in India.

As regards the latter class, the Committee recommend.

(i.) That the scholarship shall only be granted after the student has received the highest scientific training in India.

(ii.) That he must have shown considerable aptitude for research work.

(iii.) That the scholarship shall be tenable for four years; and

(iv.) That if the scholar be successful in gaining a paid position in the laboratory of an English tannery, his right to a free passage back to India shall be extended for a further three years (paragraphs 105-112).

Chemical Manufactures .—

That the grant of scholarships for the study of chemical industries in the United Kingdom is of doubtful utility; that training in India would be preferable, and that, before any such scholarship is granted, inquiry should be made as to the possibility of providing in this country a complete training in the special branch of industry concerned, full particulars being furnished to the India Office as to candidates' qualifications and prospects of finding employment on their return to India (paragraphs 113-115).

2

India Office, London,
8th August 1913.

Public Works,
No. 40.

To His Excellency the Right Honourable the Governor
General of India in Council.

MY LORD,

I forward herewith, for the information of Your Excellency's Government and for any observations you may wish to make thereon, a copy of a Memorial to my address from Indian Engineering Students in this country and of the reply I have caused to be addressed to them.

2. Among other matters discussed in the report of Sir Theodore Morison's Committee is the difficulty which Indian Engineering Students find in obtaining practical training in this country, and it is important that opportunities for their obtaining it in India should, if possible, be provided, and this can only be done on Government works and railways and on Companies' railways. I request that this side of the question may be carefully considered by your Government.

I have the honour to be,
My Lord,
Your Lordship's most obedient humble Servant,
(Signed) CREWE.

ENCLOSURES.

ENCLOSURE No. 1 :—

To the Most Honourable The Marquess of Crewe, K.C., Secretary of State
for India.

May it please your Lordship,

We, the undersigned Indian Engineering Students at the different Universities and Institutions in Great Britain, most respectfully beg leave to approach your Lordship with this our humble representation, for your Lordship's favourable consideration :—

1. There are about 140 Indian Students studying Engineering Science in Great Britain, and a course of practical training is essential to the attainment of efficiency in the profession ; but, unfortunately, they find it extremely difficult to get into engineering firms and works, due to the lack of proper influence. They are more adversely placed than the natives of this country, who can easily arrange for their work, and mostly without paying any premiums, through the influence of their parents, friends and relatives. The few of us who can arrange for such practical experience have to pay heavy premiums.

But the case of the Students belonging to some of the Scottish Universities (numbering about half the total) is more deplorable. Under the sandwich system, the engineering departments of these Universities remain closed for six months from April to mid-October, to enable the students to gain practical experience in engineering firms and workshops, so that the theoretical training at the colleges may go side by side with practical knowledge outside ; so that if these students cannot arrange for practical work, the spirit of the system is wholly neglected, and they are forced to sit idle during six months in the year.

Now we are convinced that through the India Office arrangements can be made for our training without any difficulty, and beg your Lordship's leave to suggest that the Indian Government make a rule (as it is done by the Japanese Government) that every Government contractor or engineer must take a number of Indians (recommended by the Professors) into their firms as apprentice engineers and give them facilities to learn the work. This will not place the Indian Government under any financial or other obligations (as no firm will hesitate to accept this rule as part of the specifications) but will be of immense advantage to the Indian Students.

2. In the year 1909 the Secretary of State for India in Council made a rule that a maximum of 10 per cent. of the appointments for the Imperial Service of the Public Works Department should be given to Indians, if otherwise found fully qualified. Since then the number of Indian engineering students in this country has increased fourfold, and therefore we feel bound to approach your Lordship to so modify the rule as to give Indians a substantial share in the appointments referred to.

The anxiety of the Government of India to have as many capable Indians as possible employed in the engineering profession is shown unmistakably in their circular letter to the Local Governments on the Atkinson Report on the Technical Education in India, from which the following is an extract :—

“It seems to the Government of India that the time has come to endeavour to connect Educational Institutions closely with business firms, railways and other employers of labour, to enquire how the former can better meet the requirements of the latter, and to point out the way to further the employment of Indians in them.”

Nothing can promote the object of this most commendable endeavour more than to lead the way and to employ for the State as many Indians as are found qualified.

3. A number of engineers are appointed every year in the covenanted service with an agreement to serve a limited number of years in India (most of

whom are afterwards transferred to Permanent List); Indians up till now had no share in these appointments, and we beg leave to suggest that these and other Temporary Engineers be appointed in India from qualified Indians (whether trained in this country or in India).

4. The existing distinction between the Imperial and Provincial Engineering Service is wholly prejudicial to the aspirations of the engineers belonging to the latter service, and we strongly request your Lordship to remove the present barrier, throwing open the Imperial Service to the members of the Provincial Branch.

We have the honour to be,

My Lord,

Your Lordship's most obedient Servants,

AMARNATH (Glasgow).

&c., &c. .

ENCLOSURE No. 2:—*India Office to N. K. Mitra, Esq., B.Sc.*

P.W. 1063.

India Office,

7th August 1913.

Sir,

I am directed by the Secretary of State for India in Council to acknowledge the receipt of the memorial signed by you and a number of other Indian Engineering Students at different universities and institutions in Great Britain which was enclosed with your letter of the 9th April last.

In reply I am to say that the Secretary of State recognises and regrets the difficulty experienced by Indian Engineering Students in obtaining practical experience in this country, and I am to inform you and your fellow petitioners that the question has recently been inquired into carefully and sympathetically by a Committee appointed by the Secretary of State, the report of which has recently been published.

The questions dealt with in the Report, a copy of which is enclosed herewith, are under the consideration of the Government of India and of the Secretary of State.


With regard to the appointment of Temporary Engineers referred to in paragraph 3 of the memorial, I am to state that for some years no appointments of Temporary Engineers under covenants have been made in this country, and no such appointments are at present contemplated.

The matters dealt with in paragraphs 2 and 4 come within the scope of the Indian Public Service Commission, and I am to inform you that a copy of your petition will be laid before that Commission. It will also be communicated to the Government of India for consideration.

I am, &c..

N. K. Mitra, Esq., B.Sc.

S'1431

MINUTE
ON
INDIAN EDUCATION, 
WITH SPECIAL REFERENCE TO
The Reorganisation
OF THE
Indian Education Department.

1913.

T. 2, W.M. 1. 21
E

PREFACE.

This Minute is concerned solely with recent Educational Developments in India and their past history. In every case full reference has been given for the statements made. The subject appears to be of sufficient consequence to deserve consideration solely on its merits, and it is thought that the introduction of names may tend to divert attention from the highly important question of What is right to the relatively insignificant question of Who is right? For this reason the Minute is issued anonymously.

51431

Historical Survey.



In March, 1904, a resolution was issued by the Governor-General in Council, giving a summary of facts and figures concerning the history and growth of education in India.⁽¹⁾ Therein it is stated that—

“Education in India, in the modern sense of the word, may be said to date from the year 1854, when the Court of Directors of the Old East India Company, in a memorable dispatch, definitely accepted the systematic promotion of general education as one of the duties of the State, and emphatically declared that the type of education which they desired to see extended in India was that which had for its object the diffusion of the arts, science, philosophy, and literature of Europe; in short, European knowledge.....The first instinct of British rulers was to leave the traditional modes of instruction existing in the country undisturbed and to continue the support which they had been accustomed to receive from native rulers.”

Education on Western lines introduced in India in 1854.

Previous tendency of British administration to leave traditional methods of instruction undisturbed.

To this end provision had been made, so far back as 1813, for giving regular assistance from public funds. These traditional modes of instruction, however,

“Mohammedan no less than Hindu, assigned a disproportionate importance to the training of the memory, and sought to develop the critical faculties of the mind mainly by exercising their pupils in metaphysical refinements.”

Inherent disadvantages of such methods.

The impulse towards reform which resulted in the dispatch of 1854 came from two directions: the need for public servants with a knowledge of the English language, and secondly, the missionary influence exercised in favour of both English and vernacular education.⁽²⁾ In accordance with the policy outlined in this dispatch, a Department of Public Instruction was subsequently created; Universities were founded in the Presidency towns; training schools for teachers were established; existing Government educational institutions were increased, and a system of grants-in-aid was introduced to encourage local effort.

Nature of impulse which produced the Educational Dispatch of 1854.

Foundations of existing Educational Department laid.

The policy thus laid down in 1854 was re-affirmed in 1859, when the administration was transferred to the Crown.⁽³⁾

Character and development of its work.

The following figures serve to indicate the progress made upon the lines indicated. The Universities of Calcutta, Madras and Bombay were incorporated in 1857, and those of the Panjab and Allahabad in 1882 and 1887. The growth of schools and colleges proceeded most rapidly between 1871 and 1882, and by the end of this latter year there were 2½ millions of pupils under instruction. According to the last available Quinquennial Report on Education in India, 1902—7,⁽⁴⁾ there were in 1902, 3,204,336 pupils in 97,854 primary schools, and 622,768 scholars in 5,493 secondary schools, while the number

Comparative statistics shewing its growth during quinquennium 1902 to 1907.

⁽¹⁾ “Indian Educational Policy,” published in book form in 1904.

⁽²⁾ *Ibid*, para. 4.

⁽³⁾ *Ibid*, para. 6.

⁽⁴⁾ *Vide* Government of India, 5th Quinquennial Review, Vol. II., page 57, table 7, and page 60, table 16.

of colleges was 191 with 23,009 students. Thus including special schools, technical and industrial schools, schools of art, normal schools for teachers, etc., the total number of schools and colleges for public instruction amounted to 104,622 with 3,886,493 pupils, and if private institutions be added, the total number of scholars known to the Education Department reached 4,521,900, necessitating an expenditure exceeding 400 lakhs, out of which 177 lakhs were provided from public funds, the balance being obtained from fees, endowments, and private sources. Thus the total cost to the public funds fell short of £1,200,000.

According to the same report the population of British India was in 1907, 229 millions scattered over an area of 964,073 sq. miles, and the activities of the Education Department throughout the country were distributed in the following way at the end of the Quinquennium :—3,937,866 pupils in 112,930 primary schools, 713,342 scholars in 5,898 secondary schools, and 25,168 students at 182 colleges ; the total number of public educational institutions was 121,336, accommodating 4,744,480 pupils, this latter number rising to 5,388,632, if pupils at private institutions be included. The total cost to the country of this educational system was 559 lakhs of rupees, out of which 296 lakhs (£2,000,000 nearly) represented the expenditure from public funds.

Their importance.

These figures for the years 1902—7 are of peculiar importance because they record the educational results which have sprung from the application of the common policy of educational expansion and reform outlined authoritatively in 1904 by the Governor-General in Council, and followed continuously from that date in all the provinces of the Indian Empire.

Position Examined.

Advantages which have resulted.

The same resolution, in a section dealing with the merits and defects of the existing system,⁽⁵⁾ states that—

Defects of the system enumerated

“ it is almost universally admitted that substantial benefits, have been conferred upon the people themselves by the advance which has been made in Indian education within the last fifty years ; that knowledge has been spread abroad to an extent formerly undreamed of..... and that there has been a marked improvement in the character of the public servants now chosen from the ranks of educated natives, as compared with those of the days before schools and universities had commenced to exercise their elevating influence. But it is also impossible to ignore the fact that criticisms from many quarters are directed at some of the features and results of the system as it exists at present, and that these criticisms proceed especially from friends and well-wishers of the cause of education. Its shortcomings in point of quantity need no demonstration... ..In point of quality the main charges brought against the system are to the general effect (1) that higher education is pursued with too exclusive a view to entering Government service, that its scope is thus unduly narrowed, and that those who fail to obtain employment under

⁽⁵⁾ “ Indian Educational Policy, para. 8.

“Government are ill fitted for other pursuits; (2) that
 “excessive prominence is given to examinations; (3) that
 “the courses of study are too purely literary in character;
 “(4) that the schools and colleges train the intelligence of
 “the students too little, and their memory too much, so
 “that mechanical repetition takes the place of sound
 “learning.....”

Further, it is stated in the same resolution⁽⁶⁾

“that Government service is regarded by the educated
 “classes as the most assured, the most dignified, and the
 “most attractive of all careers; and that the desire on the
 “part of most students to realize these manifold advant-
 “ages as soon and as cheaply as possible tends to prevent
 “both schools and colleges from filling their proper posi-
 “tion as places of liberal education.”

An examination of these defects in the light of the past history of Indian education very clearly indicates that they have sprung from two main sources, both lying beyond the control of the Education Department itself. (1) the primary motive which prompted Government to set up the existing system in 1854, and (2) the traditional modes of instruction which had previously held sway throughout the country. Attention has already been drawn to the fact that the first impulse towards educational development arose from the urgent demand that existed for clerks in Government offices. It was largely in order to meet this demand that Government formulated their educational policy and decided for the first time to take a direct part in the educational work of the country. The defects in the quality of education summarised under the headings (1) and (2) in the paragraph quoted above are obviously of a character to be expected from an educational system admittedly introduced with the avowed object of increasing the supply of public servants available in the country; while those grouped under (3) and (4) evidently result from the original inherent educational tendencies of India herself. The scheme introduced in 1854 appealed naturally to the majority of thoughtful Indians whose countrymen from time immemorial have been accustomed, under their native rulers, to regard positions such as dewan or wazir as the highest prize obtainable by an educated man. In consequence the supply very soon outstripped the demand, and year by year the number of educated Indians unable to find employment under Government has largely increased. The natural outcome of such a system was a feeling of grievance which rapidly developed into discontent.

During the unfortunate years of seditious disturbance preceding 1909 much of the blame for such outbreaks was justly laid upon the educational system of the country. It must be noted in this connection, however, that responsibility for this system rests upon the administrative Government by whom it was originally set going, and not upon the Education Department, which is merely a part of the system introduced, and which, in spite of the initial administrative bias and the inherent traditional tendencies of the country, has admittedly produced a marked improvement in the type of public servant educated in the country.

These defects traced to two causes.

(1) Initially narrow educational outlook of Government.

(2) Inherent defects of India's traditional educational methods.

Educational system, resulting from this narrow outlook, unsatisfactory.

⁽⁶⁾ *Ibid.*, para. 9.

The effect of this bias, the existence of which is indicated in the original motive which prompted the dispatch of 1854, is further illustrated by the following significant fact. During the unfortunate period mentioned above, Government possessed so little confidence in the educational system for which it was responsible, that it felt constrained to issue circulars drawing the attention of its educational officers to a detailed list of the most obvious duties devolving upon them to assist in combatting the propagation of seditious ideas.

Government's lack of confidence in educational officers.

Narrow out look results in Secretariat bias against the adoption of a liberal educational policy

The above evidence is sufficient to indicate that in the past there has been prevalent in secretariats a very one-sided view of the advantages to be derived from education, and it suggests that the administrative reluctance to introduce a really liberal and progressive educational policy has been due to the idea that such a policy would make the task of Government more difficult, rather than that it would render the country more worthy of its position in the Empire and increase its real need for a highly specialised and advanced system of administration.

Further, there is a very strong opinion in Indian secretariat circles that education offers the most suitable field for the exercise of India's nascent powers of self-government and that consequently the chief educational need of the country lies not so much in a strong and efficient Education Department, organised on lines which have recommended themselves in the Western World, but rather in the encouragement and gradual development of India's power to evolve an educational system for herself under the fostering care of non-expert secretariats. This is an obvious reversion to the initial position when

"the first instinct of British rulers was to leave the traditional modes of instruction existing in the country undisturbed."

Definite recognition of this by an independent educational authority.

The unsatisfactory condition of educational affairs in India has been the subject of a note by Sir Henry Craik, and since it bears upon the points mentioned above, the opinions expressed by this eminent and independent authority are of great interest. Writing upon the subject after his tour in India in 1907-8, Sir Henry Craik stated⁽¹⁾

"It is the system that is wrong—wrong in its original conception and faulty in its present administration. Education has an independent place in the central secretariat and all new schemes must be submitted through an alien department."

The same writer, referring to the evidence before the Decentralisation Commission, also stated that :—

"I had the advantage of hearing some of the educational evidence placed before the Decentralisation Commission. The chief witness* examined (of whom I knew nothing before) seemed to me to give his evidence with admirable force, and was evidently in touch with all that is soundest in educational theory at home. It is not,

⁽¹⁾ Vide Appendix I.

* A Member of the Indian Educational Service.

“perhaps, surprising that his questioners were not so conspicuously conversant with the subject, and the cross-examination of one of the commissioners—himself a civil servant in India—served what was to me the useful purpose of showing a spirit which, so long as it prevails in official quarters, will, in my opinion, effectually bar the way against any real educational reform. Educational administration must have its own independent position before it can make any bold and effective advance.”*

Furthermore, during the past few years events in India have caused considerable attention to be focussed on Indian educational affairs, even in England. When the unsatisfactory condition of these affairs came to be realised, the question of the appointment of a special Royal Commission to conduct an enquiry received considerable attention. Mr. Montague, Under-Secretary of State, replying in the House of Commons to a question put by Sir Philip Magnus, said :

Suggested advisability in high official quarters of an enquiry by a Royal Commission.

“The necessity for an improved system of education in India demands comprehensive and urgent recognition. Lord Morley is unable at present to promise the appointment of a Committee or Royal Commission, but he recognises the probable advantage of such a course.”

The possibility of a Royal Commission being appointed to conduct an independent enquiry into the Indian educational system caused considerable alarm in Indian secretariat circles. The “*Pioneer*,” the leading Conservative organ in India, which voices the views of the higher administrative service, writing in May, 1910, on Indian educational affairs, stated in a leading article⁽⁸⁾ that

Reception of this suggestion in India.

“In England the idea seems to prevail that we are in urgent need of a brand-new educational policy. . . . Even Lord Morley appears to share this delusion . . . What Lord Morley’s intentions in this connection may be in the future no one in India probably even pretends to know, but it is significant, perhaps, that we should be already hearing of an eminent Oxonian scholar with qualifications for conducting an expert enquiry into our educational system. The gentleman in question is a Mr. M. E. Sadler . . . who has had a wide experience in ‘overhauling’ systems of education in English towns and counties. We have no desire to belittle Mr. Sadler’s attainment as a scholar or his claims to pose as an educational expert, at any rate outside India, but the point is that there is nothing to be gained and much to be lost by bringing out to India either a Royal Commission or a roving educational inquisitor. The only result of special enquiries of this kind would be to hang up indefinitely all those schemes of progress in which Local Governments as well as the Government of India are particularly interested at the moment.”

Such a statement from the “*Pioneer*” not only bears out the remarks made by Sir Henry Craik in 1907-8, but indicates the existence of a deeply-rooted bias in official administrative circles against the introduction of a really sound and liberal system of education.

Its confirmation of Sir Henry Craik’s criticisms.

* See also Appendix Ia.

⁽⁸⁾ *Vide* Appendix II.

The New Department.

Official recognition of the force of these criticisms followed by hurried administrative re-adjustments in India.

The possibility of the appointment of a Royal Commission to conduct an enquiry into Indian education was rapidly followed by the formation out here of a Department of Education for the first time at the headquarters of the Government of India, but it must be noted that the Department is still "an alien Department," so far as education is concerned. The Calcutta "*Englishman*" writing of this Department on December 13th, 1910, stated⁽⁶⁾ that

Real nature of these re-adjustments exposed in Indian press.

"The new Department of Education which has now been created should apparently have been in existence for years, as the educational policy of the Government of India has been subjected to more severe criticism than perhaps any other. With a properly organised Department many mistakes of the past might have been avoided. Even as now constituted the Department has tacked on to it certain branches of work which do not properly belong to education. But the Resolution of the Government of India creating the New Department is quite frank about the secondary object with which it has been brought into existence, viz. : 'for affording relief to the Home Department.' No one will question the necessity for giving the Home Department relief, at the same time the expediency of tacking on Local Self-Government to education seems a trifle far-fetched, even on the ground that 'municipal and local bodies are responsible for no small part of the public expenditure on education.' But even accepting the principle that all matters relating to Local Self-Government are more or less connected with education, we fail to see why the New Department should be saddled with such miscellaneous branches of work as sanitation, archæology books, records, ecclesiastical, and a few other subjects of minor importance now dealt with in the Public Branch of the Home Department . . . It seems to us . . . that if the energies of the New Education Department are to be dissipated in controlling the subjects named above, its officers will have very little time to devote to solving educational problems."

Need for educational reform employed as a justification for bifurcation of Home Department.

Miscellaneous duties allotted to the so-called Education Department.

Changes more nominal than real.

Such criticism shows that the New Department at the head-quarters of the Government of India is an Education Department more in name than in fact, and indicates that any advance, which may have been made in recent years, rests upon very insecure foundations, especially when viewed in the light of the official bias which has already been shown to exist.

The member in charge of the Department is a covenanted Civil Servant, and not an expert educationalist, while of the two joint secretaries under him, the junior alone is an educational officer, the senior being another member of the Civil Service. Moreover, the name Education Department is a complete misnomer, and could equally well be replaced by "Sanitation Department," or "Local Self-Government Department," the same also applying to the much paraded title "Education Member." Week by week and month by month the only notifications which appear in the Government of India Gazette (Education Department) deal almost exclusively

⁽⁶⁾ *Vide* Appendix III.

with the postings of ecclesiastical and sanitation officers, while only on very rare occasions have they any reference to educational affairs.

Furthermore, recent events have distinctly indicated that there is danger of educational matters being overlooked in a growing anxiety for sanitary reform, and no less a person than the Education Member himself, while presiding over an All India Sanitation Conference, specially convened by the Education Department of the Government of India, remarked in his address to the members of the Conference, that

Dangers ahead.

Sanitary reform may take precedence of educational reform.

“it was no mere chance that education and sanitation were grouped together under one Department.”

Since this announcement there have been many stalwart advocates of the policy that sanitation should take precedence of education, and in the *Times*⁽¹⁰⁾, dated February 4th, 1913 strong protests were made

“against the folly of allowing education to run away, leaving sanitation hopelessly behind.”

Those in India, who are familiar with the prevailing condition of affairs, distinctly fear that, on the contrary, sanitation may be advanced at the expense of education. Because school authorities can, and in several instances do, undertake the teaching of the principles of hygiene, that is no reason for combining sanitation and education in a single department for purposes of administration. The great need for sanitation in India is well recognised, but this is merely a reason for placing its control in expert hands. Under existing conditions it is becoming a matter of some difficulty to determine how much of the Education Budget is for education, and how much for sanitation. Thus, in the Government of India Budget Statement for 1913, a sum of 2½ crores of rupees is set aside for non-recurring expenditure on education, and 1½ crores for urban sanitation. With regard to recurring expenditure, however, 1 crore is allotted for education and sanitation together. Now, money spent on buildings and equipment for educational work cannot be spent efficiently without proper expert advice, and a corresponding increase in recurring expenditure for up-keep; it is consequently anomalous that although so large a non-recurring grant as 2½ crores is proposed specifically for education, there is at the same time no indication of the precise additional recurring expenditure that should form the natural corollary of so large a non-recurring grant. Such methods of finance indicate an allotment of funds which cannot have been preceded by the preparation of a carefully detailed scheme of expenditure, and this is borne out by the statement made by the Education Member in the Imperial Council Chamber, Delhi, on February 28th, 1913, when he stated that

Need for clear differentiation between expenditure on Education and that on Sanitation.

“of the grants given for the last two years, some 71 lakhs or £500,000 sterling have not yet been disposed of.”

It must be admitted that facts such as these are calculated to rouse the fears of those interested in the advance of Indian Education, and who are familiar with its history. In the past Indian Educational administration has not escaped the severe adverse criticism of expert European educationalists, and at

Government educational policy fails to secure either expert approval or the confidence of Indian public opinion.

⁽¹⁰⁾ Vide Appendix IV.

the present time Indian educational policy fails to obtain the full confidence of those Indians anxious for the educational development of their country, as became very obvious during the discussion which took place in the Imperial Council Chamber on February 25th, 1913, when this subject came up for discussion, and much disappointment was expressed at Government's inability to lay down a fully detailed programme.

Finally, the recently issued resolution, dated 21st February, 1913, dealing with the Educational Policy of the Government of India, is largely a colourless document filled with educational platitudes⁽¹¹⁾. So far as it deals with one highly important branch, Technical Education, it is most deficient, and contains indications of the Government's tendency to ignore, in the case of technical education, the fundamental distinctions between secondary and higher grades, which has been productive in the past of so much confusion in the case of general education.

Responsibility for past mistakes does not rest with educational officers.

There is a distinct tendency in official circles to divorce Technical Education from general education on the ground that educational officers are not qualified to deal with so important a subject. This is largely due to the fact that educational officers are held responsible for the mistakes which have been made in the past, although it is sufficiently clear that such officers have not been in any way responsible for the educational policy which Government has pursued. It is impossible here to avoid briefly contrasting the educational method of India with that of Japan, in which country some forty years ago the Japanese Government secured the services of a small band of English educational experts to organise both technical and general education, with a success which is too well known to need recapitulation. It is noteworthy that in its latest educational resolution,

"the Government of India, agreeing with the great majority of the Local Governments, are unable to accept the view that the Director of Public Instruction should be *ex-officio* Secretary to Government,"

Secretariat dislike of expert educational advice.

by which decision the new Education Department has shown itself prepared to continue an anomaly in the existing system of educational administration which has called forth the most severe condemnation from some of the ablest of educational experts, and Indian administrators alike.

The Indian Educational Service.

It is here necessary to examine the nature of the organisation by means of which the actual work of education is carried on in India, and which, in spite of the inherent difficulties and initially wrong administrative bias already discussed, has yet been productive of

Official recognition of the beneficial work executed by educational officers.

"a marked improvement in the character of the public servants now chosen from the ranks of educated natives, as compared with those of the days before schools and universities had commenced to exercise their elevating influence."

⁽¹¹⁾ *Vide* Appendix V.

The resolution of 1904, from which the above quotation is taken, describes this organisation in the following words⁽¹²⁾ :—

“ The Education Department is divided into the superior and the subordinate services. The superior service consists of two branches, called respectively the Indian and the Provincial Educational Services, of which the former is recruited in England and the latter in India. The opportunities and responsibilities which work in the department brings to an officer of this service give scope for a wide range of intellectual activity. Such an officer takes an active part in the profoundly interesting experiment of introducing an Eastern people to Western knowledge and modern methods of research; he comes into contact with the remains of an earlier civilisation and the traditions of ancient learning; he can choose between the career of a professor and that of an educational administrator, and in either capacity he has great opportunity of exercising personal influence and promoting the best interests of genuine education. In order that members of the Indian Educational Service may keep themselves abreast of the advances which are now being made in other countries in the science of education, facilities are given to them while on furlough to study theory and practice of all branches of education both in England and in other parts of the world. The part, already considerable, that is taken by natives of India in the advancement of their countrymen in modern methods of intellectual training will, it is hoped, assume an even greater importance in the future. If the reforms now contemplated in the whole system of instruction are now successfully carried out, it may be expected that the Educational Service will offer steadily increasing attractions to the best educational talent. Where the problems to be solved are so complex, and the interests at stake so momentous, India is entitled to ask for the highest intellect and culture that either English or Indian seats of learning can furnish for her needs.”

Official description of educational officers' work in India

It is upon officers of the Indian Educational Service that the main responsibility rests for the maintenance of adequate educational standards so far, at any rate, as “ Western knowledge and modern methods of research ” are concerned. This is accomplished through the agency of Government Arts Colleges, Professional Colleges, Model High Schools, Training Schools, and the higher grade inspectors; and these form the principal safeguards for ensuring that the work represented by the figures given in educational statistics shall be of a quality which shall justify the increasing public expenditure devoted to it.

In view of this, it is instructive to note that, in August, 1907, no less an authority than the late Sir Edward Law, sometime Finance Member of the Viceroy's Council, made the following deliberate statement⁽¹³⁾ :—

Misleading nature of this description clearly exposed.

“ The fact is that education officers have been, with intent, kept in a distinctly subordinate position.”

⁽¹²⁾ *Vide* “ Indian Educational Policy,” para. 45.

⁽¹³⁾ *Vide* “ Blackwood's Magazine,” August, 1907.

This statement is in startling conflict with the spirit of the quotation taken from the 1904 resolution, and lends added weight to the criticisms of Sir Henry Craik in 1908 when he referred to

“ a spirit which so long as it prevails in official quarters
“ will effectually bar the way against any real educational
“ reform.”

Degradation
of the
Educational
Service con-
sequent upon
the last re-
organisation
of 1896.

Independent evidence is not wanting to show the existence of such administrative tendencies which, during the past twenty years, have produced a steadily detrimental influence upon the Indian Educational Service. Thus previous to 1896, apart from certain special posts, the service, so far as concerned superior appointments, was mainly divided into four grades; the distribution of officers and salaries being as shown in Appendix 6. With the re-organisation of 1896, the substitution of a time scale with personal allowances, in place of the four grades already mentioned, slightly diminished the average pay of the service, and only afforded benefit in the earlier years of service at the expense of the later. It thus tended to create an initial attractiveness during those earlier years which rapidly evanesced in the later, and it is doubtful whether such a change can be regarded as calculated to produce the best results from the service concerned. Moreover, a secondary result was to degrade the official status of the educational officer in his later years of service, since recognition in the warrant of precedence depends for educational officers upon salary, and only in exceptional cases can such officers now receive any recognition at all. Also, the actual number of Indian Educational Officers was reduced (*vide* table) and the number of allowances was calculated on the strength of the cadres then sanctioned. Thus in 1896, twenty out of seventy-seven officers were admissible to these allowances; since 1896, however, the strength of the cadres has almost doubled, but the number of allowances has not been increased, and, consequently, the present condition of affairs is the same as would have existed under the old graded scheme, if the cadres had been doubled and the whole of the increase confined to the lower two grades. Further, the change effected a saving of over Rs 8,000 p.m., or close upon one lakh per annum, on the cost of all superior posts in the Education Department, although it slightly increased the expenditure on the Provincial Service at the expense of the Indian Educational Service, a movement in strict accordance with an administrative tendency, already noticed, in favour of the traditional modes of instruction existing in the country, despite the fact that these are calculated to over-develop the memory at the expense of the intelligence.

Summary of
the results of
this re-
organisation.

The main effect therefore of the 1896 reorganisation was to lower the status of the European element in the department, to diminish its prospects and to reduce its numbers⁽¹⁴⁾; it is consequently difficult to regard it as other than a retrograde step. It was unquestionably necessary to increase the share which educated Indians could take in the system of Public Instruction spreading over their country, but to do so without taking adequate measures to ensure that the quality of

⁽¹⁴⁾ *vide* Appendix VII.

instruction given should conform to European standards was to court educational disaster.

There is moreover official indication that the steps taken in 1896 were, admittedly, retrograde; thus in 1906 the Secretary of State issued the following ruling:—

“ The Secretary of State desires that appointments to the Directorship (of Public Instruction) should no longer be governed by the rules laid down in the resolution of 1896, but by those prescribed in the Home Department resolution of September 4th, 1886. The latter resolution, while not giving members of the Education Service an absolute claim to succeed to the post of Director, contemplated that before appointing a person not belonging to the service Local Governments should, in the event of their considering it desirable to fill the post otherwise than from the local educational staff, seek the assistance of the Government of India with a view to procuring a suitable selection from the Educational Department of some other Province. The Secretary of State also considers it desirable that in order to provide a properly qualified successor in the event of a vacancy arising in the Directorship, measures should be taken in good time to give the officer on whom the choice would most probably fall a wide experience of the working of the department in all its branches.”

Secretary of State's recognition of Secretariat tendency to refuse educational officers any effective control over Government's educational policy.

The post of Director of Public Instruction is an onerous one, since he is the officer responsible for the efficient working of the Department under each Local Administration. The fact, however, that there should be difficulty in obtaining a suitable officer from the ranks of the service is certainly an indication that the recruitment cannot be entirely satisfactory. In 1907 the Indian Educational Service included 157 officers, while the number of Directorships was 8, and the fact that 5% of the service could not be relied upon to develop the necessary administrative ability to fit them for such posts, constitutes the most serious indictment possible against either the existing method of recruitment, or the inducements of the service to attract the right type of man.

With reference to the Director it must be noted that, although responsible for the work of his Department, he does not possess the official right to lay his proposals personally before the executive head of the Local Administration. The proposals must be submitted through the Secretary of “an alien Department,” and Sir Edward Law,* writing upon this said,

“ The Director has no direct access to the Governor of the Province, and can only address the Local Government through a chief secretary who is overburdened with other business and who, as I have already pointed out, may feel no personal interest in educational questions. . . . I cannot believe in any permanent improvement until Directors have direct access to the chief executive officer in their respective provinces.”

Further exposure of this tendency by Sir Edward Law.

With the introduction of enlarged legislative Councils, Directors of Public Instruction have been granted seats on such

* Blackwood's Magazine, August, 1907.

Position slightly modified on the enlargement of Legislative Councils.

Position insecure.

bodies, and have in consequence been entrusted with duties which give to such officers the appearance of Secretaries to Government. It must, however, be noted that there is still an intrinsic difference between the position of a Director of Public Instruction and an officially recognised Secretary: the latter has access to the executive head of his province 'by right, the former merely by courtesy, and it is consequently still possible for administrative action to be taken in educational matters without the official knowledge of the Director. Moreover, this anomalous position, as already pointed out, has now received the final approval of the Government of India through its curiously constituted Department of Education. The position, here discussed, is fraught with much danger, particularly at the present time, when it is being recognised on all sides that a large extension of educational activity is necessary in the country. Under existing circumstances there is no guarantee that money allotted to education will be expended in pursuance of a continuous educational policy carefully thought out in all its details. Secretaries to Local Government chosen from the ranks of the covenanted service are changed possibly every five years or less, and much time is lost at each change so far as education is concerned. If the secretary feels "no personal interest in education," he is probably less dangerous than if he has preconceived ideas formed in a non-educational field of labour. In any case it is doubtful whether rapidly changing non-expert secretaries are best suited to deal with questions of policy affecting any branch of specialised professional work. It must be borne in mind that the secretary to a Local Government does the work of a permanent official in the English Civil Service, and not that of a Secretary of State, and the existing position in the Education Department has admittedly been found unsuited to the needs of one highly specialised professional branch of Government Service, viz., the Public Works Department, where the Chief Engineer is *ex-officio* Secretary to Government.

Illustrations of this.

Evidence is not wanting to illustrate the very real nature of the danger referred to above. Thus in the last quinquennial report, 1902 to 1907, it is stated in paras. 185--186, that

"there are two important developments to be recorded in the quinquennium. One is the transfer of a large number of municipal schools to the Education Department in the Panjab, so as to complete the provision of a Government school in every district; and the other is the movement made in precisely the opposite direction by the United Provinces, where the Local Government in the year 1906 made over the district high schools to the management of district boards. . . . Lest, however, this isolated action of the United Provinces should acquire excessive importance by being supposed to mark an important turn in policy, it may be well to record that the transfer of the schools to the district boards had a very brief life, and that shortly after the close of the quinquennium the action taken in 1906 was reversed, and the schools were again placed under the management of the Educational Department with, as the Lieutenant-Governor remarked, 'acclamations of approval.'"

Again, this point is further illustrated in the following statement made by the Director of Public Instruction, United

Provinces, in the Local Legislative Council at Lucknow, on the 13th March, 1912 :—

“The chief recurring item of my budget is an item of new expenditure of Rs.1,27,000 for the provincialisation of the district inspecting staff, in other words for the transfer of deputy and sub-deputy inspectors of schools from the services of boards to the Education Department. The reform is one which I have advocated for more than four years the reform will enable my department to act as the eyes and ears of Government in the districts as to the extent and progress of vernacular education, and it will further enable it to help and advise the boards in the administration of the schools. A further benefit which will result from the change will be that vernacular education will be protected and encouraged by a Department that has no doubt about its value and only desires most earnestly to see, as soon as may be, the reproach of illiteracy removed from this province.”

In view of these facts it can scarcely be doubted that there is urgent need for the inclusion of an expert educational adviser in the inner Councils at the headquarters of local administrations, and, moreover, that such advisers should possess full official recognition, rendering it impossible for proposals affecting matters of educational policy to receive official consideration by the executive head of the Government unless submitted to him through the Educational Department. Such procedure would only place education upon the same footing as public works.

Urgent need for official recognition of the value of expert educational advice.

Conclusion.

In view of the preceding evidence it may now reasonably be contended that the extension of educational activity in India which has undoubtedly followed the issue of the Authoritative resolution on Indian Educational Policy by Lord Curzon, in 1904, has not been accompanied by an adequate administrative re-organisation in connection with the relations existing between the secretariats and the Education Department.

Present position specified.

It must be remembered that the paramount administrative authority in Indian Secretariats rests with a single branch of the Public Services which, it is claimed, forms a “corps d’élite.” The unique position of this service (the covenanted Civil Service) dates from a time when there were practically no distinct professional services in the country and the members of this service still arrive in India devoid of any specialised professional training such as is required in the case of officers recruited for the Public Works Department, Forest, Agriculture, Education, and similar professional departments. As divisional and sub-divisional officers members of this covenanted Civil Service are regarded as constituting the official eyes and ears of what is familiarly known as the Patriarchal System of Government. This system has, without doubt, been extraordinarily successful in the past while India has been slowly assimilating the ideas and methods of Western civilization, but it remains one which is diametrically opposed in

This position shewn to be an anachronism.

principle to that towards which those same Western ideas inevitably point. Moreover, although the village life in India even yet remains but slightly influenced by the West, still the city and industrial life has within recent years absorbed such influence to an extent which has radically altered its character. In times past it has been essential that officers of the covenanted Civil Service should be handy-men⁽¹⁵⁾, capable of turning their hands to anything, but during recent years the conditions which demanded such qualifications have passed away. Many branches of the Public Service are now filled with highly specialised professional men, and to continue to place the control and direction of these specialised branches in the non-expert hands of an alien service is a deplorable anachronism. The need for higher specialised professional branches of the Public Service has become undeniable, and the recruitment and organisation of such services is a matter of pre-eminent importance to India's further development. But such recruitment and organisation cannot be properly efficient unless there be a fundamental change in the administrative relations existing between these branches and the "corps d'élite."

India's
growing need
for
specialised
professional
services.

This already
recognised
in the case of
the Public
Works
Department.

This has already been very clearly indicated in the case of the Public Works Department, which at the present time is the oldest and most highly organised of such branches, and now forms an efficient professional service of assured status, officially recognised in the Local Secretariats, and held to be in responsible charge of its own section of Government work. Similar developments must inevitably follow in other directions, and the recent expansion of educational work, with the attempted administrative readjustment already noticed, indicates the necessity⁽¹⁶⁾ for the liberal adoption of an administrative attitude towards the Educational Department similar to that which has now been in vogue for some time in the case of the Public Works Department.

Similar
recognition
in connection
with educa-
tion essential
to future
progress.

The first step towards such an administrative change is the one to which attention has already been directed independently by Sir Edward Law and Sir Henry Craik, two authorities respectively on the administrative and educational side whose opinions are of undoubted weight. Until Directors of Public Instruction are transformed into officially recognised secretaries to Local Administrations, the educational efforts of Government will lack efficient expert control, and secretariats will continue to display that bias which has been evidenced in the past by a spirit of hesitating mistrust of the advantages to be derived from a general policy of sound educational advancement in India. Patriarchal control, no matter how beneficent in intention, should no longer be allowed to interfere with expert technical direction in the details of departmental administration.

Indian educational problems are of increasing complexity, due partly to the accumulation of errors in the past, but still more to the changes which are being effected in the country's commercial and industrial position. Primary, secondary, university, and technical education all demand increased expert attention, which it will be impossible for Government to give without a highly organised professional Educational

⁽¹⁵⁾ *Vide* Appendix VIII.

⁽¹⁶⁾ *Vide* Appendix IX.

Department. The lines which such organisation should follow have already been evolved in the case of the Public Works Department. Their adoption must follow in the case of other large professional services, and at the present time the importance of educational work in India is sufficient to justify their adoption in the case of the rapidly extending Educational Service.

Appendix I.

The "*Pioneer*," Allahabad, March 1st, 1908.

Sir Henry Craik, M.P., on Indian Education.

Sir Henry Craik, M.P., the distinguished Educationalist, who has lately been on tour in India, in communicating his views to a Home paper, delivers a judgment on the educational system of this country, which may well be taken note of. He writes—

On most Indian questions I form an opinion with diffidence and express it with hesitation. On the main aspects of the educational question I confess that I feel less hesitation. I have seen much earnest and energetic work, and I am conscious that there is much more that I have not seen. But in thinking that in its main lines it is hopelessly wrong I am only repeating the opinion expressed to me universally by all the wisest Anglo-Indians and natives whom I have seen, and impressed on me by my own experience. I can only describe that impression by saying that there is a sort of mildew lying over the work. System, routine, and formality rest like shackles over the whole thing. I found handbooks of the modern philosophy of the West in the hands of whole classrooms of students, who could formally con their teachings, but in whose minds a totally different set of thoughts was implanted by their history and their nature. Theories of political science and of political economy were being inculcated in youths who could deftly apply them to their own purposes, but who were entirely ignorant that the matters which they discussed and the theories which they propounded were not fundamental axioms, but matters on which in Western life a hundred different views were entertained. One of the ablest amongst the educational workers whom I met told me, with the weariness of misapplied labours,—“I have to-day been trying to explain to a class of Hindu students the meaning of Shelley's *Ode to the Skylark* and *Silas Marner*. They are prescribed in the University curriculum, and so they must be learned. What good can it do?” Only one answer is possible. In the libraries of the higher schools I constantly found *Tom Brown's School Days*. What meaning can that have for boys who have drunk in with their mother's milk ideas of formal courtesy, of studied respect for age and rank, of a personal dignity dependent on fixed rules

which have the force of religion? Do we really imagine that we shall create in them the spirit of the English schoolboy by what they must hold to be a travesty of all the relations of life as these appear to them?

I am quite aware that there is a good deal of sound technical education being attempted in India, and glad to know that some of the ablest of our Indian administrators feel the necessity of more being done in this way. But in many cases I am obliged to confess that such technical education as I saw was a miserable mockery, and those who showed it could only say that they had hopeless hindrances—the weight of which I fully admit—to contend against. The system of caste, the habits of the people, their inertness in manual labour, their fixed idea that clerical work has a dignity of its own—all these will take long before they are overcome. But meanwhile we might surely endeavour to link the intellectual training which we give more closely to their life and their traditions, and to abandon the senseless attempt to turn an Oriental into a bad imitation of a Western mind. Why should we teach them that education is impossible without acquiring the English language? What can that impress upon them except that education is useful only to enable them to undertake those administrative duties which are their absorbing ambition; and in the exercise of which they rarely command the confidence of their own race! Here in Bengal, under the permanent settlement of Lord Cornwallis, the great Zemindars have large estates and vast influence. The management of these estates, and the supervision of their tenants or ryots might give them, employment of the best kind and a sphere of enormous usefulness. If education is to do anything for them it must be by making them cultivated gentlemen of enlarged views, but not necessarily views out of harmony with their own traditions. As it is they leave our colleges with only one aim, to become Government officials, and with acquisitions of knowledge that drive them further from their own people, instead of bringing them into closer touch with and rendering them more fit for the work which can be discharged by none except themselves. It is not a triumph for our education—it is, on the contrary, a satire upon it—when we find the sons of leading natives expressly discouraged by their parents from acquiring any knowledge of the vernacular. Yet instances of this are by no means rare. It is a smaller thing, but yet an undoubted evil, that this over-strained temptation to the native to learn English tends to render the command of the vernacular by Anglo-Indians much more restricted than the old officials assure us that it was in the early days of their service. This does not, of course, apply to the provincial districts—the *mofussil*, as they are called, where the district officer must be, and is, familiar with the vernacular—but it is unquestionably the case in some of the central seats of Government. If the tendency spreads, it will sap more than anything else the security of our hold on India. It is one of the chief incentives to a certain class of natives to acquire facility in our tongue, that by so doing they can interpose between the higher official class and the mass of the people.

I am quite aware of the immense difficulties of re-casting the educational system. But that it requires re-casting is the opinion not of a man here and there, but of everyone who is capable of judging. We must free education from the

domination of examination. We must leave greater freedom of choice and of method to separate schools and colleges. We must show the native that education has other aims than to make Babus, subordinate officials, and pleaders. We must teach them that there are other spheres of activity for the educated man than the law courts and Government appointments. We must abandon the vain dream that we can reproduce the English public school on Indian soil. We must recognise that it is a mistake to insist that a man shall not be considered to be an educated man unless he can express his knowledge otherwise than in a language that is not his own. Place no restriction on English as an optional subject, but cease to demand it as the one thing necessary for all.

And in another and more restricted sphere, I fancy that most of us who know India will agree that, with the most benevolent of aims, we have encouraged a course of doubtful expediency. It has become the fashion for the sons of well-to-do parents to be sent to Britain for their education, and educational institutions at Home are not slow to encourage it. But is it wise, and does it tell in the long run, for their own good or the good of their country? Such youths come into surroundings for which, as a rule, they are ill-fitted. With the marvellous capacity which they possess of adapting themselves to the superficial aspects of their surroundings, they settle down for a time, and their tutors and guides at home are satisfied with their conduct, and fancy they are being moulded into British shape. But do they enter into full sympathy with our thoughts and feelings, or is it, indeed, expedient that they should do so, in view of their future lives? They usually come when, with a maturity strange to the Western youth, they are at the same time utterly incapable of judging our social conditions, or knowing them below the surface. Too often they form aspirations which can never be satisfied, and which no human contrivance can enable them to attain without involving incalculable evil. They break with their own traditions; they cease to be true representatives of their own people, and yet they are divided by an impassable barrier from ours. I know that there are notable exceptions, but they are due to special natural faculties and to special racial peculiarities. For the most part the experiment of mental and moral acclimatisation proves a hopeless failure. Let them come, if they come at all, not at the impressionable period of youth, but when character has been formed, and when they are able to judge and appreciate, not to imitate, superficial traits.

I wish most carefully to guard myself against any suspicion of adversely criticising the educational officials of India. Some of them, I fancied, seem tired out with their work, and scarcely to be versed in the most recent educational movements. But amongst them there are men of first-rate ability. It is the system that is wrong—wrong in its original conception, and faulty in its present administration. Education has no independent place in the central secretariat, and all new schemes must be submitted through an alien department. The result is what it inevitably must be—misunderstanding and delay. The evil was supposed to be met some years ago by the appointment of a junior official from Home to act as a sort of general adviser to the central Government. The plan was one which, without the smallest personal reflection, hardly could have proved satisfactory, and which has not apparently

worked better than was to be expected. I had the advantage of hearing some of the educational evidence placed before the Decentralisation Commission which is now ranging over India. The chief witness examined (of whom I knew nothing before) seemed to me to give his evidence with admirable force, and was evidently in touch with all that is soundest in educational theory at Home. It is not, perhaps, surprising that his questioners were not so conspicuously conversant with the subject; and the cross-examination of one of the commissioners—himself a civil servant in India—served what was to me the useful purpose of showing a spirit which, so long as it prevails in official quarters, will, in my opinion, effectually bar the way against any real educational reform. Educational administration must have its own independent position before it can make any bold and effective advance.

Appendix Ia.

The "Pioneer," Allahabad, March 26th, 1908.

Ideas on Indian Education.

The *Morning Post*, which is better informed upon Indian affairs than most English newspapers, has lately had some severe criticisms upon our educational system:—

"The Indian Government," it says, "of 50 or 60 years ago imported into India a system of instruction borrowed from England, where instruction was not well conducted and education utterly neglected, except by one or two pioneers like Arnold of Rugby. . . . The marvel is not that these past follies of Indian Governments have produced the Tilaks and Lajpat Rais, but that there should have emerged from so ill-judged a system the many Indians of high character and sound judgment who have adorned the Indian Bench and the Indian Public Service."

The *Morning Post* goes on to indicate the remedy:—

"What is wanted for Indian boys and young men is a discipline suited to the conditions of Indian life and of Indian religion, accompanied by instruction in the elements of natural science and of history, communicated in the native language of the pupils. English and English letters should be the accomplishment of those for whom there may be scope in Indian careers where English is requisite for their work."

It adds truly enough:—

"The Englishmen engaged in education in India are, after all, the best judges in these matters. But, strange to say, they are not listened to by the Indian Government."

Appendix II.

The "Pioneer" Mail, May 27th, 1910.

Most people in this country are prepared to accept the statement that we owe a part at least of our recent troubles to an imperfect system of education. Yet there are probably few Anglo-Indians who would be willing to go back entirely on the achievements of the past fifty years. In England, however, the idea seems to prevail that we are in urgent need of a brand-new educational policy, that the only method of illumining our educational darkness is to exchange our old worn-out lamps for new ones of thoroughly up-to-date English make. Even Lord Morley appears to share this delusion; otherwise we should not have Mr. Montague declaring on his behalf that the Secretary of State "recognises the probable advantages" of an investigation, conducted either by a Royal Commission or a Committee. What Lord Morley's intentions in this connection may be in the future no one in India probably even pretends to know, but it is significant perhaps that we should be already hearing of an eminent Oxonian scholar with qualifications for conducting an expert enquiry into our educational system. The gentleman in question is a Mr. M. E. Sadler, who was Director of Special Enquiries and Reports in the English Education Department from 1895 to 1903, and who has had a wide experience in "overhauling" systems of education in English towns and counties. We have no desire to belittle Mr. Sadler's attainments as a scholar, or his claims to pose as an educational expert, at any rate outside India, but the point is, there is nothing to be gained, and much to be lost, by bringing out to India either a Royal Commission or a roving educational inquisitor. The only result of special enquiries of this kind would be to hang up indefinitely all those schemes of progress in which the Local Governments, as well as the Government of India, are particularly interested at the moment. The ground has already been sufficiently prepared, and we have surely had enough of expert investigations, involving immense labour, and ending in reports that are characterised by many impracticable suggestions. It is clear that the path of educational progress in this country is strewn with many serious obstacles, and the struggle now proceeding in the Western Presidency in regard to the improvement of University courses is instructive of the kind of difficulties that have to be faced; but Local Governments, no more perhaps than the Government of India, would be inclined to welcome in this, or in other directions, the intervention of educational experts from outside. No one will deny that much remains to be done before we can be said to have put our educational house in order, but the work of reform can best be entrusted to those who have already made a study of our educational requirements on the spot.

Appendix III.

The "Englishman," Calcutta, December 13th, 1910

The New Education Department.

The Government of India, like the wheels of the gods, moves slowly. It requires a tremendous amount of agitation and the pressure of public opinion to induce it to embark upon any new scheme of reform. In some respects this is sound policy, and "hustle" would be apt to place the Government in a false position. Having said so much in favour of the *festina lente* policy, it is only necessary to look back upon the results of such a policy in India to trace the backwardness of the country in many directions. The new Department of Education which has now been created should have been in existence many years; as the educational policy of the Government of India has been subjected to more severe criticism than perhaps any other. With a properly organised Department many mistakes of the past might have been avoided. Even as now constituted, the Department has tacked on to it certain branches of work which do not properly belong to Education. But the Resolution of the Government of India creating the new Department is quite frank about the secondary object with which it has been brought into existence, viz.—"for affording relief to the Home Department." No one will question the necessity for giving the Home Department relief; at the same time, the expediency of tacking on local self-government to education seems a trifle far-fetched, even on the ground that "municipal and local bodies are responsible for no small part of the public expenditure on education." But even accepting the principle that all matters relating to local self-government are more or less connected with education, we fail to see why the new Department should be saddled with such miscellaneous branches of work as sanitation, archæology, books, records, ecclesiastical, and a few subjects of minor importance now dealt with in the Public Branch of the Home Department. Even the Imperial Record Office is to be handed over as a sub-department of the new Department. The Resolution states that the extreme importance of the subject of education needs no demonstration," and then proceeds to indicate the many directions in which the activities of the new Department are to be employed; but primarily it is to assist in solving the many educational problems that present themselves, and to direct the policy of Government in these matters. It seems to us, however, that if the energies of the new Educational Department are to be dissipated in controlling the subjects named above, its officers will have very little time to devote to the solving of educational problems; for local self-government is a big subject in itself; and if the recommendations of the Royal Decentralisation Commission are to be given effect to, the newly appointed Member in charge will not have much time to guide the educational policy of Government. His energies, and those of his Secretary and junior officers and office establishment will be divided in a manner that does not augur hopefully for education. The officers of the new Department are not educational

experts ; and this circumstance raises a doubt as to the effective character of the Department in dealing with those problems for the solving of which it has been created. The only hopeful feature of the Department lies in its experimental character, as the Government of India regards the superior staff as provisional only, and subject to reconsideration in the light of experience which would be gained hereafter of the special requirements of the new Department. The Government of India, we are told, do not require to tie their own hands, or those of their successors by declaring that the posts of Secretary or Joint or Assistant Secretary should be assigned to any particular services, "as the creation of a new Department was an experiment and its novelty justified the Government of India in retaining from the outset a full measure of freedom to modify the constitution of the staff in such a manner as seemed best calculated to fulfil the objects with which the Department was formed." This is the only hopeful feature of the new departure, and time alone will show what modifications may become necessary.

Appendix IV.

Indian Sanitation.

The "Times," London, February 4th, 1913

TO THE EDITOR OF THE TIMES.

SIR,—We attempted in your issue of October 14 to show the absurdity of a scheme advanced by the Government of India which would limit the executive sanitary service to municipalities, or 7 per cent. of the population, whilst the rural population, amounting to 93 per cent. (or 227 millions) and admittedly suffering from an appalling death-rate from preventible diseases, is, with a bland faith in academic methods, left to find salvation in education. We also invited attention to the retrograde policy which, as a sequel to the vain endeavour to abolish the post of a separate Sanitary Commissioner with the Government of India, proposes to render him a negligible quantity by subordinating him to the Director-General, Indian Medical Service, who holds an appointment the selection for which and the *raison d'être* of which is the utilization of medical, not sanitary, training or experience.

In your telegram of the 31st ult. it is now reported that these opinions have evoked "adverse criticism" in India. It does not seem that this criticism is particularly potent, if the sample your Correspondent has selected is typical. He reports that "The dream of an executive sanitary service for all India is one not in the least likely to be realized in these days of decentralization."

But, as we have pleaded for "the organization of an effectively administered sanitary service," and, in animadverting upon the petty and circumscribed effort of confining executive sanitary staffs to municipal areas, have stated "The scheme gives no real executive sanitary service to India," we fail to recognize the quotation which makes a covert suggestion of an inapplicable Procrustean policy to all India. As a

fact, imperial, provincial, local, and municipal and private funds could be as safely utilized in supporting the influence of a "correctly administered sanitary service" as by the Education Department, when making its policy felt through the Indian Educational Service, the Provincial Educational Service, and locally-recruited subordinates—without in the slightest degree imperilling the rights and privileges of the suppliers of funds as now emphasized by decentralization. We take it that such a service in India could not be termed "correctly administered" if it were incapable, not only of conforming to such conditions, but of adapting its methods to the economic, social, caste, and race peculiarities of the various provinces.

It is, however, curious that in a telegram purporting to describe the Sanitary Conference at Madras and making special reference to "adverse criticism" of our views, no reference is made to Lord Pentland's closing address, in which they were fully justified. He stated:—"In a country like this, where so large a percentage of the population live under rural conditions, there may be some danger that the clamant needs of the towns and centres of industry may overshadow interests and wants. The importance of a pure water supply and other essentials of health is as vital to the villages as it is to the large towns and cities."

Further, Babu Motilal Ghose, the editor of a well-known Indian journal, whilst stating he yielded to none in his desire for spread of education, in asserting the rights of rural areas, twitted the President, in an amusing parable of "two wives" on his obvious disregard of the interests of practical sanitation, and appealed to him to "show more substantial tokens of his love for his neglected wife Sanitation . . . For in one sense sanitation demands more attention than education."

He specially called attention to the unchecked loss of life as influencing adversely the economic advance of the country, and he challenged that officer to show that Indians did not understand ordinary hygienic laws; he maintained it was not academic ignorance of these laws which was at the root of the great mortality, but the absence of practical sanitation as applied to communities. Such contentions but illustrate how deeply the Education Department has blundered in not distinguishing between personal hygiene and the sanitation of communities, and has aggravated this by insisting that the latter must wait for the development of the former at the hands of the schoolmaster.

From *data* supplied by us, Mr. Stott, the well-known mathematician, has kindly calculated the waste of money which results from the useless attempt to rear men who shall be useful citizens, in a country where, undoubtedly owing to their insanitary environments, the expectation of life at birth of the Indian is 19 years below that of the Englishman under more favourable conditions. He finds that if the expectation of life of the Englishman be regarded as the normal condition which should exist in a sanitary India, then, using Hardy's table of mortality, the excess loss in failure to reach the age of 29 years by Indians educated at the school-going age amounts to £851,318 per annum of the total funds now spent for educa-

tion—the calculation being somewhat less according to Stuart's table. Even after allowing liberally for possible errors and for a proportion of the value of education being reaped in good citizenship of those prematurely sent to death, the total loss is not less than £600,000. Under such conditions, increase of the proportion of the school-going age to be educated and the necessary further concurrent waste of funds as a sequence of neglecting concomitant sanitary measures is the penalty India reaps for handing sanitation, with other "miscellaneous" subjects, to the Education Department with its rival financial interests.

We trust it will not be thought we hold it an error to spread education in India, especially if more reasonable cognisance be taken of technical education in the interests of industrial development. In this connexion we protest solely against the folly of allowing education, under specious excuses of "new activity" and non-recurring doles, to run away with the bit and leave sanitation hopelessly behind; we also protest against 93 per cent. of the population, subject to the devastations of plague, cholera, malaria, and other preventible diseases, being left out of a scheme that is heralded by the Government of India as "the general reorganization of the sanitary services throughout India."

Yours faithfully,

W. G. KING (Col. I.M.S., Retired: formerly Sanitary Commissioner with the Government of Madras).

W. J. SIMPSON, Professor of Hygiene, King's College.

January, 1913.

Sanitation in India.

The "Pioneer," Allahabad, February 6th, 1913.

Colonel King and Professor Simpson write to the *Times* on India's sanitation, reverting to their argument in previous letters to the *Times* on the 14th October last. They reply in an exhaustive manner to the criticisms of their statements and cite data showing the huge loss, not less than £600,000, incurred through the failure of Indians educated at a school-going age to reach the age of twenty-nine and become useful citizens. They protest against the folly of allowing education to run away leaving sanitation hopelessly behind, and they also protest against 93 per cent. of the population being left out of the scheme which was heralded by the Government of India as the general re-organisation of sanitary services throughout India.

Appendix V.

The "Englishman," Calcutta, February 24th, 1913.

The New Educational Policy.

The very lengthy Resolution by the Government of India, laying down the line of policy to be followed in matters educational, affords very instructive reading, and is an indication that the authorities have at last realised the inherent defects in the existing policy, in accordance with which thousands of half-educated youths are turned out yearly, who are becoming a danger to the body politic, by adding to the ranks of the disaffected unemployed. This is a danger to which the Press of this country has been directing attention for many years; but so far their's has been a "voice calling in the wilderness." To some extent this is the result of too much centralisation; and it is largely due to the fact that those responsible for the educational policy of the Government of India have been men whose training has not been of such a character as to impress them with the tremendous responsibility of the Government in this matter. It cannot be too strongly emphasized that in a country administered as India is, the people look to the Government for a lead in everything. So far the great aim seems to have been to increase the number of schools and the pupils attending them, regardless of other important considerations, and particularly whether the teaching staff was competent and the curriculum suitable to the requirements of the people. The tendency throughout the country has been to turn out the greatest number of passed candidates under a system of "cram" which has had the most disastrous results. The Education Commission of 1882 recommended "the introduction of a school course complete in itself and of a modern and practical character, freed from the domination of the matriculation examination." That recommendation has been systematically ignored. The Government of India recognise this fully now, and revised ideals are to be substituted for those which have found favour so far.

The outstanding features of the Resolution under reference are the readiness of the Government of India to assist Local Governments by large grants; not to centralize the provincial system, or to introduce superficial uniformity, still less to deprive Local Governments of interest and initiative in education. This would seem to indicate that the Government of India are prepared to spend much larger sums upon education than in the past, and is therefore a matter for satisfaction. Apparently, the Government of India have appropriated a very large sum for this purpose. From what sources this money is to be provided is not stated; but the recognition of the claims of education upon the Indian exchequer is the first step towards placing education upon a sound basis. In the past education has been starved, while other schemes of less public utility have received liberal grants. It has been urged with painful iteration that one of the greatest needs of education is a competent teaching staff with remuneration consistent with

the requirements of this service. If the teachers are not competent to impart the education necessary it follows that the taught will reflect the results of such teaching. Of all State Departments, the educational is the most poorly paid, with the inevitable result that men of the proper stamp and standard are not attracted to that service. It is the same in private aided schools. It is satisfactory to find that the Government of India now fully recognise that few reforms are more urgently needed than the extension and improvement of the training of teachers for both primary and secondary schools in all subjects, including, in the case of the latter, science and oriental studies; and that the Government of India have for some time had under consideration the improvement of the pay and prospects of the Education Services, Indian, Provincial and Subordinate. Indeed, we gather that proposals had actually been drawn up "when it was decided to appoint a Royal Commission on the Public Services in India." We have failed to understand why the administrative proposals should be dependent upon the findings of the Services Commission. It is stated that "the Government of India recognise that improvement in the position of all the Education Services is required so as to attract first-class men in increasing numbers, and while leaving questions of re-organisation for the consideration of the Commission, are considering minor proposals for the improvement of the position of these Services."

The Public Services Commission will not go into the questions of the Education Service this year, but next, and will probably require a couple of years to sift the great mass of evidence they will have collected and to write their report, which will probably not be presented for another two years after that. So that it will be at least four years before the reorganisation of the Indian Education Service can be taken in hand. Meanwhile, we are told that the Government of India "attach the greatest importance to the provision for the old age of teachers either by pension or a provident fund. Teachers in Government institutions, and in some areas teachers in schools managed by Local Boards, are eligible for these privileges. But it is necessary to extend the provision in the case of Board and Municipal servants, and still more in the case of teachers of privately managed schools, for the great majority of whom no such system exists. It is not possible to have a healthy moral atmosphere in any school, primary or secondary, or at any college when the teacher is discontented and anxious about the future. The Governor-General in Council desires that due provision for teachers in their old age should be made with the least possible delay. Local Governments have already been addressed upon this subject." This is a move in the right direction, but it begins at the wrong end! On the subject of the education of the Domiciled community we gather that the Government of India are prepared to adopt a far more liberal policy. They are, we are told, prepared to accept at once the view that the most urgent needs are the education of those children who do not at present attend school, and the improvement of the prospects of teachers. They are also disposed to regard favourably the proposal to erect a training college at Bangalore with arts and science classes for graduates' courses attached to it. They recognise that grants-in-aid must be given in future on a more

liberal scale and under a more elastic system. They will recommend to Local Governments the grant of a greater number of scholarships to study abroad. The proposals to re-classify the schools, to introduce leaving certificates, to include in the course of instruction general hygiene and physiology, special instruction in temperance, and the effects of alcohol on the human body, and the other detailed proposals of the Simla Educational Conference, will be carefully considered on the lines of the opinions of Local Governments when they have been received. We are particularly gratified to find that a course of instruction in physiology is to be introduced in European schools. This is a most important reform, as a knowledge of physiology may be calculated to save youths a deal of life-long misery. On the whole, we view with satisfaction the new educational policy of the Government of India.

Appendix VI.

Comparative statement concerning the establishment and salaries of the senior branches of the Educational Service immediately before, and after, the re-organisation of 1896, compiled from Appendices A & B of the Government of India, Home Department, letter No. 4 Education/204—215, dated Simla, the 23rd July, 1896, which was published in all the Government Gazettes.

Establishment.

INDIAN SERVICE, INCLUDING OLD GRADED SCHEME.	Mad- ras	Bom- bay	Bengal	N.W. Prov.	Pan- jab	Cent. Prov.	Total
No. of Officers on Rs. 500-50 750	8	5 (a)	16	4 (c)	3	2	38
„ „ 750-50-1000	4	5 (b)	11	3	3	1	27
„ „ 1000-50-1250	2	3	6	4	2	nil	17
„ „ 1250-50-1500	1	2	2	1	nil	1	7
„ „ holding special appointments	4	6	—	nil	1 (d)	—	11
Total No. of appointments...	19	21	35 <small>ambiguously shewn as 27 in Appendix A</small>	12	9	4	100
NEW SCHEME.							
Total No. of Officers on Rs. 500-50-1000	14	14	26	11	7	5 (e)	77
Allowances of 200-10-250	2	2	2	1	1	nil	<small>included in the above total 77</small>
„ „ 250-50-500	2	3	3	2	1	1	

(a) including 3 officers on Rs. 700 p.m., and 1 on Rs. 500-50-700 p.m.

(b) „ 1 officer on Rs. 800 p.m., plus a personal allowance of Rs. 250 p.m.

(c) „ 4 officers on Rs. 600 p.m.

(d) „ 1 officer on Rs. 800 p.m. (Principal Mayo School of Art.)

(e) „ 1 officer on Rs. 1250-50-1500.

Cost per Mensem.

	Madras	Bom- bay	Ben- gal	N.W. Prov.	Panjab	Cent. Prov.
Indian Educational Service, old scheme, total cost	Rs. 18250	17300	34350	11233½	7883½	4033½
Ditto new scheme	Rs. 16893½	17166½	23333½	9683½	6650	5283½
I.E.S. and Provincial Ser- vice, old scheme	Rs. 28006½	28987½	57700	17810	12966½	5133½
Ditto new scheme	Rs. 27743½	25566½	52583½	17433½	12750	6516½
SAVING	Rs. 263½	3421	5116½	376½	216½	-1383½

TOTAL SAVING—Rs. 8011 p.m., or nearly 1 lakh per annum.

Appendix VII.

India in Parliament.

The "Pioneer," Allahabad, November 3rd, 1912.

The following questions were asked in the House of Commons during the mail week:—

INDIAN EDUCATIONAL SERVICE.

Sir J. D. Rees asked the Under-Secretary of State for India: If he will state the conditions of service, pay, and pensions in the Indian Educational Service; whether the pensions and average rates of pay in this service are lower

than in any other of the imperial services of India; whether, as a consequence of this, the service is regarded as an inferior branch of the public service; and whether, in view of the importance of securing the best possible men from our universities for the work of education in India, the Secretary of State will take steps to render that service more attractive.

Mr. Montagu: The conditions of service, pay, and pension in the Indian educational service are published in the annual India Office List. The ordinary scale of pay is Rs. 500 a month, rising by increments of Rs. 50 to Rs. 1,000 a month. There are, in addition, certain junior allowances of Rs. 200 to Rs. 250, and senior allowances of Rs. 250 to Rs. 500. Directors of Public Instruction receive pay ranging from Rs. 1,250 to Rs. 2,500 a month. The pension rules are, with an important exception, in favour of this department, the ordinary rules for pension in civil departments other than the Covenanted Civil Service. Indian educational service officers are, exceptionally, allowed to reckon as service for superannuation pension the number of completed years, up to five, by which their age at appointment exceeded twenty-five years. An Indian educational service officer becomes eligible for a pension on completing thirty years' qualifying service or on attaining the age of fifty-five. The maximum amount of pension for twenty-five years' service or upwards is Rs. 5,000 a year. Directors of Public Instruction who have rendered not less than three years' approved service in that office are eligible for an additional pension of Rs. 1,000 a year. Invalid pensions are on the ordinary scale; one sixtieth of average emoluments, subject to prescribed maximum, being granted for each year of service up to twenty-four, and half average emoluments, subject to a maximum of Rs. 5,000, for twenty-five years upwards. The Secretary of State fully realises the importance of attracting the best class of recruits. The initial pay of the service is exceptionally high, and the terms of pension identical, subject to the advantage as to reckoning years for service described above, with those existing in all other imperial civil departments (other than the Indian Civil Service), except that members of three departments can retire voluntarily after twenty-five years' service on full pension, a privilege not possessed by the generality of civil departments. There is no reason to suppose that the Indian educational service is regarded as an inferior branch of the public service, but an examination of the conditions of service in this and other civil departments is covered by the terms of reference to the Royal Commission recently appointed.

Indian Educational Service.

The "Pioneer," Allahabad, November 29th, 1912.

TO THE EDITOR.

SIR,—Mr. Montagu's reply to Sir J. D. Rees' question in the House of Commons with regard to the conditions of service, pay and pension of the I.E.S., illustrates the well-known fact that a perfectly accurate statement may be entirely misleading. The reply shows that members of only four civil services, including the I.C.S., can retire voluntarily on full pension after 25 years' service, but obscures the fact that the

four Services thus privileged comprise all the Imperial Services recruited in England except two, the Police and the Educational. Men in the Telegraphs, Forest and Public Works all enjoy this privilege, and some of them have the option of voluntary retirement on reduced pension after 20 years. The Indian Medical Service and Government Chaplains are similarly favoured.

Mr Montagu omits to mention the slight put upon the Educational Service by its position in the Order of Precedence. Under present conditions a man may be so blocked for promotion that he comes into the table only after 15 years' service. Then he is graded with men of other services many years junior to himself and on much lower pay, and he has every prospect of getting no higher.

What recruits think of the conditions of service may be estimated from the fact that in one province alone, with a cadre of not more than 16 I.E.S. men, four men resigned in four years before the completion of their probationary term. The discontent in the service is so serious that the offer of pension after 25 years would probably induce every senior man below the rank of Director to prepare for his retirement as soon as he had completed that term. Yet it is impossible to keep the Educational Service and the Police in a position of permanent inferiority to other Imperial Services in such an important respect. The difficulty of recruiting suitable men is increasingly felt at the India Office, the causes are well known, and the remedy obvious. The Government of India considered the matter in 1909 and the knowledge that Government had begun to move caused the Service to refrain from a general memorial. After a delay of three years the deliberations of the Government produced a press *communiqué* stating that no action would be taken pending the report of the Royal Commission, which includes a man so unsympathetic to the I.E.S. as Sir Valentine Chirol.

This is hardly the best method of stimulating men to the greater zeal and energy which will be necessary to the satisfactory realisation of the far-reaching schemes for educational progress outlined at the Coronation Durbar.

ORBILIUS.

The "Pioneer," Allahabad, February 27th, 1913.

FOREIGN INTELLIGENCE.

Public Services Commission.

CRITICISM IN THE "TIMES."

[Reuter's Press Messages.]

LONDON, 25th February.

An article in the *Times* to-day criticises the Public Services Commission, declaring that it is taking too narrow a conception of its objects. The article says reports of the sittings of the Commission lead to the conclusion that unless the Commission's methods are drastically altered they may cause a serious increase in racial bitterness. After quoting the terms of refer-

ence as seeming on the surface admirable the article emphasises that the Commission has not to confine its enquiries to the Covenanted Service. The article refers as being mischievous to the manner of putting to witness questions the purport of which is, "Do you think the Indian is as good a man as the Englishman?" The writer considers that these vague wounding questions serve no useful purpose. They will certainly not lead to the reform of existing defects.

Alluding to the inquiry into the working of Indian Courts the article repeats that such an enquiry can only be conducted by English judges of great eminence. The writer thinks that the investigations of the Commission touching Indian Courts should be severely restricted. The writer considers that Lord Islington in his opening speech struck a false note. The true functions of the Commissioners do not lie in the direction of discussions of the relative mental and moral qualities of the two races, with which some of the most important problems in connection with executive administration have nothing to do. The Commission remains wholly oblivious of many grave questions, including the question whether the developing needs of India now require that members of the Covenanted Service should be specialised almost from the beginning or whether the old tradition, feasible enough a century ago, that the Indian administrator should be a handy man able to turn his talents in any direction, should be preserved.

Appendix IX.

"Truth," London, February 12th, 1913.

No doubt the Indian Public Service Commission will enquire into the grievances of educational officers in regard to their pay, etc.; but the more important question of general reform of Indian educational policy and administration will apparently be outside the province of the Commission. Yet, as I know from correspondence that reaches me, this is a matter on which members of the educational service are exercised quite as strongly as they are on the subject of salaries, promotions, and pensions. It is true that there is now a new Education Department at the headquarters of the Government of India, under the charge of an I. C. S. Member of Council, with a second I. C. S. Officer as senior Secretary. The constitution of the department, however, is unsatisfactory.

In point of fact, the new Department was established hurriedly to avert a threatened agitation for a more effective measure, and its working has only helped to confirm the view that there can be no real reform of Indian educational methods without the formation of a strong and independent educational service on the lines of the Public Works Department. As things are, educational officers possess no authoritative position in which they can take an effective control of the educational policy of the country. They are kept in a subordinate place because in high quarters the attitude towards their work is unsympathetic, the idea being that education makes the Indian more difficult to govern rather than better worth governing.

REPORT
OF THE
CONFERENCE OF DIRECTORS
OF
PUBLIC INSTRUCTION

4

Delhi, January 1917

AGENTS FOR THE SALE OF BOOKS

PUBLISHED BY THE

Superintendent of Government Printing, India, Calcutta.

IN THE UNITED KINGDOM.

MESSRS. P. S KING & SONS, 2 & 4, Great Smith Street, Westminster, London, S. W.
MESSRS. KEGAN PAUL, TRENCH, TRÜBNER & Co., 68-74, Carter Lane, E C., and 25, Museum Street, London, W. C.
MR. BERNARD QUARITCH, 11, Grafton Street, New Bond Street, London, W.
MESSRS. H. S. KING & Co., 65, Cornhill, E.C., and 9, Pall Mall, London, W.
MESSRS. GRINDLAY & Co., 54, Parliament Street, London, S.W.
T. FISHER UNWIN, Ltd., 1, Adelphi Terrace, London, W.C.
MESSRS. W. THACKER & Co., 2, Creed Lane, London, E.C.
MESSRS. LUZAC & Co., 46, Great Russell Street, London, W.C.
MESSRS. CONSTABLE & Co., 10, Orange Street, Leicester Square, London, W.C.
MR. B. H. BLACKWELL, 50 and 51, Broad Street, Oxford.
MESSRS. DEIGHTON, BELL & Co., Ltd., Cambridge.
MESSRS. OLIVER AND BOYD, Tweeddale Court, Edinburgh.
MESSRS. E. PONSONBY, LTD., 116, Grafton Street, Dublin.

ON THE CONTINENT.

MR. ERNEST LEROUX, 28, Rue Bonaparte, Paris.
MR. MARTINUS NIJHOFF, The Hague, Holland.

IN INDIA AND CEYLON.

MESSRS. THACKER, SPINK & Co., Calcutta and Simla.
MESSRS. NEWMAN & Co., Calcutta.
MESSRS. R. CAMBRAY & Co., Calcutta.
MESSRS. S. K. LAHIRI & Co., Calcutta.
MESSRS. B. BANERJEE & Co., Calcutta.
THE INDIAN SCHOOL SUPPLY DEPÔT, 309, Bow Bazar Street, Calcutta, and 226, Nawabpur, Dacca.
MESSRS. BUTTERWORTH & Co. (INDIA), LTD., Calcutta.
THE WELDON LIBRARY, 18-5, Chowringhee Road, Calcutta.
RAI M. C. SIRCAR BAHADUR & SONS, 75-1-1, Harrison Road, Calcutta.

STANDARD LITERATURE COMPANY, LTD., Calcutta.
LAL CHAND & SONS, Calcutta.
MESSRS. HIGGINBOTHAM & Co., Madras.
MESSRS. V. KALYANARAMA IYER & Co., Madras.
MESSRS. G. A. NATESAN & Co., Madras.
MESSRS. S. MURTHY & Co., Madras.
MESSRS. THOMPSON & Co., Madras.
MESSRS. TEMPLE & Co., Madras.
MESSRS. P. R. RAMA IYER & Co., Madras.
E. M. GOPALAKRISHNA KONE, Madras.
MESSRS. THACKER & Co., LD., Bombay.
MESSRS. D. B. TARAPOREVALA, SONS & Co., Bombay.
MESSRS. A. J. COMBRIDGE & Co., Bombay.
MRS. RADHABAI ATMARAM SAGOON, Bombay.
MR. SUNDER PANDURANG, Bombay.
MESSRS. GOPAL NARAYAN & Co., Bombay.
MESSRS. RAM CHANDRA GOVIND & SON, Kalbadevi, Bombay.
A. H. WHEELER & Co., Allahabad, Calcutta and Bombay.
MR. N. B. MATHUR, Superintendent, Nazair Kanun Hind Press, Allahabad.
RAI SAHIB M. GULAB SINGH AND SONS, Mufid-i-Am Press, Lahore.
MESSRS. A. CHAND & Co., Lahore, Punjab.
MESSRS. RAM KRISHNA & SONS, Lahore.
SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.
MANAGER, "HITARADIN", Nagpur.
MESSRS. A. M. & J. FERGUSON, Ceylon.
MANAGER, EDUCATIONAL BOOK DEPÔTS, Nagpur and Jubbulpore.*
MANAGER, IMPERIAL BOOK DEPÔT, 63, Chandney Chalk Street, Delhi.*
MANAGER, "THE AGRA MEDICAL HALL AND CO-OPERATIVE ASSOCIATION, LIMITED" (Successors to A. JOHN & Co., Agra).
SUPERINTENDENT, BASEL MISSION BOOK AND TRACT DEPOSITORY, Mangalore.*
MESSRS. P. VARADACHARY & Co., Madras.
MR. H. LIDDELL, Printer, etc., 7, South Road, Allahabad.*
MESSRS. D. C. ANAND AND SONS, Peshawar.*
MR. RAM DAYAL AGARWALA, 184, Katra, Allahabad.*
MANAGER, NEWAL KISHORE PRESS, Lucknow.*
BABU S. C. TALUKDAR, Proprietor, Students and Company, Cooch Behar.

* Agents for sale of the Legislative Department publications only.

T. 83 p 2, ND

E)

CONTENTS.

	Page.
LIST OF MEMBERS OF THE CONFERENCE	i
HIS EXCELLENCY THE VICEROY'S OPENING SPEECH	1—3
PROCEEDINGS OF THE CONFERENCE	4—20
APPENDICES	21—25

LIST OF MEMBERS OF THE CONFERENCE.

1. The Hon'ble Sir C. Sankaran Nair, Kt., C.I.E., B.A., B.L., Education Member of the Viceroy's Executive Council.
2. The Hon'ble Sir E. D. Maclagan, K.C.I.E., C.S.I., I.C.S., Secretary to the Government of India, Department of Education.
3. The Hon'ble Mr. H. Sharp, M.A., C.S.I., C.I.E., Educational Commissioner with the Government of India.
4. The Hon'ble Mr. J. H. Stone, M.A., C.I.E., Director of Public Instruction, Madras
5. The Hon'ble Mr. J. G. Jennings, M.A., Director of Public Instruction, Bihar and Orissa.
6. J. G. Covernton, Esq., M.A., C.I.E., F.R.N.S., Director of Public Instruction, Burma.
7. The Hon'ble Mr. J. C. Godley, M.A., C.S.I., Director of Public Instruction, Punjab.
8. The Hon'ble Mr. C. F. de la Fosse, M.A., Director of Public Instruction, United Provinces.
9. A. L. Covernton, Esq., M.A., Offg. Director of Public Instruction, Bombay.
10. The Hon'ble Mr. W. W. Hornell, M.A., M.R.A.S., Director of Public Instruction, Bengal.
11. The Hon'ble Mr. A. I. Mayhew, M.A., Director of Public Instruction, Central Provinces.
12. The Hon'ble Mr. J. R. Cunningham, M.A., Director of Public Instruction, Assam.
13. J. A. Richey, Esq., M.A., Director of Public Instruction, North-West Frontier Province.
14. G. Anderson, Esq., M.A., Assistant Secretary to the Government of India, Department of Education.

Speech delivered by His Excellency the Viceroy at the opening of the Conference.

His Excellency the Viceroy, in opening the Conference, said:—

Gentlemen,—I do not propose to do more than offer you a few words of welcome on the occasion of your meeting together and briefly touch on the various matters which are going to engage your attention. I should like in the first place to emphasise the publicity of your proceedings. Education is not a subject to be wrapped up in mystery and discussed behind closed doors. We wish to awaken an intelligent interest and an active co-operation on the part of the general public, and we can only do this by taking them completely into our confidence. Above all, we must remove the idea that we have any ulterior motives behind our educational policy. In my speech at the Convocation of the Calcutta University I laid stress on educational questions being dealt with on educational lines with a single eye to educational efficiency. I hope this open conference will show that this is the case and that no political considerations find a place in your discussion of purely educational problems. There is a further circumstance to be borne in mind in this connection. It is all-important to enlist the interest and sympathy of the general public in the matter of education. Those of you who have had experience of English conditions will remember the widespread indifference of the general public to educational questions. The lessons of this war may to some extent correct this attitude, but we want equally in India to bring home to people generally the paramount importance of education in their lives, and I think nothing is better calculated to quicken the public interest than open conferences from time to time, which will show the importance which the Government of India attach to education. It may be said that this conference partakes of a purely official character. I would point out, however, that in the resolution of 21st February 1913, the general lines of our educational activities were laid down after the public had been taken into our confidence at three conferences attended by many non-officials. If it was a question of revising radically the policy already laid down, we should undoubtedly have invited the help of some of the many non-officials who interest themselves in education. But for the present we are in the main confronted by problems in which expert official assistance is primarily required. Owing to the war, it is now necessary for us to select what we can afford to adhere to, and to decide what we can with least disadvantage postpone. This is largely a matter in which expert advice is necessary—the advice of men who administer funds and who are accustomed from day to day to select between the good and the better. There is then no question of springing any new and startling educational policy upon an unsuspecting public. Indeed, our task in India at the present moment seems to be rather to examine and make sure of our foundations. We are all in agreement that primary education should be further extended. I take that as common ground. But schools depend for their efficiency on the quality of their teachers, and inefficient schools represent so much good money thrown away. I would press upon you, then, in the first place, concentration on the teaching problem. We want, as I said lately in Calcutta, to raise the status of the teaching profession, to make it a calling with prizes which will induce men to enter it as a life profession. For this we must raise the pay of the teachers. Much has no doubt been done in recent years to raise the pay of teachers, but I would ask you to consider whether the pay given now, and more especially the minimum pay, is adequate. As one who had the task of tackling this particular problem in London some thirteen years ago, I know the difficulties of the question and the need there is for careful preliminary investigation. Having got your teacher, your next task will be to train him, and it is impossible, I think, to over-estimate the value of training. At the present moment out of 267,000 teachers in India you have only 80,000 who have undergone a course of training. Even if the percentage were higher I would still urge the paramount importance of training. The quality of the

teacher is the alpha and omega of educational efficiency. One last word on this topic. You have secured your teacher and you have trained him. It remains for you to keep him. There can be, I think, no better way of building up a permanent service than by the establishment of a provident or pension fund scheme whose benefits are sacrificed by premature retirement. I hope that the scheme which was evolved some three years ago and which is still under consideration may meet the end which we have in view.

I turn now to the second main subject of your discussion—technical training. Naturally at the present moment when the Government of India are hoping for a lead from the Industrial Commission in the direction of industrial development, technical training looms large in the educational sphere. There are two things I would wish to say with regard to this question. First, consider "technical" in its widest and not its narrowest sense,—by this I mean, do not overlook the claims of agricultural and commercial education. There are some who say we have nothing to teach the men on the land in this country. I cannot claim to talk with authority on such a question, but having seen something of the work of scientific agriculture in other parts of the world, I take leave to doubt such a statement. The great advance made by scientific agriculture during the last half century justifies us in pressing forward with a policy of agricultural education; and though you would not claim to speak as experts on the agricultural side, your educational experience qualifies you to give us useful hints with regard to an advance along this road. Again, on the commercial side of education, I am surprised to find how little has been done in spite of India's large and growing commerce, and I am puzzled as to its cause. It may be that it is obvious to you, but I have not yet had any satisfactory explanation given to me. Compared with a technical institution, a commercial school is a relatively cheap institution, and one would think that there was a great opening in our big towns for good commercial schools.

The second point on which I would lay emphasis is that in technical training in its narrower sense we must not lose sight of workshop practice in outside works. Laboratory training, however good, is no real substitute for the discipline of the workshop. I am well aware of the difficulties which stand in the path, and I merely strike this note of warning that technical training divorced from workshop experience is likely to prove a snare and a delusion.

The subject of women's education is going to engage your attention. You are more familiar than I with the obstacles arising out of social custom which stand in the way, but I would say this that I view with apprehension the growing inequality between men and women arising out of difference in education. It cannot be good for a country that its women should lag so far behind men in this matter of education. I believe that this apprehension is shared by many Indians, and I think it behoves us to do all in our power to improve women's education, so far as we can do so within the limits laid down for us by social customs. In the meantime, we must look to and hope for a gradual change in public opinion, and in this we can count, I hope, on the support and co-operation of all educated Indians. I trust, however, that in the consideration of this most important matter, we shall enlist the co-operation of women. It is they who know where the shoe pinches and any purely man-made scheme is foredoomed to failure.

There is one more matter with regard to which I should like to say a few words. I am fully aware that it is highly controversial, and that it has more than once been the subject of discussion, but it lies so deep in the foundations of our education that I think it well to bring the matter forward, especially at a time when our task is, as I have said above, to examine and consolidate our educational foundations. I refer to the relative claims of English and vernacular teaching. At the present moment we rely on English as the medium of our higher instruction. This is due mainly to the fact that English is the passport to employment and that vernacular text-books are not available. But the consequence is obvious,—students endeavour to grapple with abstruse subjects through the medium of a foreign tongue, and in many cases through their mediocre acquaintance with that tongue have perforce to memorise their text-books. We criticise adversely this tendency to memorise, but to my

mind it reflects credit on the zeal of the students who, rather than abandon their quest for knowledge, commit to memory whole pages, nay, whole books, which they understand but imperfectly. This is of course a mere travesty of education. I had an opportunity the other day of conversing with a prominent Indian gentleman on this very subject, and he told me his personal experience. When he was at the University he took up history as one of his subjects and found, though he is an admirable English scholar now, that his acquaintance with English was insufficient to enable him to understand his text-book, so he resolved to memorise the whole book. In the course of his examination he had a question, the answer to which he knew lay in a certain page, but he was uncertain what portion of the page was relevant, so *ex abundanti cautela*, he wrote out the whole page. For this he obtained fewer marks than he thought he was entitled to. On remonstrating with the examiner, he was told that his answer contained so much irrelevant matter, that it was clear that he did not rightly comprehend the question. I think this piece of evidence illustrates the defects of our present system. I would ask you, and I ask myself, as university men, how should we have fared in our education if it had been wholly through the medium of a foreign tongue? I doubt whether we would not have abandoned the attempt in despair, and I am lost in admiration for the grit of those boys who make a gallant attempt to surmount the difficulties imposed on them by a vicious system. The remedy seems to me to lie in one of two directions, either we must teach in vernacular as long as we can and put off to the latest possible moment the use of English as a medium of instruction, or we must concentrate our attention more closely on the teaching of English. Or can any middle course be suggested which is sound on educational lines? I understand that it was arranged some two years ago in the Legislative Council that local Governments should be addressed on this subject generally when the war is over. I have no intention of bringing up the question for decision in advance of the time so arranged, but I wish it to receive thoughtful consideration without bias, so that when the time comes, not only will you have discussed and thought over it in your own provinces and be ready to give us your opinions, but the best minds in India will also be equally ready with their opinion.

In conclusion, may I express my appreciation of the difficult and exacting duties which the modern development of education entails for a Director of Public Instruction in this country. It is not merely that work has increased much in volume. That is no doubt the case, but with the increase in volume has come a still greater increase in complexity. You are dealing, too, with a subject on which almost every educated man is himself interested, and you are subjected to an almost overwhelming amount of outside advice and outside criticism; you have to deal with large bodies of men who are in no way subject to your control and whom you can influence only by perseverance. You have often to support a line of action which, however it may commend itself to you as experts, has failed to find favour with those whom it affects. For the fulfilment of your duties you require unlimited enthusiasm, unfailing courtesy and unflinching resolution. These qualities have been displayed by directors in the past, and will, I trust, continue to be displayed by them in the future. India owes much to the Directors of Public Instruction and to the fine service which they represent; and although the work you have to do may become more complex and more difficult, you will, I am sure, continue to maintain the qualities of your predecessors and the tradition of your service.

Comparative claims of different classes of education.

Distribution of
expenditure.

The directors were generally agreed that the claims of all forms of education were such that it was impossible to divert any existing grants from one branch to another. In regard to any additional grants that may be made by the Government of India in the future, opinions differ. In *Bengal* the most urgent necessity is the improvement of the secondary education system which should, it was suggested, be extended up to something similar to the present intermediate standard. All branches and especially primary education are sorely in need of additional assistance, but the improvement of the secondary system is the most imperative necessity. In the *United Provinces* and in *Burma* collegiate and secondary education, and in the *Central Provinces* collegiate education, are in particular need of additional grants. In *Madras* though the expansion of collegiate education is of some importance, the primary system in particular and secondary education to a lesser extent demand more attention. In the *North-West Frontier Province* to which liberal grants have been made by the Government of India for secondary and collegiate education, and in the *Punjab* additional grants should be allocated almost entirely to primary education. In *Bombay* the present scale of distribution is fairly satisfactory, but if further grants are forthcoming the claims of primary education should be considered first. In *Assam* and in *Bihar and Orissa* large additional grants are so urgently required for practically every department of education that it is not possible at this stage to single out any branch for preferential treatment. All directors were agreed that the improvement and expansion of training facilities needed consideration.

The suitability
of instruction in
the lower classes of
primary schools.

2. The Chairman then referred to a statement recently made to him that a very large proportion of pupils leave school before the close of the lower primary stage is reached and soon forget what they have learnt in school, with the result that the money spent on that teaching is wasted. He asked whether that statement was true and, if so, what were the causes? Most of the directors thought that there was wastage. Mr. Stone said that fully half the number of boys who entered the primary standards did not go beyond the infant classes. Mr. Richey agreed and quoted figures in support of Mr. Stone's contention. There was some difference of opinion about the causes of this defect. Mr. Stone suggested that the methods of giving grants-in-aid might be improved. The capitation system in his opinion encouraged "grant-earners" who helped to swell the numbers in the elementary classes, but could scarcely be regarded as *bonâ fide* pupils. Mr. Stone suggested that the present *Madras* system could be improved if the award of "merit" grants were made to approximate somewhat to a results grant system, and capitation grants were calculated upwards from a minimum for infants. Mr. Hornell emphasised the fact that the withdrawal of the results grant had caused a serious set-back to primary education and criticised the existing grant-in-aid system as singularly ineffective. There was strong opinion in certain quarters that the root of the trouble was the indifference of the parent towards vernacular primary education if it did not lead direct to English education. Mr. Stone mentioned that the teaching of English in the third and fourth standards which was permitted under certain conditions in *Madras* was very generally approved. His own opinion was that vernacular education is valued for its own sake in *Madras*, but there is also a demand for a little English education even on the part of those parents who have no idea of their boys going further than an elementary school. Mr. Hornell thought that the primary system should provide for a type of school which taught the simplest and most rudimentary curriculum. At the same time competent teachers should be encouraged to teach such additional subjects as may be regarded to be suitable. It was essential that the primary school system should lead on to the secondary. Mr. A. L. Covernton pointed out that the experiment of giving a limited vernacular education in the rural schools in *Bombay* had not been appreciated. Mr. J. G. Covernton remarked that in French Indo-China the teaching of French and in the Philippines the teaching of English were introduced into the lower standards of primary schools, but he could say little about the results of the system. Other directors held the opinion that vernacular education, if conducted

efficiently, was very much appreciated and that the defect referred to by the Chairman was due rather to unsatisfactory teaching. Mr. Richey, therefore, desired the substitution of board for "venture" schools. Mr. Jennings and Mr. de la Fosse thought that the feeble results of the schooling were due to a teacher having to instruct some three or four standards and to the lack of proper inspection. In *Bihar and Orissa* an attempt had been made to confine a teacher's work to two standards only; and in the *United Provinces* the effect of having more and better teachers for these lower standards had recently been tested on a limited scale, with the result that the proportion of boys proceeding to the higher classes was immediately increased. Mr. Cunningham, however, considered that even if only 5,000 out of 100,000 pupils reached the close of the lower primary stage and thus came permanently into the class of the literate, he would not regard the money spent on the remainder as wasted. As education advanced, the proportion would improve.

3. The general opinion was that if additional grants by the Government of India were definitely earmarked for primary education, the view might be held in certain quarters that Government was trying to discourage higher education. It would be better to leave the distribution of grants to the local Governments. If money were passed on to local boards and municipalities, the general idea was that the needs of primary education would not suffer by such an arrangement, but Mr. de la Fosse was somewhat nervous lest these bodies might favour secondary at the expense of primary education. The work of the district boards has been satisfactory on the whole, but the position of municipalities in the general scheme of education needs readjustment.

Additional grants should not be earmarked.

4. In answer to the Chairman's inquiries about the progress made in fulfilling the hopes expressed by the Government of India in 1913 that the pupils under primary education would in the not distant future be doubled in number, it was found that owing to lack of funds the programmes submitted by local Governments have not been fulfilled to any great extent. In *Burma* and the *North-West Frontier Province*, however, the original programmes, subject to a few modifications, have been carried out.

Progress in primary education since 1913.

In answer to an inquiry, Mr. Sharp said that the educational policy laid down by the Government of India in 1913 was not merely a pious hope, but was intended to be a practical and practicable scheme of progress.

5. In regard to policy, Mr. Hornell said that in *Bengal* there were board and aided schools and that any real improvement lay in the direction of the former, seeing that they had some permanent stability. On the other hand, any sudden discouragement of the latter was to be deprecated, as it would result in a serious diminution of numbers. The aim of the panchayati union scheme which was evolved by the Government of *Eastern Bengal and Assam* and had now been made applicable to the whole Presidency, was to place one board school in each panchayati union, an area of about nine square miles. This scheme would not of course provide anything like an adequate number of primary schools, but if carried out would be a beginning of a system of school provision as opposed to the haphazard method of encouraging a primary school teacher, whenever and wherever he could be found. In the *United Provinces* Mr. de la Fosse said there had been some waste of money through undesirable competition between primary schools. This matter, however, had been referred to a committee and a plan for the removal of this defect discovered. The effect of its adoption was that though the number of schools had been reduced, the number of pupils had been increased by 13,500.

Primary school policy.

6. The directors were generally in agreement with the proposal that local bodies be given powers to impose a special cess for primary education, a practice which was already in force in *Berar*. Mr. Stone said that the unofficial members of the Legislative Council in *Madras* favoured very strongly the proposal as regards municipalities. Messrs. Cunningham, de la Fosse and Jennings approved the principle. Mr. Godley thought that such a measure was inevitable, if primary education were to be extended satisfactorily. Mr. A. L. Covernton and Mr. Richey were of the opinion that local bodies had become accustomed to rely so much on Government assistance that they might be opposed to additional taxation; but the former held that, if local taxation

Responsibilities of local authorities.

were accompanied by increased Government assistance, these objections of local bodies would probably be removed. Mr. Hornell was also in agreement with the proposal in theory, but feared that in *Bengal* municipalities would be unable to increase taxation for the sake of education, as there were other very urgent needs before them. Regarding district boards, his impression was that most of the funds which they received were earmarked for specific purposes. He had never heard it suggested by any chairman of a district board that additional funds could be raised without difficulty, whether for education or for any other purpose. He thought that the whole question of local education authorities in *Bengal* and their responsibilities towards education needed investigation. Mr. J. G. Covernton also agreed with the general principle, but doubted whether the proposal would be suited to the local conditions of *Burma*.

Other means of raising additional revenues.

7. In regard to the inquiry whether any class of education might receive substantial development in any other way than the spending of public money, the question of fees was discussed. It was generally agreed that the fees in primary schools could not be increased at present. In regard to secondary schools, it was pointed out that in many provinces such as *Bombay*, the *Central Provinces*, *North-West Frontier Province* and *Madras*, the fees in secondary schools had recently been raised. In *Bombay* the amount of money thus received is earmarked for the improvement of the schools. There has been a certain amount of discontent of a temporary nature, but no appreciable diminution in the number of scholars. It was not considered advisable to raise the fees any further at present. Mr. Mayhew, however, thought that it might be possible to raise fees before long, but would not recommend such a step until there had been a systematic inquiry into its justification. He also hoped that additional assistance might come from private subscriptions and endowments. Mr. Hornell suggested that the large sums of money now paid for private tuition might well be diverted to the revenues of the schools themselves. If the boys were properly taught at school, private tuition except in abnormal cases should be quite unnecessary.

Technical Education.

The teaching of science in secondary schools.

8. The Conference first discussed whether any special steps are necessary for the expansion and improvement of science teaching in secondary schools. Mr. Stone said that in *Madras* object lessons were given in elementary schools. In the middle classes of secondary schools subjects verging on science were studied, and in the higher classes elementary science was obligatory; in the higher classes of secondary schools physics, chemistry, botany and natural history were taught. Additional science courses could also be taken in the two highest forms. In *Bombay* science is compulsory in Government high schools throughout the course, except for the school-final candidates. The University demands for matriculation the study of science in the two high standards and a certificate from the headmaster that the course has been accomplished, but there is no examination in science conducted by the University. In the *United Provinces* physics and chemistry together constitute one of the alternative subjects for the matriculation. The teaching is based on a text-book without any practical work and is, therefore, to a large extent valueless. Laboratories have been provided in schools in connection with the school-leaving certificate and have created a revolution in science teaching. This science teaching occupies four years, bifurcation taking place four years before the examination. It was thought suitable to prescribe other courses, e.g., a classical course as alternative to science. In the *Punjab* science is compulsory in the science matriculation and is optional in the arts matriculation,

but it is commonly taken as an optional subject in the latter. Mr. Godley was of the opinion that the popularity of science is increasing, but it should not be made compulsory for all pupils. In the *North-West Frontier Province* science is compulsory in the middle stage and a good many of the pupils continue its study in the high stage. In the *Central Provinces* science is optional in the middle classes, but Government schools insist upon it at that stage. Special attention has been paid in recent years to the improvement of laboratories. It was mentioned that there is a science inspector in *Bombay*, the *Punjab* and the *Central Provinces*. Mr. J. G. Covernton expressed the need for one in *Burma*.

In those provinces, however, which come under the Calcutta matriculation, the position of science teaching is not so satisfactory. In *Bengal* Mr. Hornell thought the present state of affairs deplorable, as there is practically no science teaching whatever in schools for Indian pupils. One of the optional subjects for the matriculation examination is elementary mechanics, but very few candidates offer this subject. Geography is also an optional subject for matriculation. Otherwise, no provision whatever is made in the Calcutta University matriculation for the teaching of science. Looking to the peculiar difficulties which underlie the educational problem in *Bengal*, Mr. Hornell thought that it would be well to make practical science obligatory and he would include it in the school-leaving certificate. In *Assam* there is again very little science teaching in the schools. Mr. Cunningham could find no good grounds for making science compulsory for all pupils undergoing a secondary school course, if by that term was meant the detailed study of a particular science. He suggested that it should be sufficient to give pupils in the secondary classes a rudimentary course introducing them to the more important principles of natural science in its various branches. The expense of providing laboratories would be a difficulty in the way of compulsion. In *Bihar and Orissa*, though very elementary science is taught in the secondary vernacular schools, there is no science teaching in the secondary English schools. Mr. Jennings hoped that with the introduction of the school-leaving certificate better provision would be made for science. Mr. J. G. Covernton said that in *Burma* it was intended to improve the science teaching, but as yet little could be done through lack of funds. Some guidance in the matter was expected from the recommendations of the committee recently appointed in England.

The general feeling was that science should not be made compulsory as an advanced or formal subject. Most of the directors, however, were in favour of some elementary training in science, and Mr. Hornell would insist on some practical science teaching during the school course.

9. The next subject for discussion was the preparation of boys for non-literary careers either at the University or elsewhere after the completion of the school course. The existing facilities in different provinces were described. *Madras* has an engineering college, and applications are always in excess of available places. In *Bombay* there are colleges of Engineering and Commerce. In the former the students are usually graduates, but there are also workshops to which pupils with lesser qualifications are admitted. In the latter, students are admitted who have attained a principal's certificate after the conclusion of a year's course in an arts college, and then prepare for the Bachelor of Commerce degree. The School of Art and the Victoria Jubilee Technical Institute offer various courses and admit pupils of very varied qualifications. In the former institution, there are special classes in architecture, and proposals have been submitted for instituting a degree in that subject. Mr. Covernton remarked that the practical work in pottery has been very successful. In *Bengal*, there is the Engineering College at Sibpur and the Engineering School at Dacca; the former is a University college of engineering to which an apprentice department is attached and in which provision is also made for the training of artisans; the latter has apprentice and artisan classes only. These institutions are liberally supplied with scholarships and freeships. There is also the Serampore Weaving School which attracts a large number of students, some of whom are graduates. In the *United Provinces* manual classes are common in schools and the subject is helpful to those who wish to gain admission to Roorkee. It has been proposed to transfer the lower subordinate class from Roorkee; and the mechanical

Training for non-literary careers after the completion of the school course.

apprentice class has already been transferred from there to the Technical School, Lucknow. The Roorkee College will eventually confine itself to higher grade work. There are also schools for artisans, the Carpentry School at Bareilly, the School of Arts and Crafts at Lucknow, and the Weaving School at Benares. There are also commercial classes, the University having instituted a commercial course of two years. Mr. Godley referred to the technical institutions and scholarships in the *Punjab* such as the Engineering School at Rasul and the Agricultural College at Lyallpur. In *Burma*, a number of technical subjects were made optional in anglo-vernacular schools some years ago under the results grant system. The work has not been very satisfactory. The Burman, in Mr. Covernton's opinion, is clever at manual labour, but is not attracted by it. In some of the schools conducted under American agencies book-binding, printing and masonry are taught. The School of Engineering at Insein has taken a new lease of life and now attracts Burmans, the introduction of the "sandwich" system having had happy results. In *Bihar and Orissa*, besides the agricultural institutions of Pusa and Sabour, there are technical and commercial schools, the qualifications for admission to which are varied. There is an artisan school at Ranchi, a class for Europeans at the Jamalpur railway workshop and proposals for a mining school at Dhanbad and a technological institute at Sakchi. The commercial and agricultural schools number three and two, respectively. In the *Central Provinces*, there is a school of engineering. In *Assam*, there are some small schools of very doubtful utility, while places are reserved at Dacca and Sibpur for boys from *Assam*. In the *North-West Frontier Province*, the question of technological training has not yet been seriously discussed.

Future
development.

10. In regard to future development, three suggestions were emphasised by the directors—

(i) In some provinces it was obvious that the demand for admission has outstripped facilities. Mr. Hornell urged that there is a strong demand for men in mechanical and electrical engineering work, but the supply of civil engineers is adequate. Mr. Stone thought that the best means of development would be the multiplication of industrial and technical institutions. Mr. Cunningham was strongly opposed to the increase of industrial schools which would exist in an economic vacuum, save in places where there was a market for employment. In some provinces, it was thought that existing facilities sufficed.

(ii) Mr. Stone was strongly in favour of manual training in the existing schools and would like money to be spent on this object. This work would show whether or not a boy had a bent for technical employment. Mr. Mayhew agreed. He considered that the Education Department should confine its attention to offering a sound general education of not too exclusively a literary type. In his opinion the Department should have nothing to do with vocational training. There was a very general agreement with Mr. Stone on the benefits to be derived from manual training.

(iii) There was a very general opinion that more use should be made of the apprentice system in workshops attached to commercial concerns. Mr. Hornell thought that for the training of mechanical engineers it would be well to give part of the training in railway workshops and under firms such as Messrs. Burn and Company. He would reserve places in the apprentice department at Sibpur and Dacca for a certain number of boys who had reached a standard roughly equivalent to that attained under existing conditions two years before matriculation, had undergone an examination conducted by the Education Department, and then completed in addition a term of apprenticeship in workshops. The apprentice departments would at the same time continue to take B. class or matriculate students. At present he found that many boys in the apprentice departments at Dacca and Sibpur left before the completion of their course, as they felt that the work was not suitable to them. This was especially the case with those who took up the mechanical and technical courses at Sibpur. Mr. Mayhew said that at Nagpur in the case of mechanical engineering the last year of the course would be spent in private workshops. Mr. Cunningham was in favour of an apprenticeship system. Mr. Godley, on

the other hand, said that the attempt to combine apprenticeship in the railway workshops at Lahore with higher instruction in the railway school had not proved popular. Mr. de la Fosse said that in the *United Provinces* they were gradually giving up artisan classes as it was found that a craftsman could get better training from his father. Mr. Covernton thought that any multiplication of schools should be organised in connection with an apprentice and workshop system.

11. With reference to the question whether a sufficient proportion of the funds devoted to education generally was being spent on technical education, Mr. Cunningham said that the question could not be dealt with on an arithmetical basis. Conditions varied in different provinces, and in any case there were no *data* on which a computation of proportions could proceed. This view was generally accepted and the question was not discussed.

Training of Teachers.

12. The feasibility of the Government of India Circular no. 813, dated the 30th of August 1916, was first discussed. On the whole, replies were favourable and especially in *Madras*, the *North-West Frontier Province* and the *Punjab*, where it was hoped not only to make up for wastage but also gradually to substitute trained for untrained teachers. The percentage of trained to untrained teachers was also higher in these than in the other provinces. In the *North-West Frontier Province* the position is satisfactory, as the aided schools demand the services of trained teachers to a considerable extent. If an expansion of education is decided upon, it will be necessary to start a new training institution. Mr. Stone said that in *Madras* it would be possible to make suitable provision for the training of new teachers at the cost of 11 lakhs recurring and 66 lakhs non-recurring. He emphasised the importance of the part played by the training institutions in promoting education and referred to the excellent results achieved by the college at Saidapet. Mr. Cunningham thought that in *Assam*, provided that there was no sudden expansion of education and that funds for the establishment of new training institutions were granted in reasonable measure, there would not be much difficulty in fulfilling the requirements suggested in the Government of India's circular letter. He considered, and Mr. Hornell agreed, that the system of depending on Dacca for the training of secondary teachers for *Assam* was neither adequate nor desirable; and therefore the establishment of a training college in Assam was essential. In *Bihar and Orissa* the existing training facilities are not sufficient to meet even the present demands, and Mr. Jennings thought that considerable additional expenditure would be necessary. In the *United Provinces* the facilities for the training of primary schoolmasters are satisfactory on the whole, but more normal schools are badly needed. For English schools there is a training college for graduates at Allahabad and one for undergraduates at Lucknow; but it will be necessary as soon as funds are forthcoming to have an additional institution at Agra similar to that at Lucknow. In the *Central Provinces* the position is satisfactory, but the aided secondary schools still need trained teachers. Mr. de la Fosse emphasised the success of the training classes in the *United Provinces*. Mr. Cunningham said that in *Assam* there were a number of such classes both in the plains and in the hills. More, however, are needed for which additional funds will be required.

The difficulties in providing suitable training facilities seem to be greater in *Bengal* and *Bombay* than elsewhere. Mr. Hornell said that it was

Consideration of
the recent
Government of
India Circular.

as yet impossible to train enough teachers even to make up for wastage. Though it might be possible to provide for the needs of Government high schools, the problem of aided schools was almost insoluble. Even if training facilities were available, it was doubtful whether a large number of candidates would use them, so unattractive are the conditions of teaching in *Bengal*. In *Bombay* the training college can barely supply the needs of the Government high schools. It will be a long time before teachers even in the Government schools are all trained. In *Poona*, an attempt has been made through the agency of two teaching authorities to assist in the improvement of the methods of teaching adopted in the aided schools of that city. This is a poor substitute for training and can only be regarded as a makeshift. Very considerable expenditure will be necessary to bring it about that even a small proportion of the teachers in aided secondary schools shall be trained. Mr. Covernton stated that the number of primary training institutions is sufficient to fill up vacancies as they occur.

Mr. Mayhew was of the opinion that the first subject for consideration was to decide what proportion of the new teachers should be trained. Mr. Richey was doubtful whether it would be advisable to train all the teachers, as in the *North-West Frontier Province* there might not be enough vacancies in the schools to go round, should the expansion of education be impeded in any way.

Experience of the teachers in charge of training institutions.

13. The Chairman asked whether the officers in charge of the big training institutions had themselves undertaken a course of training in Europe. Mr. de la Fosse stated that the regulations of the Allahabad University were very stringent in the matter and that the teachers of training colleges in the *United Provinces* were, therefore, themselves men who had received a secondary training in the United Kingdom.

Duration of the courses.

14. The directors were almost unanimous in protesting against any reduction in the duration of the courses and especially in those for the vernacular school teachers. In *Burma*, however, the Educational Syndicate is engaged in considering whether some of the courses at any rate may be reduced in length, but no decision has yet been made in the matter. In *Madras* the Government has recently decided to lengthen the secondary training course from one to two years. Mr. Stone said that an attempt was being made to impart a general education in an elementary training school to the teachers in addition to the professional training. Mr. J. G. Covernton feared that in *Burma* this tendency had been exaggerated and that the practical and professional side was sadly neglected. In the training classes in *Bombay* the course may be of one, two, or three years, the duration depending very largely upon the capacity of the teacher to benefit from the training. In *Western Bengal*, the *Guru* training school course extends over two years, discretion being given to inspectors to allow exceptional men to take the whole course in one year. Such concession is ordinarily allowed to those *Gurus* only who have passed the middle school examination. In *Eastern Bengal* the *Guru* training course for those who entered upon it as teachers is of one year. Those who are not teachers take the course in one or two years according as they have or have not read up to the middle vernacular standard. The normal school course is one of three years in *Western Bengal* and of two years in *Eastern Bengal*. Special provision is also made for a one year course for those already engaged in teaching. The B. T. and L. T. courses are each for one year. Mr. Mayhew said that in the *Central Provinces* there was a secondary course of two years and a primary course of two or three years. In neither case would it be advisable to reduce the length of the course. Mr. Godley said that the weak point in the *Punjab* system was the shortness of the course, which was of one year in the normal schools and of one to two in the training college. In the *United Provinces*, the course is of two years in the normal schools and of one year in the training classes.

Inducements for teachers to undertake training.

15. The Conference then considered the difficulties in obtaining satisfactory candidates for teacherships and by what means teachers might be induced to undertake a course of training. There was a general impression that the prospects offered were insufficient to attract a large number of suitable candidates to the teaching profession. There has been, however, considerable

improvement in recent years, and especially in *Bombay*, the *Punjab* and the *United Provinces*. In the latter province Mr. de la Fosse hoped that with the improved rates of pay it should be possible to obtain the services of well-qualified graduates for secondary schools. Mr. Hornell stated that in *Bengal* few graduates enter the teaching profession, except as a temporary measure. It was and would continue to be extremely difficult to get efficient teachers of any standing. Mr. A. L. Covernton thought that some form of pension or provident fund would prove an attraction. Mr. Mayhew was not sure that the initial pay in the *Central Provinces* was sufficient. Mr. Godley said that the supply of teachers in the *Punjab* was on the whole satisfactory. Mr. J. G. Covernton said that, though the pay of teachers in *Burma* was far higher than that in India, the Burman was not attracted towards the teaching profession.

In discussing whether inducements should be offered to teachers to become trained Mr. Hornell urged that the payment of stipends was essential in *Bengal*. There were no stipends at the David Hare Training College, and it was consequently almost impossible to induce students to come to the college other than those who were already in Government service. Mr. Mayhew said that in the *Central Provinces* scholarships were given to men even preparatory to training. Mr. Stone thought that a provident fund scheme should be confined to trained teachers and that this would go far to consolidate the teaching profession. Mr. Godley said that in the *Punjab* the staff grants that were given to aided schools, were based on the salaries paid to trained teachers and that the results were very satisfactory. Mr. J. G. Covernton said that in *Burma* a teacher receives no salary grant until he becomes qualified. In *Madras* there is a rule that half the teachers in aided secondary schools should be trained men. In *Bihar and Orissa* very liberal concessions are given to teachers under training. Many of the directors were of the opinion that it would be difficult to grant promotion on the score of training, but this practice is observed in the *United Provinces* and in *Bombay* with satisfactory results. Mr. Godley said that in the *Punjab* though the trained man obtained no immediate advantage over the untrained, he would benefit pecuniarily in the long run.

16. In answer to the question whether Government was justified in providing training primarily for teachers employed in its own schools in preference to those of outside bodies, Mr. A. L. Covernton stated that it was the intention in *Bombay* that the Government schools should be regarded as model schools and therefore it was necessary to consider first the needs of those schools. The other directors generally agreed with Mr. Covernton. In some provinces it is the practice to reserve a portion of the vacancies at training institutions for teachers in aided schools.

17. The Chairman then asked how far the university courses in pedagogy might be utilised. Mr. Hornell was of the opinion that in any new university there should be a department of teaching, but the present training courses undertaken by the colleges affiliated to the university were too academic. Mr. Stone thought that the university degree in teaching had been of very distinct value in *Madras*. Mr. A. L. Covernton stated that proposals for a university degree in teaching were being considered in *Bombay*, but as yet no definite conclusion had been arrived at. In the *Punjab* graduates take the B. T. degree and receive practical training at the Training College. The Licentiate in Teaching is valued in the *United Provinces*. The general impression was that the association of the universities with the training of teachers was very beneficial and helped to raise the status of the profession.

The relative claims of Government and privately managed schools.

The utilisation of the university courses in training.

Female Education.

The demand for female education.

18. The Conference first discussed the reasons why there had been so little progress in the past and how far there existed a demand for additional facilities. The general condition of things in various provinces was briefly described. It appeared that a genuine desire for education was growing up in some provinces, and in *Madras* and *Bengal* for English education. Mr. Stone said that in *Madras* the Government, municipal and mission schools were increasing in numbers. Mr. Godley said that in the *Punjab* there had been a considerable advance in recent years and there was a steadily increasing demand. In *Assam* there is undoubtedly a demand and numbers can be largely increased by the establishment of new schools. Many of the girls would leave school before learning much, but Mr. Cunningham said that their attendance even for a short time would serve a useful purpose. By this means a beginning at any rate would be made. On the other hand, there was considerable apathy in some provinces. In the *Central Provinces* there are only 2,000 girls in classes above the three primary standards and it is found that despite liberal grants Government cannot create a demand. In the *United Provinces* also there is apathy and advance is slow.

Separate provision for girls.

19. Mr. J. G. Covernton said that in *Burma* boys and girls mixed freely together and, therefore, the girls used the ordinary facilities for instruction provided in the schools for boys. Mr. Jennings said that in *Bihar* feeling was in favour of separate girls' schools, but that, speaking generally, there was no objection to the ordinary schools in *Chota Nagpur* and little in *Orissa*. In *Bengal*, Hindus generally desire to educate their girls up to the age of twelve. There does not seem to be any strong reason why the Hindu girl of the *bhadra log* class should not ordinarily be at school between the age of six and twelve. In the case of Muhammadans the progress is slow, and it is necessary to have separate Muhammadan schools staffed by Muhammadan lady teachers. In both cases schools for boys and girls should be separate. Mr. Hornell was not in favour of separate caste schools for Hindus. In the *North-West Frontier Province* separate provision is usually made for Muhammadan and Hindu girls by enabling them to sit in separate rooms in the same building. This is due merely to the difference of script. Mr. Hornell instanced the demand for religious instruction in the Muhammadan schools.

Management.

20. Mr. Stone said that a conference on the subject had recently been held in *Madras*. A recommendation was made in favour of delegating powers to local bodies where such bodies could undertake the powers, and the establishment of local advisory committees for groups of schools. Mr. Stone was in favour of local board management. There might be in addition local committees for a district, but these should have only advisory functions. Mr. A. L. Covernton said that in *Bombay* there was less reason for Government giving up the control of girls' schools than in the case of boys' schools because it was found that private agency was less sympathetic towards the expansion of female education. In support of this contention, he referred to a local board which said that it saw no need for separate girls' schools or for women teachers and so forth. If special committees were formed and given powers, there might be great confusion. Difficulties would also arise over the proper area to be assigned to the committees. He could not see that a local committee was in any way superior to a deputy inspector who knew about the schools and was in touch with local opinion. The committee also would not be able to travel about the district. Mr. Hornell said that in *Bengal* many of the primary schools were aided by Government but the bulk were aided by district boards and should so continue. These schools should be administered and controlled by the boards. He was not in favour of the extension of Government schools. Sadar schools had been established in *Bengal* in accordance with the advice of the Female Education Committee appointed by the late Government of *Eastern Bengal and Assam*. These were middle schools, sometimes under Government and sometimes aided and managed by a committee. He was in favour of a local committee for the management of each secondary school. In the *United Provinces* advisory committees had been started in each district with high hopes, but interest had been found to be intermittent

and the best schools were the model schools maintained by Government in which no committee exists. In the *Punjab*, there has been a request for more Government secondary schools. Private schools are usually aided by Government. Mr. J. G. Covernton said that in *Burma* the raising of the question of control was very unfortunate, and the proposals had caused alarm. The best higher education for girls was conducted by missions, who had been much worried by the suggestion of local committees. Girls' education in *Burma* was thoroughly mixed up with boys' education. Local committees (save the divisional school boards which were now to be established) might tend to spoil both. In *Bihar and Orissa* there are managing or advisory committees for all girls' schools and it is proposed to hand over primary schools to local bodies. Mr. Jennings thought that local committees should have only advisory powers. In the *Central Provinces* Mr. Mayhew said that he was quite prepared to hand over the primary schools to local bodies, provided that efficient management could be secured. The liberal treatment afforded in the *Central Provinces* could effect no progress until there was a more genuine demand for girls' education. Mr. Cunningham saw no reason for changing the system in *Assam*. Mr. Richey said that in the *North-West Frontier Province* private agency was not advancing female education, but the municipalities were doing good work. The existing local bodies could exercise better control than any one else.

The general upshot was that with some exceptions Government schools should be maintained, that local bodies were suitable for the control of girls' schools, and that additional local committees, except in an advisory capacity, did not offer much advantage.

21. Mr. Stone thought that a liberal education was the main aim with some admixture of domestic economy. He was not in favour of making a move towards religious education. Mr. A. L. Covernton thought that the elementary curriculum should be simple and much the same as for boys. He was in favour of a liberal rather than a vocational curriculum for secondary schools. The position was different from that in England where the school had usurped the functions of the home. If there was a need for vocational instruction, it should be given in home classes. He thought there was a demand for three types of curriculum,—a vernacular curriculum, a simple secondary curriculum with some English, and a curriculum similar to that for boys and leading to the matriculation. Mr. Jennings said that the new curriculum arranged in *Bihar and Orissa* in accordance with the advice given by a committee consisting entirely of ladies was very elastic and differed largely from that for boys. It contained oral English, religious instruction and domestic work. It was capable of much modification. Mr. Mayhew denied that parents were at all influenced by the nature of the curriculum in their determination to send girls to school or not. Under present conditions, Mr. Cunningham could see no place for vocational instruction in the ordinary school courses.

The general feeling appeared to be in favour of a simple liberal curriculum with a minimum of vocational teaching, if any, and slightly easier than that for boys.

22. The feeling was general that the lack of women teachers greatly prejudiced the cause of female education. Mr. Hornell said there was a demand for a separate Muhammadan training class in Calcutta. Mr. Stone said that there was a great need for training institutions in *Madras*. He thought that some middle schools might be raised to the high school standard and have training classes attached to them. Mr. Jennings reiterated the demand for additional training facilities and said that little could be done in *Bihar and Orissa* until there were a greater number of trained lady teachers. Mr. J. G. Covernton and Mr. de la Fosse held similar opinions.

23. Mr. Stone considered that experience had shown that only a female inspecting agency could spread female education. He could see no advantage in control being divided between the male and the female agency. He emphasised the need for ladies trained in Europe and the unanticipated and immediate success of the new colleges for women in *Madras*. Mr. Hornell

said there were two European inspectresses and ten Indian assistant inspectresses in *Bengal*. The male agency still play a large part in the actual inspection of primary schools, but the female agency has practically taken over all schools at district headquarters. The inspecting officers report about schools in rural tracts to the inspectresses. Mr. Hornell thought that the control over girls' schools should be handed over as far as possible to the inspectresses.

School-leaving Certificate and Matriculation Examinations.

Sub-Committee.

Improvements in the conduct of school examinations. Advantages of the certificate system.

24. There was a general agreement that the inclusion of oral and practical tests and the consideration of school records were necessary to a properly constituted school-leaving examination. Mr. Stone said that the effects of the introduction of the school-leaving certificate in *Madras* had been satisfactory. Mr. de la Fosse stated that the work of candidates and the tone of the schools where the school-leaving certificate was taken had improved. Mr. J. G. Covernton said that teachers were agreed that the school-leaving certificate was productive of better work than the matriculation. Mr. Hornell considered that the influence of the matriculation in *Bengal* was such that there was no proper system of class-work in schools. Mr. Richey said that the certificate system had effected great improvements, and especially in the written work of the schools. There was, however, a considerable difference of opinion how these objects should be achieved. The arrangements for conducting the school examinations differ considerably in the several provinces.

The matriculation and the school-leaving certificate side by side.

25. In certain provinces there are, or are intended to be, two examinations—the matriculation and the school-leaving certificate—held at much the same time and with similar courses, though the school-leaving certificate offers in addition a number of optional and non-university subjects. It was generally agreed that if there is a school-leaving certificate of this nature, it should be regarded as an equivalent to the matriculation and enable a boy to proceed to the university courses. Dealing with the question whether a university could be called upon to accept vocational subjects, Mr. Hornell was unable to distinguish between university and non-university courses. He was in favour of following the Whitehall Board of Education system of requiring certain subjects and giving a free choice of optionals in addition. All that a university could reasonably demand was that a boy had gone through a good, comprehensive school course. The object at present in the provinces referred to in (a), (b), (c), and (d) of this paragraph is to concentrate attention on the improvement of a comparatively small number of schools by means of a better conducted examination and suitably arranged courses. On the other hand, there is a danger of conflict with the University; and Mr. A. L. Covernton quoted Mr. W. H. Sharp's opinion that *Bombay* University would always refuse to recognise a departmentally controlled examination. In other provinces, again, such as the *Punjab* where sectarian rivalry exists, Mr. Godley was of the opinion that it would be inadvisable to give headmasters responsibility with examination results.

(a) In the *United Provinces* there is a school-leaving certificate alongside the matriculation which admits to Government service and is recognised by the University as an equivalent to matriculation. Only those schools are recognised by the Department for this examination which satisfy the requirements of the Central Board on which are representatives of the Allahabad

University. If the number of high schools so recognised (at present about half the total) were greatly increased, there might be difficulty in providing the necessary machinery. There are oral and practical tests, and attention is paid to school records. Mr. de la Fosse was careful to point out that it was the duty of the inspector to supervise the keeping of school records, but not to conduct the oral examinations of the pupils which are carried out by examiners appointed by the Board. Students may enter for both examinations, but this is rarely done. Mr. de la Fosse stated that there had been considerable improvement in the teaching and efficiency of those schools which had been recognised for the school-leaving certificate.

(b) In *Bengal* there is as yet no school-leaving certificate, but Mr. Hornell stated that he was submitting proposals for an examination somewhat similar to that in the *United Provinces* and confined to a small number of schools. Were the proposed examination applied to all the high schools in *Bengal*, Mr. Hornell thought that it would take some four years to complete a single examination. There should be a comprehensive curriculum to suit the university and other requirements. The *Calcutta University* should have two representatives on a Board of ten members, and it was intended also to give representation to the Chamber of Commerce and other bodies.

(c) Mr. Cunningham stated that in *Assam* they were awaiting the publication of the *Bengal* scheme, but he did not anticipate that anything would be done for a few years.

(d) In *Bihar and Orissa* it is intended to have a school-leaving certificate which Mr. Jennings anticipates will be recognised by the University. There should be representatives of the proposed *Patna University* on the Board. No fee is to be charged for this examination. There will be a great variety in the choice of subjects.

26. In certain other provinces there is or is proposed a single examination conducted by a Board and adapted to all requirements by means of a number of optional subjects and groups. The chief object is to prevent competition in the matter of examinations, and to leave it to the Board to make such improvements in the conduct of the examination as may appear from time to time advisable in the light of experience. The chief difficulty seems to lie in the composition of the Board rather than in deciding its responsibilities.

A single examination conducted by a board.

(a) In *Bombay* there are still two examinations, but efforts have been made recently in accordance with the recommendation of Sir Alfred Hopkinson to institute a single examination to be conducted by a joint Board with Government and University representatives. At present there is a deadlock between the University and the Government, as the University claims the right to control the examination, while the declared policy of the Government of India is that the conduct of a school-final examination should be regarded as outside the functions of a University.

(b) In the *Punjab* it is proposed to have a University Board with the Director of Public Instruction as chairman and a majority of its members directly connected with school education. Mr. Godley was of the opinion that the best solution of the difficulty was for the University to control the examination by the agency of such a Board. A variety of groups will be offered to the candidate, some of which will be insisted upon by the University for admission to its colleges. The University conduct a clerical and commercial examination which does not lead to university study.

27. Messrs. Stone, Mayhew and Richey were generally agreed that, where as the Department should have the right to lay down the subjects which should be taught in the schools and examined by means of a school-leaving certificate, the University also had the right to demand additional qualifications and standards. In that case the school-leaving certificate might well precede the matriculation in point of time. Mr. Stone explained the difficulties existing at present in *Madras*, which were due to the principals of colleges admitting students unfitted for a university class and to the cumbrous nature of the certificate. He thought that those boys who did not desire to go

The school-leaving certificate may precede the matriculation.

to the University should have the benefit of a school certificate and be able to leave school immediately after the certificate examination. Mr. Richey stated that in the *North-West Frontier Province* all subjects in the school-leaving certificate are optional. If candidates pass in the subjects required by the *Punjab* University, they become matriculates. A certificate, therefore, does not necessarily carry with it the right of admission to a college. A boy who is desirous of proceeding to a college, even though he has obtained a certificate, may have to remain at school until he has passed in those subjects required by the University. Government also give a preference in the matter of Government service to those boys who pass the subjects prescribed by Government. In theory a boy has complete liberty of choice, but in practice he is limited to the subjects in which his school is recognised by the Department.

Improvement and expansion of collegiate education.

Sub-Committee.

Increase in the number of collegiate students.

28. The directors were agreed that there was a largely increasing demand for collegiate education which was in excess of existing facilities. The Chairman asked whether this big increase in numbers was due to any deterioration in the standard of the matriculation. Mr. Hornell was of the opinion that the change from the entrance to the matriculation had not resulted in the improvement which was anticipated, and especially in English. He found it difficult to believe that the standard of admission to university courses had not been lowered somehow or other. This was partly due, he thought, to the new arrangements regarding prescribed and recommended books. Mr. Stone said that in *Madras* candidates for matriculation were expected to make a detailed study of the prescribed books and a general study of the recommended books, subjects for composition being drawn from the latter. Mr. Hornell replied that this was not the case in *Calcutta*. Mr. A. L. Covernton said that the chief difficulty in *Bombay* was to be found in the big fluctuations in the standard of admission to colleges from year to year. Mr. Stone said that arrangements had been made in *Madras* whereby the law classes were held during the middle of the day and therefore students were unable to undertake two courses of study concurrently, but Mr. Hornell thought that the adoption of a similar practice in *Calcutta* would not be appreciated.

Standards imposed at present for the affiliation of colleges.

29. The Chairman then asked what standards were now imposed by the universities for the affiliation of new colleges, and whether any definite proportion between students and teachers was insisted upon. The general condition of things in provinces was explained by several of the directors. The *Calcutta* University allows classes of 150 students and sometimes makes exceptions in excess of that number. A class is usually divided up into sections and therefore a teacher may be called upon to deliver the same lecture to three sections, each of 150 students, on the same day. By this means, the number of students can be multiplied without a corresponding increase in the staff; and this can be done without the knowledge of the affiliating authorities. The *Punjab* University considers that a class of a hundred students is excessive, but has laid down no definite maximum. Mr. Godley said that in practice intermediate classes are usually sub-divided if they exceed a hundred, and that for science and English composition groups are formed. The *Allahabad* University demands that when a class exceeds sixty, it should be split into sections; and

in science when a class exceeds sixteen, a demonstrator should be entertained. The *Bombay* and *Madras* Universities lay down no definite proportion or limitation, save that in the case of the former university the total number of students attending two new second-grade colleges has been limited.

30. The Conference then discussed whether some definite standard could be enforced. Mr. Stone doubted whether it would be advantageous to lay down rules and preferred to trust to the control of the university. Mr. A. L. Covernton said that an inspecting committee was appointed by the *Bombay* University every three years to inquire into the general condition of all colleges. The fact that such principals as were included on the Committee might overlook defects in their own colleges and possibly exaggerate them in others, tended to detract from the value of the Committee's recommendations. Besides, as Mr. Hornell pointed out, the only real remedy in the case of proved inefficiency would be disaffiliation, and such a practice would entail the increased inability of the University to provide for the demands of students requiring admission to colleges. The existence of difficulties about admission, however, was beneficial to the extent that it might encourage private subscriptions and endowments. For example, five lakhs had just been subscribed in Rangpur which, had there been no limitation in the other colleges, might not have been forthcoming.

The control of the University.

31. The Conference was generally of the opinion that it would not be wise to lay down any hard-and-fast rules or insist on a rigid limitation of numbers in any particular class. Mr. A. L. Covernton pointed out that in fixing the numbers of a class all sorts of matters should be taken into consideration, such as the size of the room, the capacity of the teacher, and the nature of the subject and of the standard. It was unwise, therefore, to lay down a rigid maximum for each class. He thought that the upper classes were necessarily small in numbers. In answer to the question whether it was necessary to limit the numbers in the lower classes only, he said that in his opinion there was a similar necessity for restriction in the upper as in the lower classes.

A rigid limitation inadvisable.

32. The directors were agreed that tutorial work was very essential for college students and that any rules that were laid down should take this fact into consideration. Mr. Hornell pointed out that in *Bengal* the intermediate classes required school teaching, especially in English, and that there should be a proper correction of the written work. There was a general impression among the teachers in *Bengal* that many boys come up unfitted for collegiate instruction and therefore there was all the more need for suitable and effective teaching in addition to the lectures. In the upper classes, though the lectures might be delivered to a larger number of students, mere lecturing is inadequate for B. A. instruction. There should also be proper provision for tutorial assistance. Mr. A. L. Covernton said that in *Bombay* an attempt had been made to split up junior classes into sections, so that the teachers might be able to teach in accordance with school methods. The experiment has proved only a qualified success. It has been difficult to obtain the services of trained graduates and there was an unfortunate tendency on the part of the teachers employed to lecture rather than to teach. Mr. Stone pointed out that it was certainly wrong to suppose, as was often done, that the tutorial work was inferior in importance to the lectures and could, therefore, be entrusted to less qualified teachers.

The necessity for tutorial instruction.

33. Mr. J. G. Covernton urged that it was possible to lay down some rough proportion between students and teachers. For example, Mr. Hunter had suggested to him that for physics and chemistry the proportion should be 20 to 1 for the intermediate and 15 to 1 for the bachelor classes. Mr. Sharp referred to the recommendations of the committees recently appointed to consider the creation of new universities by which, taking the college as a whole, there would be roughly one teacher to every 13 students, but there would be no definite limitation in the number of students attending any particular lecture. This was considered by the directors a sound principle, Mr. Cunningham dissenting. Mr. Hornell emphasised the importance of fixing some standard. The object should be not so much to limit the numbers of students attending any particular lecture as to ensure that the lectures were supplemented by some form of teaching in the lower classes and by tutorial supervision in all classes.

The necessity of some general and flexible standard.

Possible economies
in the organisation
of collegiate
education.

34. The Conference then discussed whether any economies are possible in the present organisation of collegiate education so that the available teaching resources might be used to their utmost capacity. The question of instituting an inter-collegiate system of lectures was first discussed. Opinions varied according to the position of colleges. Mr. A. L. Covernton said that the colleges in *Bombay* were too far apart for such co-operation and that, even if they were not, the time-table difficulties would be considerable. Mr. Hornell pointed out that the climatic conditions of *Bengal* would prove a big obstacle. On the other hand, Mr. Godley said that in *Lahore* colleges were close together and therefore inter-collegiate lectures could easily be arranged. Such lectures are given already in certain M. A. subjects, and higher science has become regarded as an inter-collegiate subject. Mr. Stone said that in *Madras* inter-collegiate work was carried out in the small honour classes in the specialised subjects, but that such a system could not well be worked for large classes. Arrangements are made whereby the students do their work at one college in the morning and at another in the afternoon. The lady students of the Government College attend the science classes at the Presidency College. Mr. de la Fosse said that in the post-graduate classes students could go to different colleges for their lectures, both at *Agra* and *Allahabad*. Mr. Mayhey said that the system of inter-collegiate lectures was carried out in *Nagpur* even in the undergraduate classes in science. Mr. Hornell then referred to the abnormal number of lectures which many of the students were expected to attend. It was agreed that the number might well be decreased without loss of efficiency and that by this means college teachers and students might have more time for tutorial work.

Reference to the
Universities.

35. It was thought by some of the directors that if a reference on the subject were made to the universities, the reply would be that improvements could only be made through increased expenditure and that the colleges had no money at their disposal. Mr. Godley said that the D. A. V. College, where the number of students to each teacher was high, might object to the acceptance of a Government grant. Mr. Hornell similarly instanced the Ripon and other colleges in *Calcutta*. Mr. Stone and Mr. Hornell both thought that the reference to the universities might be beneficial, if only as a means of promoting a discussion. The present tendency was one of drift, and an effort should be made, at any rate, to evolve some sort of policy. Some of the other directors were not so hopeful of beneficial results, but they did not think that the universities would have any objections to such a reference.

Second-grade
colleges.

36. Mr. Hornell considered that the recommendation of the Universities Commission that second-grade colleges should be discontinued was a mistake, and this was the general opinion of the other directors. Mr. Stone said that in *Madras* there were a number of such institutions which did useful work, but he pointed out that they were usually attached to high schools and were not separate institutions. Mr. Jennings urged that if high schools were thus extended, the lower classes for small boys should be detached as preparatory schools. The directors were agreed that some kind of institution was required between the present school and the college which would relieve the congestion in the colleges and provide a form of instruction suited to the needs of the boys. Mr. de la Fosse and Mr. Godley urged that the work carried out in such institutions was school work and should, therefore, be conducted as such. Mr. A. L. Covernton also considered that there should be a class of school, such as there is in *Scotland*, quite divorced from the university but leading up to the university system. He considered that if such higher grade or collegiate schools were established, colleges might continue to admit matriculates direct and that the two systems might for a time work together, the system of direct admission gradually lapsing in favour of a system of intermediate institutions. Second-grade colleges *qua* colleges were undesirable, but they should be encouraged as schools. Mr. Stone considered that schools should be so extended and improved as to cover the present intermediate work. Mr. de la Fosse agreed and remarked that in that case the B. A. course could be made one of three years. There was a very general feeling that the present position is unsatisfactory in that it leads to congestion in the big centres and an unsuitable form of instruction in the lower college classes. The general conclusion thus arrived at

was that the present collégé course begins too soon, that the school course should be prolonged, and that the intermediate course should as far as possible be relegated to schools. Mr. Mayhew dissociated himself from any expression of opinion in favour of second grade colleges as an extension of the schools in view of his local Government's general university policy.

Educational Literature.

Sub-Committee.

37. There was a very general agreement that much benefit might be derived from an extended dissemination of useful information and advice among those interested in educational matters. Mr. Mayhew and Mr. Cunningham especially were very emphatic about the necessity of some definite organisation whereby these objects might be achieved. Need for educational literature.

38. In considering the questions of educational journals and magazines Mr. A. L. Covernton explained that "Indian Education" was published by a private firm under the editorship of a member of the Indian Educational Service and that the *Bombay* Government besides paying a small subsidy purchased a certain number of copies for use in schools. He understood that the journal was run at a considerable financial loss to the publishers who probably obtained some advantage in return in the shape of advertisements. Mr. Stone stated that the "Educational Review" in *Madras* was a private venture. The *Madras* Government purchase a certain number of copies both of that journal and of "Indian Education." Mr. Godley said that the "Punjab Educational Journal" was a private magazine, but the editor was usually an educational officer. The general impression was that these magazines, though fulfilling a useful purpose, were not well supported, and were always in danger of discontinuance. On the other hand, the vernacular magazines, some of which were published by Government, were very satisfactory and widely appreciated. Existing journals.

39. At first there seemed to be a desire on the part of directors for an authoritative educational journal to be published by some central authority. Mr. Mayhew stated that he was particularly anxious to have not only articles of general educational interest, but also news of what was going on in other provinces and in other countries. It was not easy, however, to find a central authority ready to undertake so big a responsibility and it was also explained that there might be difficulties in obtaining a Government subvention for this purpose. It was agreed, therefore, that the best course would be to allow the existing journals and magazines to continue as at present and also to support indirectly the publication of an educational supplement which had been proposed by a well-known Indian newspaper. Many of the directors thought that such a publication in addition to its educational value might be useful as an advertising agency. Educational officers would be permitted to contribute to the supplement provided that they kept within the terms of the Civil Service Regulations. It was urged that the newspaper in question was not read at all widely in certain parts of India, but Sir Edward Maclagan replied that the proposed supplement would be separate from the ordinary editions of the paper. An Educational Supplement to an Indian Newspaper.

40. It was also agreed that the Occasional Reports had served a useful purpose and should be continued under present arrangements. The idea of having an Occasional Report on the training of teachers was discussed. In addition to these reports which are issued by the Bureau of Education it was Occasional Reports and bulletins.

thought there was considerable scope for the issue of bulletins and monographs by the same authority. These bulletins might deal with matters of professional importance, such as the training of primary school teachers, visual and manual instruction, education for factory children and so forth. Summaries of publications received from other countries might also prove useful. Sir Edward Maclagan stated that a reprint of a portion of the London University Commission's report had been arranged and would be ready very shortly. The directors stated that this would be of great value. The bulletins should be written as far as possible by an educationist with an intimate knowledge of the work described and could, if required, be published under the author's name and might not exceed some four or five pages in length. Mr. Sharp offered a word of warning against an excess of such publications, which was approved by the directors.

Mr. Sharp said that he would welcome suggestions from directors as to suitable subjects and authors. It was suggested that a report dealing with the school education provided by the Buckingham Mills and the schools at the Beniadih mines and on the Darjeeling and Jalpaiguri tea gardens might be asked for and published.

41. Mr. Sharp said that he was sometimes asked for old resolutions and minutes which were now out of print and had begun putting some together. This work would involve the compilation of a connecting narrative which, however, need not amount to a regular history of Indian Education. The directors thought the idea very suitable.

APPENDIX A.

Comparative claims of different classes on education.

	PERCENTAGE OF PUPILS AT THE VARIOUS STAGES OF EDUCATION.			PERCENTAGE OF DIRECT PUBLIC EXPENDITURE (EXCLUDING BUILDINGS, EQUIPMENT, AND INSPECTION) ON		
	Colleges.	Secondary stage.	Primary stage.	Colleges.	Secondary schools.	Primary schools.
Madras	6	6	93.4	9	13	78
Bombay	7	7.7	91.6	11	15	74
Bengal	1	11	88	28	32	40
United Provinces	1	9	90	20	33	47
Punjab	1	11	88	16	37	47
Burma	2	5.8	94	5	61	34
Bihar and Orissa	3	4.6	95.1	13	24	63
Central Provinces	4	7.2	92.4	7	32	61
Assam	3	6.3	93.4	10	25	65
All India	8	8	91.2	15	27	58

APPENDIX B.

Technical Education. 1914-15.

	Madras.	Bombay.	Bengal.	United Provinces	Punjab	Burma.	Bihar and Orissa.	Central Provinces.	Assam.	North-West Frontier Province.	Coorg.	Delhi.	Total.
No. of Colleges—													
Engineering	1	1	1	1	...	...	...	...	...	...	...	...	4
Commerce . . . . .	...	1	...	...	...	...	...	...	...	...	...	...	1
No. of Schools of—													
Art	1	1	4	2	1	...	...	...	...	...	...	...	9
Engineering and Surveying . . . . .	...	1	4	5	2	2	3	1	...	...	...	...	18
Technical and Industrial . . . . .	...	23	54	34	28	3	38	9	7	...	...	2	198
Commercial	1	36	15	3	1	2	3	...	...	...	...	...	61
Expenditure on Colleges—													
Provincial and Local Funds	Rs. 1,37,000	Rs. 1,71,000	Rs. 2,07,000	Rs. 2,59,000	...	...	...	...	...	...	...	...	Rs. 7,74,000
Fees	30,000	27,000	18,000	19,000	...	...	...	...	...	...	...	...	94,000
Other sources	1,000	...	6,000	69,000	...	...	...	...	...	...	...	...	76,000
Total	1,68,000	1,98,000	2,31,000	3,47,000	...	...	...	...	...	...	...	...	9,44,000
Expenditure on Schools—													
Provincial and Local Funds	70,000	3,51,000	2,26,000	2,21,000	Rs 1,43,000	Rs. 52,000	Rs. 1,13,000	Rs. 41,000	Rs. 4,000	...	...	Rs. 7,500	12,28,000
Fees	4,500	65,000	45,000	11,000	14,000	5,000	14,000	...	...	...	...	250	1,59,000
Other sources	7,500	1,76,000	81,000	1,33,000	12,000	3,000	16,000	9,000	3,000	...	...	450	4,41,000
Total	82,000	5,92,000	3,52,000	3,65,000	1,69,000	80,000	1,43,000	50,000	7,000	...	...	8,200	18,28,000
Total Expenditure—													
Provincial and Local Funds	2,07,000	5,22,000	4,33,000	4,80,000	1,43,000	52,000	1,13,000	41,000	4,000	...	...	7,500	20,02,000
Fees	34,500	92,000	63,000	30,000	14,000	5,000	14,000	...	...	...	...	250	2,53,000
Other sources	8,500	1,76,000	87,000	2,02,000	12,000	3,000	16,000	9,000	3,000	...	...	450	5,17,000
Total	2,50,000	7,90,000	5,83,000	7,12,000	1,69,000	60,000	1,43,000	50,000	7,000	...	...	8,200	27,72,000

APPENDIX C.

Circular letter from the Hon'ble Sir E. D. Maclagan, K.C.I.E., C.S.I., Secretary to the Government of India, Department of Education, to all local Governments and Administrations, no. 813, dated the 30th August 1916, on the subject of the desirability of improving the supply and the training of teachers in India.

The attention of the Government of India has lately been again drawn to the inadequacy of the arrangements in many provinces for the training of teachers for secondary and primary schools. As local Governments are aware, the question of the training of teachers has not of late years been neglected, the Government of India having, from time to time, given considerable grants for this object and a great deal having been done in the same direction at the expense of the Provincial Governments. The number of teachers trained in the whole of India has, between the years 1911-12 and 1914-15, risen by 38 per cent. while the amount of money spent on the training of teachers has risen by 45 per cent. The proportion of trained teachers is still, however, in most provinces very small and the average for the whole of India is at present 29 per cent only.

2. In the replies to this Department letter nos. 838—849, dated the 9th May 1913, the various local Governments supplied estimates of the expenditure likely to be incurred during the three years—1913-14 to 1915-16—on the training of teachers. But it is observed that no general standard was adopted as representing the extent to which training should be supplied in the various provinces. In view of the fact that for several years to come there can be no expectation of a grant of money from the Imperial Government for this class of expenditure, it is recognized that any standard which may now be adopted must necessarily fall far short of the standard which could be prescribed if suitable funds were available. At the same time, it appears to the Government of India that it would be useful for the several local Governments to have before them some standard in dealing with this question, and as at present advised they are of opinion that the lowest result which should be aimed at by local Governments is that the number of teachers (male and female) to be trained in each year for Indian schools should not be less than the number of new teachers whom it is necessary to provide during the year in order to take the place of teachers who have died or resigned or in order to meet the demands caused by the extension of education. The Government of India would be glad, therefore, if local Governments could undertake to estimate the number of teachers thus required during the next five years beginning from April 1917 and should consider how far they will be able to carry out the proposal that the number of teachers trained in each year should not be less than the number of teachers so required. It would be for the local Governments further to decide whether, in cases where the training supplied would not cover more than the number of new teachers required each year, the number trained should include any of the existing teachers in preference to the supply of training to a certain number of the new teachers. It is further recognised that, although, as a rule, a complete training cannot be supplied in less than two years at the least, the present exigencies may justify the adoption of a normal period of training amounting to a lesser period such as one year—a period which has already been adopted in several provinces. If, on consideration of the results brought out by an estimate such as is above suggested, the local Governments should find that the standard recommended is unsuitable, it would be open to local Governments to devise some other standard: but, as above noted, the Government of India are of opinion that it will be better in all cases for the local Governments to adopt some standard however inadequate rather than to leave the expansion of training institutions to be dealt with in an unsystematic and haphazard manner. In commending this matter to the attention of local Governments, the Government of India would be glad to be informed in due time of the courses which each local Government may decide to follow in order to ensure an adequate supply of trained teachers in the future.

3. In this connection I am to recommend that local Governments should enquire into the possibility of making improvements and economies in the present system of training, and to suggest that such enquiries might be facilitated by information as to the systems in force in other provinces.

4. I am further to invite attention again to the recommendations made in paragraphs 11 (vi) and 22 (1) (b) of the Government of India Resolution no. 301-C. D., dated the 21st February 1913, regarding the provision of adequate pay for teachers. From the information available to them the Government of India understand that much has been done in most provinces to carry out the wishes of the Government of India in this respect, but they would be glad if local Governments would take this opportunity of considering the progress made and of judging as to the adequacy of the measures hitherto taken for improving the remuneration of the teaching staff.

5. I am directed to add that the reference now made by the Government of India is in respect of action which may suitably be taken when normal conditions return, and that so long as the war lasts and the necessity for conserving the financial resources of Government remains paramount, it will ordinarily not be possible to provide for any material increase of provincial expenditure in the directions indicated.

TRAINING OF TEACHERS.

1914-15.

Percentage of trained teachers.

Province.	Primary Schools.	Middle Schools.	High Schools.	Total.	Government and Board Schools.	Aided Schools.	Unaided Schools.
Madras	35	66	62	38	61	30	11
Bombay*	34	18	28	33	42	20	9
Bengal	14	26	8	15	37	13	10
United Provinces	31	63	25	35	47	6	9
Punjab	48	61	58	52	64	28	27
Burma	16	43	73	24	76	21	...
Bihar and Orissa	17	41	16	18	45	20	6
Central Provinces	27	36	25	29	33	12	4
Assam	30	40	20	38	43	27	10
North-West Frontier Province	30	54	52	38	40	32	9
Coorg	65	53	77	65	66	50	...
Delhi	49	51	54	53	73	40	6
India	27	41	29	29	47	20	10

* Figures for Indian schools are not given separately.

APPENDIX D.

Number of students per teacher in Arts Colleges.

Province.	GOVERNMENT.				BOARD AND MUNICIPAL.				AIDED.				UNAIDED.				TOTAL.			
	Colleges.		Students per teacher.		Colleges.		Students per teacher.		Colleges.		Students per teacher.		Colleges.		Students per teacher.		Colleges.		Students per teacher.	
	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.	1912.	1915.
Madras	4	5	13·4	16·0	3	4	10·9	13	22	26	16·7	20·4	3	2	6·0	15·9	32	37	14·9	19·3
Bombay	2	3	24·2	17·9	...	...	...	...	5	4	33	30·3	1†	...	1	...	11§	7	33	25·6
Bengal	8	8	17·9	18·4	1	1	13	18·4	10	14	25·4	24·3	14	11	29·3	37·4	33	34	24·1	26·6
United Provinces	4	4	11·4	19·2	...	...	...	...	25	29	17·3	20·6	8	7	10·2	22·2	37	40	14·0	20·7
Punjab	1	1	11·0	20·0	...	...	...	...	6	7	24·4	22·8	4	2	21·7	32·7	11	10	19·7	25·5
Burma	1	1	20·2	24·1	...	...	...	...	1	1	4·5	5·6*	...	...	...	...	2	2	14·0	17·4
Bihar and Orissa	2	2	18·1	13·7	1	...	2·8	...	2	4	22·5	20·2	2	1	42·8	5†	7	7	21·7	16·6
Central Provinces and Berar	2	2	15·5	17·5	...	...	...	...	2	2	19·8	23·3	...	...	...	...	4	4	17·9	21·1
Assam	1	2	11·6	17·8	...	...	...	...	1	...	14·0	...	...	...	...	...	2	2	12·3	17·8
India	25	28	15·6	18·6	5	5	10·1	18·1	75	91	20·8	21·8	32	23	21·6	32·2	140§	147	19·5	22·6

25

* There is only 1 college with 67 pupils and 12 teachers. — † The Techno-Chemical Laboratory, Bombay.
 ‡ There is only 1 college with 5 teachers and 25 pupils.
 § Includes 3 Native States Colleges.

**Educational Publications on sale at the Office of the Superintendent
Government Printing, India, Calcutta.**

EDUCATION IN INDIA—

- Note on the state of — during 1865-66. By A. M. Monteath, C.S., Selection No. LIV. Re. 1 (4a.)
- Indian Educational Policy, 1913. (Being a Resolution issued by the Governor General in Council on the 21st February 1913. Demy 8vo, cloth. As. 4 (2a.)
- OCCASIONAL REPORTS.** Royal 8vo, board—
- No. 1.—Rural Schools in the Central Provinces. Re. 1 (4a.)
- No. 4.—Furlough Studies. Rs. 2 (6a.)
- No. 5.—The Training of Secondary Teachers. As. 8 (9d.)
- No. 6.—Educational Buildings in India. Rs. 5 or 7s. 6d. (11a.)
- PROGRESS OF EDUCATION IN INDIA, 1892-93 to 1896-97.** Third Quinquennial Review
Contents: Preliminary, General Summary, Controlling Agencies. Collegiate Education, Secondary Education, Primary Education Training Schools, Technical Education, Female Education, etc. By J. S. Cotton, M.A. Foolscap, boards. Rs. 3 (10a.)
- PROGRESS OF EDUCATION IN INDIA, 1897-98—1901-02.** Fourth Quinquennial Review. By R. Nathan, C.I.E. Foolscap, board. Vols. I and II. Complete. Rs. 7 (14a.)
- PROGRESS OF EDUCATION IN INDIA, 1902—07.** Fifth Quinquennial Review by H. W. Orange, C.I.E. Foolscap, board, in two volumes. Rs. 5-8 (12a.)
- PROGRESS OF EDUCATION IN INDIA, 1907—12.** Sixth Quinquennial Review by H. Sharp, C.I.E., Foolscap, board, in two volumes. Vol. I, Rs. 4 (10a.) ; Vol. II, Rs. 2 (8a.)
- Report of the Conference on the Education of the Domiciled Community in India, July 1912. Re. 1 (3a.)
- REPORT ON INDUSTRIAL EDUCATION.** Part I, Rs. 2 (5a.) ; Part II (Proceedings of Conferences), Rs. 2-4 (5a.) Foolscap, board. Complete. Rs. 4-4 (9a.)
- Report on the Enquiry to bring Technical Institutions into closer touch and more practical relations with the employers of labour in India by Lieutenant-Colonel E. H. deV. Atkinson, R.E., and Thom S. Dawson. Foolscap, board. As. 10 (4a.)
- Publications of the Department of Education, 1911-15 (Revised edition). Royal 8vo, paper cover. Anna 1 (1a.)
- Indian Education in 1913-14, Re. 1-8 (4a.) ; 1914-15 Rs. 2 (4a.) ; 1915-16, As 8 (9d.)
- Report of a Sub-Committee of the London Advisory Committee for Indian students on difficulties experienced by Indian students in the United Kingdom, with an official letter from the Secretary of State. Demy 8vo, paper cover. Anna 1 (1a.)
- Report of the Committee appointed to consider arrangements for post-graduate teaching in the University of Calcutta, 1917.
- Report of the Indian Universities Commission. Foolscap, cloth. Re. 1 (4a.)
-

PRINTED BY
SUPERINTENDENT GOVERNMENT PRINTING, INDIA,
DELHI.

Report of the Conference held at Simla on the 20th and 21st August 1917, to consider the question of English and Vernacular teaching in secondary schools.

5

MEMBERS OF THE CONFERENCE.

THE HON'BLE SIR SANKARAN NAIR, KT., C.I.E., B.A., B.L.,
Member of the Viceroy's Executive Council.

THE HON'BLE MR. H. SHARP, M.A., C.S.I., C.I.E.,
Officiating Secretary to the Government of India.

G. ANDERSON, ESQ., M.A.,
Assistant Secretary to the Government of India.

PROVINCIAL DELEGATES.

Madras.

1. THE HON'BLE MR. J. H. STONE, M.A., C.I.E., *Director of Public Instruction.*
2. T. V. SIVAKUMARA SASTRIYAR, ESQ., B.A., L. T., *Lecturer, Teachers' College, Saidapet.*
3. REVEREND N. MESTON, M.A., B.D., *Bursar and Professor of English, Madras Christian College.*
4. RAO BAHADUR K. SESA AYYAR, *Headmaster, Municipal High School, Mayavaram.*

Bombay.

5. THE HON'BLE MR. J. G. COVERNTON, M.A., C.I.E., *Director of Public Instruction.*
6. V. B. NAIK, ESQ., M.A., *Superintendent, New English School, Poona.*
7. G. K. DEVADHAR, ESQ., M.A., *Servants of India Society, Poona.*
8. K. NATARAJAN, ESQ., B.A., *Editor, Indian Social Reformer, Bombay.*

Bengal.

9. THE HON'BLE MR. W. W. HORNELL, M.A., M.R.A.S., *Director of Public Instruction.*
10. RAI BAHADUR DR. PURNANANDA CHATTERJI, B.A., B. SC., *Inspector of Schools, Rajshahi Division.*
11. KHAN BAHADUR MAULVI AHSANULLAH, M.A., M. R. A. S., *Inspector of Schools, Presidency Division.*

United Provinces.

12. THE HON'BLE MR. C. F. DE LA FOSSE, M.A., *Director of Public Instruction.*
13. THE HON'BLE SIR SUNDAR LAL, KT., C.I.E.
14. RAI BAHADUR G. N. CHAKRAVARTI, M.A., LL.B., *Inspector of Schools.*
15. KHAN BAHADUR SAIYID MUHAMMAD ABDUR RAOOF, *Bar.-at-Law, Allahabad.*

Punjab.

16. THE HON'BLE MR. J. A. RICHEY, M. A., *Director of Public Instruction.*
17. THE HON'BLE KHAN BAHADUR M. FAZL-I-HUSAIN, M.A., *Bar.-at-Law.*
18. BAKHSI RAM RATTAN, B.A., B.T., *Headmaster, Dayanand Anglo-Vedic High School, Lahore.*

Bihar and Orissa.

19. THE HON'BLE RAI BAHADUR DVARIKA NATH, B.A., LL.B.

Central Provinces.

20. PANDIT KANHAYALAL GURU, M. A., *Inspector of Schools, Chhattisgarh Division.*
21. PANDIT SITACHARAN DUBE, M.A., B.L., *Pleader and Chairman of the District Council, Hoshangabad.*

S/1431
5

T2: 33, (P5) p2, N1)

E)

SPEECH DELIVERED BY HIS EXCELLENCY THE VICEROY AT
THE OPENING OF THE CONFERENCE.

You have been asked to meet here in Simla to consider certain important questions relating to our educational system, and I have come to open your conference, not with any idea of attempting to influence your deliberations, but with the sole purpose of bidding you welcome and of emphasising the importance I attach to the questions which you are about to discuss. And first let me repeat, at the risk of seeming platitudinous, the principle which, I would urge, should govern all educational conferences :—Examine the question which is being laid before you solely from the educational standpoint. I quite appreciate that it may be looked at from other points of view, but we are not asking you to do this. What we are asking you to consider is whether, accepting the present policy with regard to English, any improvement can be made in the general arrangements now in force in our schools with reference to the teaching of English and the use of English as a *medium* of instruction, keeping two desiderata in view—first, that students may be enabled to obtain a better grasp of the subjects which they are taught ; and, secondly, that they may complete their secondary course with a more adequate knowledge of the English language than at present.

Some of you may be aware in this connection that the larger question of making the Indian vernaculars *media* of instruction and the study of English, as a second language, compulsory for Indian pupils in all secondary schools was brought up in the form of a resolution in the Imperial Council in March 1915, and that the then Education Member, Sir Harcourt Butler, deprecated any reference to local Governments on the subject until after the end of the war. It is not our intention to go back on this decision; but I have thought it well that we should have this small conference in the meantime with a view to clear the ground and to arrive at a better idea of the points which should later on be referred to local Governments for consideration.

You will observe then that the scope of your enquiry is strictly limited, but none the less there is important spadework for you to do, and I look forward to valuable conclusions being reached by you. While, however, you will be forming your conclusions on the working of the present arrangements prevailing in the schools, it may not be amiss if I remind you briefly of the past history of this question in its broader aspects.

As you are all aware, we go back for our beginnings to Macaulay's famous minute of 2nd February, 1835. In that minute Macaulay gave, as has been said, a decisive bias to the course of education in India and decided unhesitatingly in favour of English. But Macaulay was not oblivious of the claims of the vernaculars and looked forward to the formation of a class which should "refine the vernacular dialects of the country, enrich these dialects with terms of science borrowed from the Western nomenclature and render them by degrees fit vehicles for conveying knowledge to the great mass of the population."

From 1835 we pass on chronologically to 1854, when a despatch was written by the Court of Directors of the East India Company to the Governor-General of India in Council on the subject of the education of the people of India, and from this despatch let me quote certain striking passages :—

"It is neither our aim nor our desire," the Directors say, "to substitute the English language for the vernacular dialects of the country. We have always been most sensible of the importance of the use of the languages which alone are understood by the great mass of the population.....In any general system of education the English language should be taught when there is a demand for it ; but such instruction should always be combined with a careful attention to the study of the vernacular language of the district and with such general instruction as can be conveyed through that language ; and while the English language continues to be made use of, as by far the most perfect *medium* for the education of those persons who have acquired a sufficient knowledge of it to receive general

instruction *through* it, the vernacular language must be employed to teach the far larger classes who are ignorant of, or are imperfectly acquainted with, English. We look therefore to the English language and to the vernacular languages of India together as the *media* for the diffusion of European knowledge."

The Education Commission of 1882 did not put forward any definite recommendations on the subject, but came to the conclusion that a boy was more intelligent if he had studied through the *medium* of the vernaculars till the highest classes were reached. The Indian Universities Commission of 1902 was strongly in favour of the inclusion of vernaculars as a subject in the higher courses even up to the M. A.

The Government Resolution of 1904 laid down that English should not become the *medium* of instruction earlier than the age of 13, and that no scholar in a secondary school should even then be allowed to abandon the study of the vernacular.

Now these extracts raise some important points.

Macaulay decided in favour of the highest education being in English, but clearly contemplated an improvement of the vernaculars so as to make them the vehicle of Western thought.

The despatch of 1854 went further. It distinctly contemplated the encouragement and enriching of the vernaculars by translations from English, the limitation of English education to very few, and the propagation of Western knowledge through translations.

Sixty-three years have elapsed since the date of Sir Charles Wood's despatch and English education has taken firm hold upon the country. It is surely out of the question now to talk of going back on the established lines of our educational system. The interest of the educated classes is centred in English. English is on the high road to become, if it has not already become, among the educated classes the *lingua franca* all over India. English is required in all the public administration of the country. While I have much sympathy with those who deplore the neglect of the vernaculars, is it not obvious that the substitution at this time of day of the vernaculars for English is beyond the bounds of practical politics, even if the Government were willing to consider such a policy? I would further ask them to remember the great divergence of opinion among the Indian members on this subject which was manifested in the debate in 1915 on the resolution to which I have already alluded. I think that the discussion which then took place affords strong confirmation of what I have just said. Again, the very multitude of the vernaculars presents a practical difficulty for which I have never seen a satisfactory solution propounded. Moreover, with each generation English will come more and more to be learnt not in the schools but in the everyday intercourse of the home. This larger question is not now before you, but in view of what has been urged elsewhere, I have briefly enumerated some of the patent objections to a reversal of the present policy.

Accepting then this position, what is there that we can do? I believe a very real advance can be made in the encouragement of the vernaculars both outside and independently of their place in our educational system and within it.

Again, within our educational system we should carefully consider the present teaching of English. It may be, for instance, that we are concentrating our attention too largely on the teaching of English literature and too little on the acquisition of English as a living language. Whatever the cause, I think it is common ground that the teaching of English in our schools is not as satisfactory as we could wish. It will be for you, gentlemen, to help us with your advice in this matter.

Lastly, I come to the subject of the *media* of instruction.

As you all know, the vernaculars and English are both the *media* of instruction in our schools, and it is sometimes over-looked to what a large extent the vernaculars figure at the present time as a *medium* of instruction. But it is certainly worth our while to examine from the educational standpoint what the

relative position of these *media* should be to each other, having in view the one object, *viz.*, that the pupil should derive the greatest possible advantage from his schooling. This is a matter on which only those who have practical knowledge of work in the schools are competent to advise, and I can only regret that I have not that first-hand knowledge which would entitle me to give an opinion. You, however, have that knowledge and I feel confident that you will be able to give us some sound and practical advice. Do not, I pray you, despise this piece of spadework which we are asking you to do. From my experience of educational work, I would impress on you the importance of these seemingly small points of practical working. The best laid schemes often go astray through the neglect or mishandling of some small detail, of which only those at work in the schools realise the importance. I recognise the value of large and generous ideals in the sphere of education, but we must never forget the need from time to time of examining and making sure our foundations, and what more important, what more practical, task in this connection could be laid upon you than the duty of devising means whereby students may be enabled to obtain a better grasp of the subjects which they are taught and to complete their secondary course with a more competent knowledge of the English language than at present.

PROCEEDINGS OF THE CONFERENCE.

scope of the conference.

Sir Sankaran Nair opened the proceedings by explaining the scope of the conference. There were some, he said, who would wish to see instruction in certain subjects carried out in the vernacular even to a very high standard; and there were others who would introduce the teaching of English freely in the primary schools and at a very early stage. It was recognised that under certain conditions some instruction in the vernacular may be desirable even in university courses, and in English in the elementary classes of primary schools. The object of the conference, however, was to leave such cases out of consideration as far as possible, and to confine attention to the teaching of English in secondary schools and to the medium of instruction in those schools. The intention, therefore, was to see how far modifications in the present system might be effected so that pupils might (a) obtain a better grasp of the subjects which they are taught, and (b) complete their secondary course with a more competent knowledge of English than at present.

systems in the several provinces.

2. *Sir Sankaran Nair* then invited the directors of public instruction and such others as were actively engaged in the administration or work of teaching to explain the systems obtaining in the several provinces. *Mr. Natarajan* thought that it would assist the discussion if an understanding were arrived at first of all on the meaning of the term, the medium of instruction. He wished to know whether, in classes where the medium of instruction was English, explanations in the vernacular were permitted. *Mr. Hornell* said that in Bengal this was certainly the case, and that in a large number of schools the teaching was conducted almost invariably in the vernacular throughout the school. The language of the text-books and of the examinations held at the end of the school course were bigger factors in deciding the medium of instruction than the language of the class-room. *Mr. de la Fosse* stated that in the United Provinces there were two classes in the high, four in the middle, and four in the primary stages, in addition to the preparatory classes. The study of English as a foreign language used to be begun in class III and continued up to class VI. A change has recently been made where by English is now taught as a foreign language up to class VIII, the end of the middle stage. In the middle classes the text-books are in the vernacular. English is thus the medium of instruction in the two higher classes only, and even in these the teachers are instructed to make free use of the vernacular in their explanations. The answers in the matriculation and the school-leaving certificate examinations are given in English. *Sir Sundar Lal* added that in the middle classes English technical terms are used, and that this practice is helpful to the pupils later on. *Mr. Richey* said that in the Punjab there were now ten school classes, five primary, three middle and two high. The study of English as a language is begun in the fourth primary class and continued as such until the end of the middle stage. English is the medium of instruction in the high school stage, that is in the two top classes. *Mr. Hornell* pointed out that Eastern and Western Bengal had somewhat different systems. In Eastern Bengal there are four classes in the high stage, two in the middle and four in the primary. English is started as a foreign language in the third primary class and as a medium of instruction at the beginning of the high school stage. In Western Bengal English is started in class VIII B and is the medium of instruction in the high school stage, that is in the four top classes. English as a language is taught as far as possible in English, but this practice does not exclude the use of vernacular words. The direct method has not been very successful and the system of translation is now the ordinary method of instruction. In the high stage English is only nominally the medium of instruction, though the text-books are in English. In the two junior high classes English is not much used and instruction is usually given in the vernacular. As the matriculation draws near, English is used to a greater extent. *Maulvi Ahsanullah* added that even in the primary classes below VIII B., English is often taught surreptitiously as a language. In only a few selected schools on the other hand is a real attempt made to teach English through the medium of that language and the translation method is almost universal. Even in schools where English is used as a medium, the subject-matter is explained in the vernacular. The style of teaching depends largely on the numbers in the classes. As the classes in Bengal are usually very large there is very

little oral work. The undue influence of the matriculation examination has also led to the neglect of conversational tests. At present there is a tendency to arrange the entire course for the purpose of this examination. Subjects which do not lend themselves to the examination test are greatly neglected. *Mr. Stone* pointed out that in Madras there are eleven school classes. In the three lowest English is not included in the curriculum, but in the next five classes instruction is given in English as a foreign language; and in the top three classes English is the medium of instruction and the text-books are in English. English terms are used as a rule in the middle classes, while in the high classes explanations are often given in the vernacular. The direct method has been introduced from the fourth year class upwards and has been very successful. *Mr. Stone* was of the opinion that more time was spent in Madras than elsewhere in teaching English as a language. About a third of the school time for a period of eight years is devoted to this subject. English can also be taught in the three lowest classes of a school with the permission of the inspector, but this permission is given sparingly. *Mr. Covernton* explained that in Bombay the secondary school consists of seven classes, three in the middle and four in the high standards. In the middle classes English is taught as a second language and very often by the direct method. In the four top classes of a school English may be used as the medium of instruction and text-books are in English. In practice, however, English is not usually the medium of instruction in classes IV and V, but in the two top classes that language is used very generally. In recent years, during the directorship of the late *Mr. W. H. Sharp*, an effort was made to attach a greater importance to the use of the vernaculars as media of instruction and therefore the students were allowed to answer certain papers in the vernacular at the school final examination. *Mr. Covernton* said that he had not been long enough in Bombay to give an opinion on the results of this experiment. Referring to this experiment *Mr. Naik* said that its results must remain indecisive to a large extent, because there were rarely any special classes for students preparing for the school final examination except during the last year at school, and therefore such students as were taught with those preparing for the matriculation examination were naturally unwilling to make use of the permission to write their answers in the vernacular. *Mr. Dwarika Nath* explained that in Bihar the system was similar to that obtaining in Western Bengal. Though the text-books are in English, explanations in classes are given very often in the vernacular. The classes, as a rule, are very large and therefore oral instruction has become a matter of great difficulty. *Mr. Kanhanyalal Guru* said that there were twelve classes under the Central Provinces system, five in the primary, four in the middle, and three in the high standards. No English is taught in the primary classes. The methods adopted for teaching English as a foreign language in the middle classes depend very largely on the capacity of the teacher. The English medium is introduced gradually. English figures and technical terms are used in the junior middle classes, and in the third and fourth middle classes English books are used for most of the subjects, though explanations may be given in the vernacular. In the same way, English maps are used in the early middle classes, and the adoption of English in the class-room is only gradually introduced. In the top three classes which belong to the high school stage instruction is given through the medium of English, but it is supplemented by explanations in the vernacular.

The Teaching of English.

3. *The Chairman* then invited opinions on the teaching of English and drew attention to the following questions on the agenda paper :—

- (a) "At what period in a pupil's career should English be taught as a language? Is it better for him, from the point of view of his ultimate mastery over the language, to start its study at an early age or only to receive such instruction after he has been well grounded in a vernacular?"
- (b) "Do the younger pupils gain a satisfactory knowledge of English by their instruction through the medium of that language or do they merely gain a smattering of incorrect and unidiomatic English?"

- (c) "What is the general experience of those boys who have passed through the vernacular middle course and then studied English at a high school? How have such boys distinguished themselves in the matter of English in comparison with those who have studied from an earlier period through the medium of English?"
- (d) "By what methods should the teaching of English be conducted? Does the present system attach too much importance to a knowledge of English literature as against the necessity of learning to speak and write the English language correctly? Should the teaching in the early stages be entirely oral or not?"
- (e) "Do the pupils in a vernacular middle school, as a rule, acquire a better knowledge and grasp of the ordinary school subjects than those of a similar age who have been instructed through the medium of English?"

The relationship between school and university education.

4. *Mr. de la Fosse* suggested that in discussing the comparative claims of English and vernacular instruction it was necessary first to take into account the fact that English was the medium of instruction at the universities and that this practice should continue. Students in the junior college classes should not only be able to follow the lectures delivered in English without either difficulty or strain, but should also be able to express their thoughts in English and indeed think in English. *Mr. Meston* went even further than *Mr. de la Fosse*. In his opinion, whether a boy went on to a university or discontinued his studies after the completion of the high school course, it was essential that he should possess a really good knowledge of English. This was not merely a question of English *versus* the vernaculars, but one of outlook on life in general. English was the language not merely of the university, but also of the administration and of business. *Mr. Stone* observed that whether this policy was right or not—and he himself thought it right—it was very unlikely that in Madras the university would cease to insist on an adequate knowledge of English from the students. Many other speakers pointed out that students were usually at a great disadvantage on entering college through their inability to follow their lectures or to express themselves with facility in the English language. *Dr. Chatterji* stated that in Bengal the standard of proficiency in English even at the matriculation stage was very unsatisfactory. Provided the teaching was good, he agreed with *Mr. de la Fosse* that an Indian could easily become bi-lingual. *Mr. Hornell* commented on the almost complete inability to speak or write the English language which is displayed by the average pupils of the matriculation classes in the schools of Bengal. *Mr. Dvarika Nath* stated that in Bihar the pupils' knowledge of English was very deficient. Moreover, there had been in recent years an almost continuous deterioration in the standard, and this was particularly the case in the aided schools. *Mr. Natarajan*, speaking from his experience as an examiner in Bombay, agreed on the whole with *Mr. Hornell* and *Mr. Dvarika Nath* that the standard of English was unsatisfactory, but added that in his opinion far too much attention was paid to purity of pronunciation. English people themselves pronounced English in widely different ways. His conviction was that Indian teachers were more likely to understand the difficulties of Indian boys in learning English and therefore should be employed in greater numbers. This suggestion would naturally apply in a much smaller degree to the college classes. Some speakers, however, held views opposite to those expressed by *Mr. de la Fosse*. *Mr. Sivakunara Sastriyar* urged that in Madras boys were able to talk very freely and their English was by no means unidiomatic. They were quite competent to understand the college lectures which were delivered in English. *Mr. Richey* urged that whereas an Indian boy might become bi-lingual, he could scarcely be expected to be bi-mental. *Mr. Fasl-i-Husain* agreed. He also contended that school education should be considered apart from and not only as subsidiary to university education. A comparatively small proportion of school boys—not exceeding 20 per cent. of those in the higher classes—went on to college, and therefore the interests of the school should not be subordinated to those of the university. In India just at present the great problem is that of mass education, and that education must be given in the vernacular. It was not right, therefore, to consider suggestions that would affect

adversely the interests of primary education. A school boy should not have more than one vehicle of thought, nor need he spend most of his time and energy in learning a foreign language in which to express his thoughts. The mental development of the boy should not be stunted. The school therefore should be regarded as a separate entity, and not merely as a training-ground for the university. *Mr. Natarajan* held similar opinions, and thought that the secondary school course should not be regarded merely as a vocational or a pre-university course. *Mr. Devadhar* spoke in a similar strain. Though he was a lover of English teaching and an advocate of its extension and improvement, yet he held strongly that in schools too much importance could not be attached to the necessity of a sound system of vernacular teaching and practical training. In support of this contention he pointed out that, from a rough analysis of the population, the Indian school system should be so framed as primarily to meet the needs of the agricultural classes who formed, roughly speaking, 70 per cent. of the total school enrolment. In view of the large numbers of pupils who abandon their studies at each stage of the school course *Mr. Devadhar* advocated bifurcation on the lines of the so-called modern side in some English schools in order to prevent wastage and to render education useful in life to a very large majority of the pupils in secondary schools. In reply to *Mr. Devadhar's* remark about the necessity of practical training, *Mr. de la Fosse* stated that in the United Provinces an attempt was being made by means of the school-leaving certificate system to provide a sound training for those pupils who did not intend to continue their education at college.

5. Other arguments beside the requirements of the universities and the necessity for vocational training were brought forward in support of English teaching. *Mr. Natarajan* pointed out that for the last fifty years at least Indian development had been closely connected with the teaching of English and western thought. Any attempt to interfere with this connection would, in his opinion, be fraught with disaster to the country. A boy trained merely through and in the vernacular could not possess that broad outlook on life which should be acquired by a boy who received a good English education. A great defect in any scheme for making the purely vernacular course longer than was necessary would be that boys would not come under the influence of men whose outlook had been broadened by contact with western thought and education. The teaching of the English language and of English literature was a great asset in the general development of Indian boys. *Mr. Naik* pointed out that even patriotic sentiment demanded English education and hence the teaching of English ought to remain a prominent though not an exclusive feature of any scheme of Indian education. *Dr. Chatterji* spoke of the remarkable growth in recent years of the Bengali language and Bengali literature. Books of every description were being published every year. Bengal can now boast of eminent scientists, philosophers, poets, historians and novelists. This phenomenon is due to the influence of English education and English culture. English literature has been a source of inspiration in Bengal during the last half century or more. Even English idioms have been introduced into the Bengali language. This being so, it is clear that English education must continue. Moreover, there is a very great demand in Bengal for instruction in English. In face of this demand, any attempt to introduce a vernacular system in secondary schools will meet with complete failure. *Mr. Meston* stated that in Madras also English education was much valued and that the demand for it was extending to all classes and grades of society. *Mr. Stone* protested against the idea that the acquisition of knowledge was the sole or even the primary object of education. The study of English had been proved to be an admirable mental discipline for Indian boys and therefore was of very great importance. *Mr. Meston* agreed and suggested that English took a place in the Indian system of education very similar to that hitherto held by the classics in England.

6. There was a very general feeling against any undue rigidity in the system. Conditions varied in the several provinces. In alluding to the fact that English instruction was very generally approved in the Madras Presidency, *Mr. Covernton* drew an interesting comparison between his experiences in Burma and in Bombay. In the former province, as in Madras, the provision of English rather than vernacular instruction seemed the correct policy. In Bombay,

Importance of English teaching.

Rigidity in the system should be avoided.

on the other hand, there was a very strong desire for vernacular instruction. It might be only a coincidence that in those two provinces whose vernaculars were non-Aryan, there was a keen desire that instruction should be as far as possible in English, whereas, speaking generally, in those provinces whose vernaculars were Aryan the reverse was the case. He gave this merely as a suggestion and could not claim that he had been able as yet to make a detailed analysis of the situation. In any case, he thought there was ample scope for diversity of system. *Mr. Natarajan* pleaded for freedom both for the teacher and the school authorities in regard to the teaching methods that should be adopted, and in the matter of school organisation. *Mr. de la Fosse* agreed that no hard-and-fast rules should be applied. *Mr. Stone* pointed out that in Madras a great deal of latitude was allowed and that, under certain conditions, English could be taught in schools in the elementary stages. *Mr. Hornell* also agreed with *Mr. Natarajan*. For example, he thought that the final decision as to where and when the medium of instruction should be changed, should be left very largely to the teacher who knows the calibre of his pupils. He also showed that in Bengal there was a vast difference between theory and practice. On the one hand, though in theory the medium of instruction is English for four years before the matriculation stage, in the average school the vernacular is never really abolished as a medium of instruction in any class. Indeed, there are very few schools in Bengal, and these are usually the best, where English is actually the medium of instruction in all subjects in the four highest classes. On the other hand, few, if any, pupils pass from the middle to the high schools without having learnt some English. Even in the primary schools, English is often taught. *Mr. Meston* alluded to the considerable success attained by girls in Madras in learning English. This was probably due to the fact that girls usually start English at an earlier stage than boys. Considerable latitude therefore should be given to girls' schools in the matter of English instruction. *Mr. Meston* also thought, and *Mr. Richey* agreed with him, that a difference might be made between rural and urban schools. In the former the study of English might be begun later; in the latter it could reasonably be started earlier.

**Comparative
results of
vernacular and
English
teaching.**

7. The conference then tried to collect evidence as to the relative values of the purely vernacular and the anglo-vernacular courses by examining the records in high schools of boys who have completed these courses. It was a matter of great difficulty to draw any reliable deductions from the evidence provided, as conditions are rarely equal. For example, *Mr. Hornell* tried to institute a comparison between the capacity in English and in other subjects generally possessed by the pupils of the schools in Bengal which are conducted according to the departmental curriculum by which English is not begun until after the fourth school year, with the capacity possessed by those boys who have been educated in schools where English is started at an earlier stage. It was generally found that the latter were very little superior in English and were inferior in other subjects; and what little superiority in English they possessed at first was usually lost during the high school stage. This deduction, however, in *Mr. Hornell's* opinion, was scarcely just in that the unaided private schools which do not follow the departmental curriculum are usually inefficient to a degree. A nearer parallel perhaps would be to compare the ordinary high school boy with the student who had passed, or was passing, through a normal school in Bengal, the curriculum of which is in the vernacular. The inspector of schools, Presidency division, has recently attempted to gauge the merits of boys in the third class of a high school, *i.e.*, the third class before the matriculation stage, with boys of corresponding age who were reading in a vernacular training school and knew no English at all. The subjects selected were history, geography, algebra and arithmetic. In history the results were practically the same, in algebra the vernacular boys were better, and in geography markedly better, than the high school boys. *Dr. Chatterji* laboured under similar difficulties as he was unable to find a fair parallel. He said that in his own student days the boys who passed through the middle vernacular course were distinctly better than those in corresponding classes in high schools. It was necessary, however, to take into account the fact that there was then a higher standard in the middle vernacular schools, and especially in Bengali, mathematics, history and geography. There was also a stiff public examination whose influence on the vernacular schools was very salutary. The boys who

obtained scholarships from these schools and gained admission to the high schools were certainly of a high calibre, but they were always deficient in English. Since that time, however, there has been a marked deterioration in the middle vernacular schools which was due mainly to the abolition of the public examination and to the introduction of a uniform course of studies for middle vernacular, middle English, and high schools under Sir Alexander Pedlar's vernacular scheme. As therefore the middle vernacular schools are both unpopular and inefficient and as English is usually taught in them, it is impossible to draw any satisfactory deductions from the records of boys who pass through them to the high schools. *Sir Sundar Lal* and *Mr. Naik* agreed with *Mr. Hornell* that the vernacular boys, as a rule, were more proficient in the ordinary school subjects than those who started English at an earlier stage, and their deficiency in English was quickly removed. The latter was confident that when the college stage was reached the vernacular boys were in no way inferior in English. He also remarked that in Bombay the vernacular boys were at a disadvantage by there being no special classes in the high schools for those who had prolonged the vernacular course. *Mr. Devadhar* agreed, but added that though the vernacular boys might be somewhat deficient in speaking English they were not inferior in composition. *Mr. Covernton* preferred to give no opinion until he had gained a wider knowledge of the Bombay system, but he said that experienced educationists such as the late *Mr. W. H. Sharp* and *Dr. Mackichan* were in favour of vernacular teaching in the middle stage. *Mr. Kanhayalal Guru* speaking from his experience as a headmaster and then as an inspector in the Central Provinces was of opinion that the vernacular middle school boys acquit themselves better both in English and the general school subjects. This was due to the fact that being of more mature age they are the better able to understand a foreign language, and having acquired a better grasp of their general work they can find more time for the study of English. *Mr. Dube* held similar opinions and maintained that it was a matter of accepted experience that a pupil who is taught through the vernacular is mentally more efficient than one who is taught through English. *Mr. Richey* also thought that in the Punjab the vernacular boys did quite well in the special classes in English, and in the general subjects were better than those who started English earlier. *Mr. de la Fosse* said that in the United Provinces there were institutions where a purely vernacular course was adopted. Boys coming from these schools were then attached to special classes in which particular attention was paid to the teaching of English. These boys ordinarily acquit themselves well in the written tests, but are not so fluent in speaking English as those who have started English earlier. *Mr. Chakravarti* speaking also for the United Provinces held strongly that the vernacular boys never recovered from their deficiency in English. *Bakhshi Ram Rattan* said that in the Punjab the scholarship holders from the vernacular schools were undoubtedly good, but they were exceptional. Speaking generally, he thought that the vernacular boys were distinctly inferior in the matter of English and chiefly so in conversation and pronunciation. Speaking for Madras, *Mr. Sessa Ayyar* and *Mr. Sivakumara Sastryar* agreed that the vernacular boys were at a great disadvantage in English, but in other subjects they were fairly satisfactory, though not as good as the boys who completed the ordinary course. In mathematics, however, the vernacular boys were reasonably good. *Maulvi Ahsanullah* agreed with the latter remark. This, he contended, was due to the fact that the mathematical course prescribed for the top classes of vernacular schools was much stiffer than that for the corresponding forms of high schools. *Mr. Dvarika Nath* said that in Bihar the pupils from the vernacular schools remained deficient in English, though in some subjects such as mathematics they showed very fair capacity.

8. The following resolutions were then put to the meeting:—

1. "Those pupils who come to the English schools after some years of study in the vernacular ordinarily do better in subjects other than English than those who have begun earlier the study of the English language"

Resolutions.

Messrs. Richey, Fazl-i-Husain, Kanhayalal Guru, Sitacharan Dube, Bakhshi Ram Rattan, Saiyid Muhammad Abdur Raof, Dvarika Nath, Devadhar, Naik, Covernton, and Sir Sundar Lal voted for the proposal.

2. "Those pupils who come to the English schools after some years of study in the vernacular ordinarily are and continue to be generally weaker in English than those who began their English studies at an earlier stage."

Messrs Svakumara Sastriyar, Sesha Ayyar, Maulvi Ahsanullah, Chakravarti, Bakhshi Ram Battan, Saiyid Muhammad Abdur Raof, Dvarika Nath, Chatterji, Natarajan, and Sir Sundar Lal voted for the proposal.

Messrs. de la Fosse, Richey, Hornell, Fazl-i-Husain, Meston, Stone and Covernton accepted the proposal with the deletion of the words "and continue to be."

The stage at which the teaching of English as a language should be introduced.

9. There was a very marked difference of opinion as to the stage in a pupil's career when the study of English as a language should be introduced. One party urged that the teaching of English should be postponed as late as possible and should not be attempted until the pupil has been thoroughly grounded in the vernacular. Other members of the conference held exactly the opposite view and contended that the study of the two languages should be simultaneous, though through the scarcity of efficient teachers in English and other causes, the introduction of English teaching might have to be delayed as a temporary measure. Others again held a middle view and thought that the study of English should be started fairly soon, but should succeed some study in the vernacular.

Postponement of English teaching.

10. The former party, who favoured the postponement of English teaching as long as possible, were in the main the members from the Punjab, Bombay and the Central Provinces. *Mr. Richey* thought that a premature introduction of English would tend to make school education one-sided and overshadow the general teaching. The object in view was that by the time a boy reached the matriculation standard he should have acquired a satisfactory working knowledge of the English language. The less time, therefore, that he spent on his English studies the more would he have for the general school work which should be taught mainly through the medium of the vernacular. If an excessive time were spent on English, the general knowledge of the pupils must invariably suffer in proportion. In most countries a boy was expected to begin the study of a foreign language at the age of ten, but under present conditions *Mr. Richey* thought that an Indian boy should begin to learn English at the age of nine. There would then be an English course extending over a period of six years. If English is efficiently taught by trained teachers by the direct method it should be, and is, possible to reach in six years the standard which is reached after nine years teaching by untrained teachers through the translation method. Experience in Bengal and the North-West Frontier Province prove this fact. *Mr. Richey* also thought there were other practical considerations which were of the first importance in coming to a decision on this matter. The earlier English is started the more it becomes a monopoly of the town population. If started early in the primary stage, boys in rural areas will have to migrate at a very early age to town schools for English education, or else anglo-vernacular schools will have to be diffusely scattered over rural areas, for which there are neither teachers nor funds available. He also thought that the question of compulsory education should be taken into account. Under the compulsory system the school course would probably be one of four years in the vernacular and as yet any idea of compulsory education in English was out of the question. *Mr. Fazl-i-Husain* felt strongly that the study of English was useless and even harmful until the pupil had been grounded thoroughly in the vernacular. The early teaching of English tended to deprive the Indian boy even of the one vehicle of expression and thought which he should possess. He therefore thought that the teaching of English should not be attempted until the sixth school year, but he added that in deference to public opinion in the Punjab he would accept the introduction of English after four years' instruction in the vernacular. *Mr. Dube* said that the multiplicity of the vernaculars in the Central Provinces rendered the early introduction of English teaching impossible. Apart from this consideration, he held that the pupil would be better able to learn English after a four years' study of the vernacular. If a boy were taught through the vernacular he would learn the ordinary school subjects more quickly

and would therefore have more time for the proper study of English as a language. *Mr. Abdur Raof* agreed. *Mr. Kanhayalal Guru* agreed in thinking that in the primary stage the attention of boys should be confined to the vernacular. He held that a boy, who begins English at a very early stage, loses his interest in the vernacular and consequently remains weak in that subject, a deficiency which he is never able to remove owing to an ever-increasing number of subjects which must be studied from year to year. Further, owing to his poor knowledge of the vernacular he finds it hard to grasp the abstract ideas occurring in his English books which can be understood by others, better acquainted with vernacular, by means of translation. The result therefore is that he is able neither to understand nor express himself in either language. The teaching of English therefore should be begun after the primary stage, when a boy is fairly well grounded in his vernacular. *Mr. Naik* agreed with *Mr. Richey* that the premature introduction of English would tend to make the system of education one-sided. Even under the present arrangements, two out of six periods a day were spent in the teaching of English for seven years in the Bombay Presidency. If good results have not been attained, this was due to other causes and not to insufficiency of time. Critics of the system were apt to pitch their expectations too high. *Mr. Naik* urged that the state of things was not much better in other countries. The learning of the English language was not by any means the sole object of Indian education and any attempt to devote more time to English would react most unfavourably on other subjects. *Mr. Coverton* agreed to some extent with *Mr. Naik's* opinions, but he observed that there was a very strong feeling in Bombay that the pupils' knowledge of English was very weak. There were many who thought that the best remedy for this defect was the addition of an extra class or classes at the end of the school course, by which means the students in the junior college classes might become reasonably proficient in English. *Mr. Fazl-i Husain* observed that instruction of a university type could not be said to begin under present conditions until after the intermediate stage.

11. *Dr. Chatterji*, on the other hand, saw no reason whatever why a boy should be well grounded in the vernacular before he is taught English. He knew many boys and girls in Bengal who spoke English with great fluency and correctness but had received little or no grounding in the vernacular. *Mr. Sivakumara Sastriyar* urged that boys should have as good a command of English as of their own mother tongue. For this purpose, the study of English should be begun at as early a stage as possible. *Mr. Sessa Ayyar* also approved of the old Madras system under which the study of the two languages was begun simultaneously. The earlier English is started the better. He did not apprehend any difficulty in Madras in finding the requisite number of teachers. No benefit was to be gained by waiting until the pupil had been trained in the vernacular. *Mr. Chakravarti* urged that the collective experience of mankind showed that a language could be learnt more easily in the early stages than afterwards. Until, however, a sufficient supply of good teachers was available, he would favour the postponement of English teaching until after the termination of the third school year. *Mr. Meston* agreed with *Mr. Chakravarti* in thinking that in theory the study of English should be started as early as possible. There could be no question in Madras of postponing yet further the teaching of English. Young pupils pick up a language very largely by imitation and therefore easily. In Madras, girls usually were taught English at a very early stage, and with most satisfactory results. *Mr. Meston* did not think that the vernaculars would suffer in any way through a further expansion of English teaching, as they were almost invariably the medium of conversation in the homes. In practice, however, he thought that the study of English should be begun in the fourth school year, but many factors such as the competency of the teachers and the inspecting staff and the place of residence should be taken into account. *Mr. Stone* agreed with *Mr. Meston* that in theory English could not be started too soon. In that case, there would not be the conflict between English and the vernacular such as exists under the present system. If a pupil is introduced to the study of English at a later stage he is apt to attach an exaggerated importance to that language and neglect the other school subjects. *Mr. Dvarika Nuth* also emphasised the necessity of starting English as early as possible and thought that this might be done under present conditions after two years' training

The teaching of English and the vernacular should be simultaneous.

in the vernacular. *Mr. Natarajan* felt that a child should begin to study English as soon as he begins to learn. An Indian boy has no inherent difficulty in learning English, and there is no necessity for him to have received a grounding in the vernacular. The study of the two languages, therefore, should be begun simultaneously. A great defect in any scheme for making the purely vernacular course longer than was necessary would be that boys would not come under the influence of men whose outlook had been broadened by contact with western education.

Some previous grounding in the vernacular should precede the study of English.

12. Other speakers held a somewhat middle position. Whereas some of the speakers referred to in the previous paragraph thought that English should not be taught until the third or fourth school year owing to the dearth of efficient teachers and other reasons, other members of the conference thought that this stage was the right time for an Indian boy to be introduced to the study of the English language. In *Mr. de la Fosse's* opinion, experience showed that class III, *i.e.*, the fourth school year when a boy was nine or ten years of age, was the time for him to start to learn English. By that time he should be able to read and write the vernacular fairly correctly. Provided there were competent teachers he should be taught English by the direct method. He should then learn from a simple reader until he reached the sixth class. Thereafter, efforts should be made to encourage the boy to use a little English in other subjects such as mathematics. No definite rules should be laid down, but the teacher should try to introduce the use of English words and conversation into the ordinary school lessons as far as possible. In the two higher classes of the school the boy should be well trained in English so that by the time the matriculation stage is reached he should be intimate with the English language. Unless this is done, he will not be sufficiently equipped for a college course. *Maulvi Ahsanullah* agreed with *Mr. de la Fosse* that the correct time for starting English was in the fourth school year and added that a good grounding in the vernacular was a necessary preparation for the study of English. *Mr. Hornell* insisted that the postponement of English until after the fourth school year would be very unwise. On the other hand, he did not think that the argument for starting English earlier had been established. In schools where English is taught earlier, the pupils have a great ignorance of the vernacular. *Bakhshi Ram Rattan* also thought that a preliminary teaching in the vernacular was necessary for a proper study of English. The study of English, therefore, should be begun in the fourth school year. This was the general opinion of the conference held recently in Lahore. He would regret very seriously the adoption of *Mr. Fazl-i-Husain's* suggestion that the teaching of English be postponed until the sixth school year. As a big proportion of the pupils—one out of five—left school at that time, and as the knowledge of English acquired by them was by no means negligible, it would be a great pity to deny them these chances of learning English. *Mr. Abdur Raoof* held similar opinions about the necessity of starting English in the fourth school year by boys between the ages of nine and eleven, and after a preliminary training through the vernacular. The teaching of a foreign language without a sound knowledge of the vernacular is a very difficult task. *Sir Sundar Lal* agreed to both these contentions and thought that the United Provinces system was a good solution of the difficulty.

Resolutions.

13. The following resolutions were then put to the vote :—

3. "From the point of view of proficiency in English, pupils should begin their study of the language as early in the school course as possible."

Messrs. de la Fosse, Sivakumara Sastriyar, Sessa Ayyar, Maulvi Ahsanullah, Richey, Hornell, Chakravarti, Bakhshi Ram Rattan, Saiyid Muhammad Abdur Raoof, Meston, Stone, Dvarika Nath, Chatterji, Natarajan and Sir Sundar Lal voted for the proposal.

4. "In existing conditions pupils should ordinarily begin their studies in English between the ages of 9 and 11, and after three years of study through their own vernacular."

Messrs. de la Fosse, Sivakumara Sastriyar, Sesa Ayyar, Maulvi Ahsanullah, Hornell, Chakravarti, Bakhshi Ram Rattan, Saiyid Muhammad Abdur Raof, Meston, Stone and Sir Sundar Lal voted for the proposal.

- (a) *Messrs. Sesa Ayyar and Dvarika Nath* preferred to substitute 'two' for 'three' years.
- (b) *Messrs. Richey, Fazl-i-Husain, Sitacharan Dube, Kanhayalal Guru Devadhar, Naik, and Cvernton* accepted the proposal with the substitution of 'four' for 'three' years.

Improvements in the Teaching of English.

14. The conference then proceeded to discuss possible improvements in the teaching of English. There was a consensus of opinion that everything centred round the efficiency of the teacher. *Messrs. Dube and Natarajan* emphasised the importance of obtaining not merely better teachers but also men of such character and influence as would mould the characters of their pupils. *Mr. Naik* thought that the teaching of English was adversely affected at present by the lack of teachers specially trained for the purpose and the constant misuse of the English language during the teaching of other subjects. The position varied in the several provinces. *Mr. Richey* said that the Punjab was fortunate in the excellent arrangements for training which had been instituted by his predecessors. *Mr. de la Fosse* explained that in the United Provinces many improvements had been effected both in increasing the pay of teachers and in providing proper facilities for training. *Mr. Sesa Ayyar* said that in Madras there was no serious dearth of efficient teachers of English, but *Mr. Stone* was inclined to qualify this statement. On the other hand, *Mr. Hornell* and *Mr. Dvarika Nath*, speaking for Bengal and Bihar respectively, felt that little could be done until there were big improvements in the efficiency of teachers. The teachers almost invariably were poorly paid and therefore soon turned to other pursuits. In consequence, there was no permanency or stability in the teaching profession. The schools therefore were in a deplorable condition, and even that condition was tending to deteriorate. *Mr. Fazl-i-Husain* said that it was impossible to expect much from the ordinary primary school whose total income amounted to some 250 rupees a year. *Mr. Dvarika Nath* made an earnest appeal for improved conditions of service for teachers. He hoped that for such a purpose increased Government grants would be forthcoming. *Dr. Chatterji* agreed with *Mr. Dvarika Nath*, but contended that there was another source of income which had not been mentioned. The fee rates in high schools which at present are lamentably low should be increased. In his opinion, a cheap education must lead inevitably to bad results. He was aware that the country was poor, but at the same time in secondary schools very much money was spent on private tutors, whose services should be unnecessary if only the school teaching were efficient. He did not desire any act of legislation but preferred to trust to moral persuasion. He had suggested to the authorities of a certain aided high school that the fee rates might be increased to Rs. 5 per mensem throughout the school. The institution which consists of 500 boys would then have a monthly income of Rs. 2,500. The authorities have provisionally agreed to his proposal. He hoped to introduce a similar scheme in other schools, but he realised that such a rate could not be applied to all schools. *Mr. Dvarika Nath* also thought that for the proper teaching of English a member of the Indian Educational Service should be placed on the staff of every Government high school at the divisional headquarters, and that the aided high schools should be encouraged to engage the best possible teachers. *Dr. Chatterji* wished to go even further in this direction than *Mr. Dvarika Nath*. In each of the Government high schools there should be a European headmaster, and there should also be a European lady teacher for the infant classes. *Mr. Natarajan*, however, doubted the wisdom of relying upon English masters to teach the English language to Indian school boys. In his opinion Indians, provided they were really efficient, were more likely to understand the difficulties of the boys and, given equality in other respects, were therefore the more suitable.

**Necessity of
greater
efficiency of
teaching.**

**Size of classes,
text-books, etc.**

15. The conference also considered certain matters in which improvement might be made and which were connected vitally with the interests of the teachers. *Mr. Devadhar* raised the question of the size of classes and was of the opinion that it was beyond the powers of even a competent teacher to deal adequately with a class of some fifty or sixty boys. The conference was in very substantial agreement with *Mr. Devadhar*. *Mr. Dvarika Nath* urged the necessity of revising the curricula and of reducing the number of subjects in the school course. *Mr. Natarajan* deprecated any attempt to impose on students departmental text-books which were the bane of the present system. *Mr. Hornell* pointed out in this connection that the present matriculation syllabus of the Calcutta University compelled a wrong method of instruction which resulted in the memorising of useless texts.

**Training of
teachers.**

16. *Mr. de la Fosse* accurately expressed the opinion of the conference in saying that an improvement of primary importance was the provision of better facilities for the training of teachers. Any attempt, for example, to teach boys by the direct method through the agency of inefficient and untrained teachers was bound to end in disaster. He explained the system which obtains in the United Provinces. Graduates were being trained at the Training College at Allahabad and on becoming teachers earned an initial salary of Rs. 70 or Rs. 80 per mensem. In certain aided schools they might receive at once as much as Rs. 100 per mensem. They often took part in the English teaching in the lower classes of high schools. *Mr. de la Fosse* did not think that there was much use in training undergraduates to teach by the direct method, as these were deficient in general knowledge and attainments. *Mr. Richey* agreed with *Mr. de la Fosse* on the importance of training, but thought that it was quite possible to train matriculates to become efficient English teachers. In the Punjab matriculates were trained for two years through the medium of English, and the results were on the whole satisfactory. *Mr. Kanhayalal Guru* said that teaching by the direct method by an untrained master was generally not only a failure but actually harmful. *Mr. Covernton* said that the lack of trained teachers was much felt in Bombay. *Mr. Devadhar*, while admitting the value of a trained teacher, pointed out the financial difficulties which confronted high schools under private management in engaging the services of trained teachers. The proportion of such schools was nearly 78 per cent. *Mr. Stone* also advocated an extension and improvement of training facilities. It was hoped that the recent grants given by the Government of India would be of very material assistance. *Mr. Natarajan* was of the opinion that, while training was useful, too much importance should not be attached to the necessity of training. The character and ideals of the teacher were greater factors in the situation than methods of teaching. He quoted an American authority* who said that graduates fresh from college often did better as teachers in schools, owing to their greater mental proximity to their students, than trained men whom training had deprived of some part of spontaneity so essential in dealing with youths during the period of adolescence. *Mr. Fazl-i-Husain* agreed that the trained teacher was necessary, but thought that the question was very largely one of finance.

**Teaching
methods.**

17. There was a very general agreement that there was much room for improvement in the methods of teaching English. Teaching in the early stages should be very largely oral, but after a few months a simple reader might be placed in the hands of the pupils. *Mr. Hornell* urged that at first the pupil should be taught to listen to and repeat words. By this means the vocabulary of the pupil would be gradually enlarged. It is also by a constant use of words that the grammatical instinct is developed. Insistence on detailed grammatical rules therefore should be avoided. In regard to the direct method, there was a good deal of confusion of thought during the course of the discussion. This was due to the fact that a variety of interpretations were given to the term in question. *Dr. Chatterji* urged that the direct method should be carefully distinguished from the merely oral method. *Mr. Hornell* thought that the direct method did not necessarily exclude in any way the practice of translation, and that the two methods were not inconsistent with each other. *Sir Sundar Lal* was of the opinion that much more attention should be paid to speaking and

* Principles of Secondary Education, by Dr. Garmo, (Messrs. Macmillan, New York).

writing the language correctly, and urged that for Indian boys the translation method was a good way of learning the English language. It was also agreed that the direct method should not become a fetish; and it should not be attempted unless the teachers are efficient. In this connection, *Mr. Dube* pointed out that although teaching by the direct method in the Central Provinces training school was fairly successful the scope was very limited. *Bakhshi Ram Rattan* thought that teachers should be trained specially for the purpose and urged that there was a great need for trained graduates. *Mr. Chakravarti* agreed with these remarks. *Mr. Devadhar* contended that it would be harmful as yet to insist on the direct method. It would also place the aided schools at a grave disadvantage as they cannot usually engage the services of trained teachers. He also urged that the preliminary teaching of English need not necessarily be dissociated from grammar and translation. *Mr. Richey* supported *Bakhshi Ram Rattan* and pointed out that the Punjab conference had been in favour of introducing teaching by the direct method whenever possible. *Maulvi Ahsanullah* said that teaching merely through translation was useless and that boys should be taught how to speak and write the English language correctly. Greater attention should be given to original composition, oral and written. *Messrs. Sessa Ayyar* and *Sivakumara Sastryar* both testified to the good results achieved by the direct method in Madras and urged that teaching in the earlier stages should be almost entirely oral. *Mr. Raoof* approved the introduction of the direct method, but thought that properly trained teachers were essential for the purpose. *Mr. Natarajan* reiterated his plea for freedom, and urged that the teacher was the only person who could adjust his methods to the immediate requirements of his pupils.

18. There was also a general consensus of opinion that too much attention is paid to the teaching of English literature, at any rate in the junior classes. In consequence, the teaching of accurate English is somewhat neglected. *Mr. Hornell* pointed out that there was a double object in view. In the first place, it was necessary to give all the pupils a real grasp of the English language. In the second place, those pupils who have literary tastes should acquire some knowledge of English literature. In practice, the two objects are independent of each other, and the attempt to teach boys the language through the medium of the literature is bound to fail. The solution of the difficulty was to postpone the reading of the literature until a real intimacy with the language has been acquired. *Mr. Hornell* added that for the purpose of understanding the literature a pupil should read both widely and quickly. *Mr. Stone* explained that in Madras the practice was to prescribe a large number of books for general reading. The subjects for the essays in the examination were drawn from these books. *Mr. Stone* was of the opinion that there was a tendency in Madras to emphasise the literary aspect, though possibly not to such an extent as in other provinces. He also insisted on the necessity of having the text-books properly graduated. *Mr. Chakravarti* also thought that supplementary reading in addition to the prescribed books was essential. *Mr. Covernton* agreed. He thought that archaic literature was not required and that selections should be as far as possible from modern authors. English teaching also should be more practical. In all work there must be some incentive. Both *Mr. Dube* and *Mr. Richey* thought that too much attention was paid in schools to an attempt to understand the literature. *Mr. Kanhayalal Guru* also thought that under the present system an excessive importance was attached to the teaching of English literature at the sacrifice of the English language and suggested that before attempting the former proper attention should be paid to the teaching of English grammar and composition. *Mr. Sivakumara Sastryar* also suggested that the study of English literature should only be attempted when a solid knowledge of the language had been acquired. *Mr. de la Posse* pointed out that in the United Provinces text-books are not prescribed for the school-leaving certificate examination and that efforts were being made to improve the pupils' knowledge of the English language. In the matriculation, however, in his opinion, the test was almost entirely literary. In consequence, the teaching of English as a language was at a disadvantage. *Mr. Natarajan*, while agreeing to some extent with previous speakers, pointed out that boys should be taught to love the language, and this could only be done by reading and understanding the literature. *Mr. Naik* and *Mr. Devadhar*, however, thought that insufficient

**The claims
of English
literature.**

attention was now being paid to English literature. The former added that an early opportunity should be taken to introduce the pupils to its study. *Dr. Chatterji* feared that the passing of the examination was the chief objective and not the learning either of the English language or of English literature. Boys should be encouraged to read books as extensively as possible. At present, the teachers in Bengal make very little use of books, but prefer to talk and dictate notes which are crammed by the boys. The result is that nothing is learnt at all.

The Medium of Instruction.

19. *The chairman* then referred to another group of questions on the agenda paper which dealt with the medium of instruction in secondary schools. The questions were as follows :—

- (a) "To what extent does instruction through the medium of a foreign language (i) hamper the pupils in the acquisition of knowledge crushing their independence and originality of thought and instilling in them the necessity of cram as the only means of learning, (ii) impose a burden on the teachers, and (iii) tend to the impoverishment of the vernaculars?"
- (b) "Are the comparative paucity of suitable text-books in the vernacular, the deficiency of the vernaculars in technical nomenclature and the multiplicity of the vernaculars insuperable objections to extending the use of the vernaculars as a medium of instruction?"
- (c) "Should English be introduced as a medium of instruction gradually or not? If so, at what period and in what degree should it be introduced?"
- (d) "To what extent is it advisable to examine students in certain subjects at the end of their school career in the vernaculars?"

The members of the conference gave their opinions on each of these questions, but it was clear from the course of the discussion that there were two main points for consideration :—

- (a) What difficulties are encountered by pupils and teachers through English being the medium of instruction?
- (b) Should certain sacrifices be made to remove these difficulties?

All were agreed that difficulties existed and also that if these difficulties were to be removed sacrifices would have to be made. The difference of opinion at the meeting, therefore, was not on the truth of the principles laid down, but rather on the extent of the difficulties and the extent of the sacrifices. One party urged that the difficulties were so great that sacrifices should be made. The other party urged that the difficulties were not big enough to warrant a change of system which entailed so great a sacrifice. Generally speaking, the representatives of Bombay, the Punjab and the Central Provinces voiced the former opinion, while the Bengal, Madras and Bihar representatives held the latter view. The members from the United Provinces, in the main, contended that a gradual change was possible.

The difficulties of the foreign medium.

20. *Mr. Richey* was of the opinion that the present system of teaching the ordinary school subjects in the higher classes of secondary schools through the medium of a foreign language undoubtedly led to cramming. The pupils, and specially those in the lower classes, could not understand properly the instruction imparted through the medium of English, and therefore adopted the only solution of the difficulty, the memöising of their text-books. *Mr. Dube*, speaking from his experience in the Central Provinces, agreed emphatically with *Mr. Richey* on this point, and thought that cramming was inevitable under the present system. In this connection, *Mr. Hornell* referred to the system in Ceylon with which he once came into contact. In the secondary schools of that colony boys were taught rigidly and exclusively through the medium of English and were prepared for the Cambridge local examinations. The results of this system, in the opinion of one of His Majesty's inspectors of schools in England,

led to the worst possible forms of cramming, so that boys who had spent some six years in a secondary school were unable to pass the junior examination, which was well within the scope of an English boy or girl of the age of fourteen. *Mr. Richey* thought that, as a rule, teachers did not like giving instruction in the vernacular, but this was largely a matter of pride, as under present arrangements they thought that this was an inferior form of teaching. Under a different system, this antipathy would soon die out. *Mr. Fazl-i-Husain* saw no reason why everything should be made subservient to the study of English. The pupils suffered very considerably from a confusion of ideas and an incapacity for clear thinking; and these defects were due primarily to instruction being given in a foreign language. *Mr. Hornell* pointed out that the capacity of a pupil to grasp the subjects he is being taught cannot outstrip the knowledge of the medium through which these subjects are presented to him. In Bengal both the teacher and the pupil should be taken into consideration. The teacher, on the one hand, through his unfamiliarity with the medium of instruction could only say in class half of what he wanted to say; the pupil, on the other hand, for the same reason, could only understand half of what his teacher told him. It was clear, therefore, that there must be both waste of energy and confusion of thought. In cases where the difficulty of the language is added to the difficulty of the subject, it is clear that the subject cannot be well taught. *Mr. Fazl-i-Husain* also urged, and *Mr. Raof* agreed, that the use of English as a medium of instruction was very harmful to the pupils' knowledge of the English language. The boys were encouraged in bad habits and tended to use and to listen to indifferent and ungrammatical English. These defects, once acquired, could only be removed with the greatest difficulty in subsequent years. English as a language should be taught scientifically and at the proper time and place, and no attempt should be made to teach it by making it a medium of instruction in other school subjects. *Mr. Fazl-i-Husain* urged that these views were shared by the majority of educational authorities in the Punjab whose opinions had been voiced at the recent conference in Lahore. *Bakhshi Ram Rattan*, though he could not go quite so far as *Mr. Fazl-i-Husain*, thought that the foreign medium was a big handicap to Indian pupils. His experience as an examiner in Lahore showed clearly that the boys in many cases had no alternative but to cram up their work. He also alluded to the waste of time involved under the present system. The pupils had to learn such subjects as history and geography in the vernacular and then relearn them in English. Under present arrangements boys in the Punjab found time only to learn Indian history and it was a matter for keen regret that they learnt no English history at school. If only the medium of instruction in history were the vernacular, *Bakhshi Ram Rattan* hoped that ample time could be found for the study of English history. *Mr. Raof* agreed and thought that the time saved by teaching through the vernacular could then be spent in giving a more methodical training in the English language. *Bakhshi Ram Rattan* also stated that in the Punjab in recent years an extension of the use of the vernaculars as media of instruction had been made, and that, in the opinion of the large majority of educationists in that province, the experiment had been a success. He thought that the study of English would not suffer by the vernacular being the medium of instruction, and that the present system entailed a great and unnecessary burden on the boys. *Mr. Sesha Ayyar*, though coming from Madras, said that his experience had converted him to the vernacularist point of view. He commented on the frequent revision of work, first in one language and then in another, necessitated by the change in the medium of instruction at some stage in the school course. Boys were therefore expected to crowd too much into the school course and tended to acquire the deplorable habit of learning by heart dictated notes. In consequence, they never gained a real grasp of the subjects, and therefore the universities were forced to do what should be the work of schools, and much to the detriment of sound learning and national development. Through their instruction in a foreign language the pupils were apt to look upon the simplest lessons as something mysterious and difficult. They therefore lost heart and relied on the memory instead of the understanding. *Mr. Sesha Ayyar* claimed that every boy had some individuality of his own which should be fostered by teaching in that language with which he was familiar. The aim of the school should be to provide not so much for the genius as for the boy of average capacity. As

the results of the present system had been most disappointing, he advocated a change. *Mr. Kanhayalal Guru* also thought that the foreign medium was attended by evil results and that the pupils rarely understood properly the lessons given in English. He further added that there were two difficulties under the present system, *viz.*, the subject matter and the English medium, which might be reduced to one by the introduction of the vernacular medium as far as possible for all subjects other than English. *Mr. Naik* did not think that the study of English was in any way improved by English being the medium of instruction. Indeed, the foreign medium of instruction was the bane of the present educational system. Not only should explanations be given in the vernacular, but English text-books should not be used in schools. *Mr. Devadhar* held somewhat similar views though he admitted that opinions in Bombay were much divided on the subject. He urged that the time had come to emphasise the use of the vernaculars as media of instruction in teaching non-language subjects up to standard V of the high school. The foreign medium led to much waste of time and the habit of cramming on the part of the pupils.

The difficulties of the foreign medium exaggerated.

21. Other members of the conference contended that the difficulties of the foreign medium could easily be exaggerated. *Mr. de la Fosse* and *Mr. Covernton* while admitting that some burden was imposed on the pupils, thought that improvements in the efficiency of the teaching would tend to remove the defects. *Sir Sundar Lal* was also of the opinion that by the time they reach the senior classes in the school the pupils have overcome the difficulties to a large extent. *Mr. Sivakumara Sastriyar* thought that many of the difficulties referred to by previous speakers could not fairly be attributed to the foreign medium but were due to other causes and primarily to indifferent teaching. The originality of the pupil was not crushed by his learning through a foreign language. A good deal depended on the mental background of the pupil which the teachers should try to secure. The inward light could easily break through the foreign medium. *Mr. Meston* and *Mr. Stone* urged that the difficulties were in themselves a valuable part of education and provided an excellent mental and moral discipline. The former also held that such difficulties as existed were due primarily to the indifferent and lifeless way in which English was taught, a legacy inherited from the methods of the pandits. In schools where the teaching was good and where English was properly correlated with other subjects, there was little fear of serious dislocation. *Maulvi Ahsanullah* and *Dr. Chatterji* both combated the idea that English should be regarded as a foreign language. The former contended that, far from crushing originality, the English language had developed a spirit of independence and original thought in the Indian. It had instilled energy and zeal into his mind and widened his outlook. He also claimed that the ordinary teacher did not consider it a hardship to give his instruction in English. In Bengal there was no dearth of English-speaking teachers, but on the other hand the number of those who could give instruction in the vernacular was limited. *Mr. Chakravarti* admitted that there were difficulties in the present system, but urged that the learning of English was one of the objects of school education in this country. It was not possible to divorce education from life, and therefore any hardship that might arise should readily be accepted. *Mr. Natarajan* quoted a letter written some ninety years ago and eleven years before Macaulay's minute by Raja Ram Mohan Roy to Lord Amherst, in which he pleaded for English as against Arabic and Sanskrit teaching and considered the idea of using the vernaculars as media of instruction in those days unthinkable. The arguments brought forward in that letter still obtain today, but the obstacles in the way of English education are not so great. The necessity of English education, moreover, is still more obvious than it was in those days. There was no reason whatever, therefore, in *Mr. Natarajan's* opinion why there should be any reversal of policy such as had been suggested. If instruction were given through the medium of the vernacular there was no reason to anticipate that the practice of cramming would be reduced. This habit was in no way a monopoly of India. *Mr. Covernton* thought that cramming in this country was largely traditional and that it was not altogether an evil. *Mr. Natarajan* was also of the opinion that a knowledge of the English language was fostered by making it the medium of instruction. *Mr. Dvarika Nath* said that in Bihar there was also a great demand for English education and that the vast majority of people realised the

importance of English teaching. The present defects were due to the weakness of the teaching rather than to the use of the foreign medium of instruction. *Mr. Hornell* again pointed out that the indifferent state of secondary education in Bengal could not be attributed primarily to the foreign medium, for in practice in the majority of schools the teaching was conducted almost entirely in the vernacular.

22. There was a greater unanimity among the members of the conference in discussing whether or not the vernaculars had been impoverished by the use of English to a large extent as the medium of instruction in schools. *Mr. Sivakumara Sastry* referred to the vernacular associations in Madras which were doing excellent work in encouraging the vernaculars. In reply, *Mr. Sesa Ayyar* contended that the primary object of these associations was to fight for the vernaculars as media of instruction and that, if that incentive were removed, their work would be of little value. *Mr. Meston* said that there was no danger of the vernaculars being neglected so long as they were the media of conversation in the homes. Besides, he referred to the remarkable development of vernacular literature in Madras which indicated clearly that there was no danger of impoverishment. *Dr. Chatterji*, as shown above, thought that the recent development of Bengali literature was due primarily to English instruction. Indeed, such improvements as had been made in recent years, and they have been considerable, were due almost entirely to the influence of English education. If the past is any guide to the future, the enrichment of the vernaculars must be largely helped by the influence of English education. *Mr. Devadhar* believed that the enrichment of the vernaculars depended very largely upon the propelling force of the message which those who received an English education felt bound to deliver to the masses who could never read English books.

23. The conference then considered whether, admitting that the foreign medium was a heavy burden on pupils and teachers alike, a drastic change would be justified. Some thought that the change could be effected with comparatively little difficulty; others that the sacrifice would be very great. The Madras representatives, except *Mr. Sesa Ayyar*, felt that the difficulties arising from the multiplicity of the vernaculars would be almost insuperable. It was pointed out that in some places it was almost impossible to state what was the vernacular. It would also be difficult in some schools to make adequate provision for the Muhammadan pupils. *Mr. Sesa Ayyar*, however, thought that this difficulty would be confined in the main to the city of Madras, as each locality fell under a distinct language area. *Mr. Devadhar* did not consider these difficulties in any way insuperable. He suggested that a school might have two sides, a practice which was already in force in the Bombay Presidency, where there might be the Gujarati and Marathi sides of a school. The deficiency of the vernaculars in technical nomenclature did not present any serious obstacles, as even the most ardent vernacularist did not object to the use of English technical terms. There was a general agreement with *Mr. Chakraparti* that duplication in nomenclature was confusing and should therefore be avoided. *Mr. Kanhayalal Guru* thought that the vernacular technical terms being generally much harder to learn than those in English, the use of the former in the class-room would be a source of trouble to the boys. Another difficulty was offered by the diversity of the vernaculars. Both these difficulties, however, could be removed by the use of English technical terms. The language used by the teacher for his explanations in vernacular might be of the type ordinarily spoken in that particular locality so as to be easily intelligible to all the pupils in a class. *Mr. Guru* did not desire the boys to be unacquainted with the vernacular technicalities. With a view to this end he suggested the supply to the boys of printed bi-lingual glossaries of each subject for their frequent reference.

Over the question of the text-books, however, there was a very wide difference of opinion. *Mr. de la Fosse* thought that there was no serious paucity of vernacular text-books for the junior classes. In the senior classes, however, there was a serious dearth of good books, and especially in mathematics and history. If any change were to be made, it would be necessary to translate English text-books or write new ones. *Mr. Sesa Ayyar* said that text-books were being published in the vernacular. *Mr.*

The impoverishment of the vernaculars.

The sacrifices involved by making the vernaculars the media of instruction in the upper classes of schools.

Richey admitted that as yet there was a dearth of good vernacular text-books and that even offers of rewards by Government had not induced men to write in the vernacular, but he thought that this reluctance could easily be overcome were the system of education different. *Sir Sundar Lal* said that as there were only two versions of the vernacular in the United Provinces, the system of using English technical terms would obviate any difficulties that might arise in that respect. Suitable text-books could easily be prepared. *Mr. Covernton* thought that the demand would create the supply. *Messrs. Naik, Kanhayalal Guru* and *Fazl-i-Husain* did not anticipate any serious difficulty in the provision of suitable vernacular text-books. *Mr. Devadhar* thought that the vernacular associations would render valuable assistance in the publication of vernacular text-books. *Mr. Hornell*, however, held very different views. He pointed out that there were few things in education that required more skill and care than the writing of text-books. The text-books now in general use in schools in England represented the experience of a large number of years. *Mr. Hornell* could not think it a wise policy to throw over that experience, especially when there was considerable uncertainty as to what would take its place. Text-books, however well translated from the English, could never be as good as the original. *Mr. Natarajan* agreed emphatically with *Mr. Hornell*. The substitution of vernacular for English teaching and of vernacular for English text-books would check progress in India for perhaps thirty or forty years and be disastrous to the interests of the country. He repeated that whatever might be the merits of a vernacular course, the boys would be largely failures so far as decision of character and resourcefulness were concerned. He was also doubtful whether the vernacular books would be forthcoming. The vernacular training colleges in the Bombay Presidency had been in existence for a number of years, but the teachers trained there had not shown any desire to write vernacular text-books. *Mr. Natarajan* also referred to recent experience in Japan and quoted from the report of the late *Mr. W. H. Sharp*. Under the old system the teaching was in Japanese, but the text-books were in English. The recent substitution of vernacular for foreign text-books had resulted in a considerable falling off in the pupils' knowledge of the foreign language. *Dr. Chatterji* said there were many Bengali text-books, but would still insist on the use of English text-books as early in the school as possible. *Maulvi Ahsanullah* pointed out that English was the *lingua franca* of educated Indians throughout India, and therefore no changes should be made which would relegate it to the position of a foreign language like Latin or Greek. Any attempt to do so would have a disastrous consequence.

The stage at which the foreign medium should be introduced.

24. In consequence of these differences of opinion, there was not much unanimity in the conference as to the stage when English should be introduced as the medium of instruction. *Mr. Richey* thought that the use of English as the medium should be postponed as long as possible. While the teaching was in the vernacular, there was no reason whatever why the pupils should not be trained to write their answers in English. Such a practice would tend to improve not only the knowledge of the ordinary school subjects, but also the capacity of the pupils to write grammatical and orderly English. *Mr. Fazl-i-Husain* went further in claiming that even English might be taught partly through the vernacular. *Mr. Dvarika Nath*, on the other hand, urged that English should be the medium in the four higher classes of the secondary school. *Mr. de la Fosse* thought that the total exclusion of English as the medium in the middle stages would result in an indifferent knowledge of English by the pupils in the higher stages. This deficiency would therefore react most unfavourably on the college instruction and render the college teaching to a large extent ineffective. In the teaching of English, *Mr. Hornell* suggested that English should be used as much as possible, but not exclusively. This was the general opinion of the conference. *Maulvi Ahsanullah* also referred to the teaching of Sanskrit and Arabic in Bengal. The results of that teaching which was ordinarily conducted in English were deplorable. *Mr. Hornell* agreed emphatically with *Maulvi Ahsanullah*. He pointed out that the matter was one of very considerable importance as a classical language is taken by every boy who appears for the matriculation of the Calcutta University. The results of the present system were very poor indeed. The pandit and the maulvi are usually incapable of translating into English; and therefore the boys are compelled to learn by heart a key written, as a rule, in

execrable language. The mental gymnastic demanded by the pupil under the present system is intolerable. He tries first to translate the classical text into his "thinking language" which is Bengali, and then tries to translate his Bengali thoughts into English, of which language he has a very imperfect knowledge. Until radical improvements can be made in the teaching *Mr. Hornell* was of the opinion that Sanskrit should be taught through the medium of Bengali and made part of a serious study of the vernacular.

25 The following resolutions were then put to the meeting :—

5. "The vernacular should be the medium of instruction in all the classes of a high school."

Resolutions:

Messrs. Fazl-i-Husain, Sitacharan Dube and Naik voted for the proposal, *Messrs. Sesha Ayyar, Richey, Kanhayalal Guru and Devadhar* accepted the proposal with the addition of the words 'as far as possible in subjects other than English.'

6. "English should be the principal medium of instruction in the two higher classes of a high school."

Messrs. de la Fosse, Sivakumara Sastriyar, Maulvi Ahsanullah, Hornell, Chakravarti, Saiyid Muhammad Abdur Raof, Meston, Stone, Dvarika Nath, Chatterji, Natarajan, Devadhar, Covernton and Sir Sundar Lal voted for the proposal.

(a) *Mr. Sesha Ayyar* accepted the proposal with the substitution of 'the highest class' for 'two higher classes.'

(b) *Messrs. Sivakumara Sastriyar, Maulvi Ahsanullah, Hornell, Chakravarti, Meston, Stone, Dvarika Nath, Chatterji, Natarajan, Covernton and Sir Sundar Lal* would accept the substitution of 'three' for 'two' classes.

(c) *Maulvi Ahsanullah, Messrs. Hornell, Chakravarti, Dvarika Nath, Chatterji, Natarajan and Covernton* would accept the substitution of 'four' for 'two' classes.

26. The conference was generally agreed that the introduction of English as the medium of instruction should be effected gradually. *Mr. Hornell* suggested that in subjects demanding a knowledge of technical terms, such as mathematics and geography, the medium of English should be utilised at an early stage. History should be taught in English where the text is sufficiently simple and where easy questions and answers are involved. *Mr. de la Fosse* said that it was the practice in the United Provinces to introduce gradually the foreign medium, but he thought that the teachers should be encouraged to use English terms more extensively than they did. *Mr. Sivakumara Sastriyar* agreed with the latter suggestion. *Maulvi Ahsanullah* was much in favour of the gradual introduction of the foreign medium. He suggested that in the fifth year English figures might be used in arithmetic lessons and in the following year English names in the geography teaching. After that, history and geography could be taught in English, and in the four top classes of a school all instruction could be given through the medium of English. *Bakhshi Ram Rattan* thought that all subjects in which expression plays an important part should be taught, as far as possible, in the vernacular. Other subjects, such as science and mathematics, could be taught in English in the top two classes. *Mr. Covernton* held somewhat similar opinions. *Mr. Hornell*, however, protested against any hard-and-fast rules. In his opinion, the efficient teacher was best capable of judging where and when the medium of instruction should be changed. *Sir Sundar Lal* thought that if it was decided to emphasise still more the use of the English medium in the schools, the change should be carried out gradually, subject by subject, and should descend downwards from the higher classes. *Mr. Kanhayalal Guru* said that the English medium should be introduced gradually as was the custom in the system obtaining in the Central Provinces.

The gradual introduction of English as a medium of instruction.

27. Unfortunately, there was little time for the discussion whether or not students might be examined in the vernacular at the end of their school course. *Mr. Hornell* explained that under the restrictions of the Calcutta University history was not a compulsory subject in the matriculation examination, and that the answers might be written in English or in the vernacular. He did not think that this concession was used to any great extent, nor did he believe that

Medium of examination at the end of School course.

such answers as were in the vernacular were in any way superior to those in English. He added that the question papers were in English. *Mr. Covernton* explained that in Bombay certain of the papers in the school final examination could be answered in the vernacular if the candidates so wished. He said that he had not yet had time to compare the records of those who answered in English with those who answered in the vernacular, but it was doubtful whether the latter showed any marked superiority. *Mr. Devadhar* disputed this expression of opinion on the strength of the remarks made by the examiners appointed by the Department and thought that the experiment had already proved successful to some extent. It was also urged that as the text-books were in English and as the medium of instruction in the classes preparing for this examination was English the concession of answering questions in the vernacular could not be of any great value to the pupils. *Mr. Devadhar*, therefore, advocated that an option of answering questions in non-language papers in English or vernacular be given to those candidates who did not intend to proceed to the university. *Mr. Natarajan* said that in the Bombay matriculation examination candidates were not examined in certain subjects, such as science and geography. The headmasters of schools were expected to certify that their students had completed satisfactorily the prescribed courses in these subjects. The mere fact that there was a strong feeling in Bombay that this concession should be withdrawn and that candidates for matriculation should be examined publicly in all subjects, showed that the concession was not much valued. *Bakhshi Ram Rattan* said that at the recent conference in Lahore a resolution had been passed by a small majority that candidates should be given the option of answering their examination questions in the vernacular. The experiment of examining students in the vernacular had been tried in the Gurukula and was reported to be successful. *Sir Sundar Lal* thought that pupils preparing for university courses or the learned professions should be examined, as at present, in English. Those, however, who were not intending to continue their education beyond the high school stage, should be allowed to answer their papers in the vernacular. In the United Provinces such a course would be practicable only in the school-leaving certificate examination. The matriculation system of the Allahabad University extends over an area larger than that of the province and includes provinces where other vernaculars are current. No change in the matriculation therefore was possible at present. *Mr. de la Fosse* agreed. *Mr. Sesha Ayyar* thought that there was room for experiment and that candidates should have the option of answering in English or in the vernacular. *Mr. Richey* thought that the candidates who intended to go to the university should be required to answer in English the papers on those subjects which they intended to study at college. *Mr. Meston* could see no advantage in giving such concessions. *Mr. Stone* said there was a very little demand for any change and that candidates wished to make as good a show as possible in the examinations. For example, those who answered their papers in the vernacular might easily be penalised in their efforts to obtain employment. *Dr. Chatterji* saw no harm in making the experiment. *Mr. Dube*, on the other hand, thought that so long as examinations continued to be held in English, all teaching will be subordinated to that end. *Mr. Kanhayalal Guru* thought that students could well be examined in the vernacular during and at the end of their school career in all the subjects except English provided that English technical terms were allowed to be used in answering papers in mathematics and certain other subjects.

28. The following resolutions were then put before the conference :—

7. " Examinations at the end of the high school course should be in the vernacular in all subjects except English, "

Messrs. Fazl-i-Husain and *Sitacharan Dube* voted for the proposal.

8. " Candidates should have the option of answering the examinations at the end of the high school course in English or the vernacular in all subjects except English. "

Messrs. de la Fosse, Sesha Ayyar, Richey, Fazl-i-Husain, Sitacharan Dube, Kanhayalal Guru, Chakravarti, Bakhshi Ram Rattan, Saiyid Muhammad Abdur Raof, Chatterji, Devadhar, Naik and *Covernton* voted for the proposal.

29. There were 21 members at the conference, excluding the Government of India officials who did not vote.

5