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TECHNICAL AND INDUSTRIAL

INSTRUCTION IN BENGAL.

—◆—
1888-1908.

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[PART I OF SPECIAL REPORT.]

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TECHNICAL AND INDUSTRIAL INSTRUCTION IN BENGAL, 1838—1908.

(PART I OF REPORT OF OFFICER ON SPECIAL DUTY.)

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CHAPTER I.

SUMMARY OF THE DISCUSSIONS AND PROPOSALS OF THE PAST TWENTY YEARS.

SECTION I.—THE GENESIS AND RESULTS OF MR. COLLIN'S REPORT OF 1890.

IN opening the Finsbury Technical College in 1883, Sir Philip Magnus said that in all discussions about technical education it was customary to commence with a definition. He called that education, training or instruction "technical" which had a direct reference to the career of the person who received it; but explained how in practice the term had the narrow signification, which applied to the training of the engineer or chemist rather than to that of the surgeon or lawyer. In England by 1897, technical education became practically any course of study prescribed by the Science and Art Department, while in Germany it has been described as the study of the principles underlying every kind of human craftsmanship. In India Lord Curzon in 1901 explained that he interpreted technical education as meaning that practical instruction which would qualify a person for the practice of some handicraft, industry or profession. He excluded research, the commercial revival of industries and manual training as a part of general education. The Simla Educational Conference held in 1901 defined technical education as (a) the study of the scientific methods and principles underlying the practice of any handicraft, industry or profession; (b) the application of those methods and principles to the practice of the handicraft, industry or profession. Mr. Nathan in his Review of the Progress of Education in India, 1898—1902, discussed the subject under the title, "Professional and Technical Education"; and this distinction is continued by Mr. Hornell in his Review of Education in Bengal from 1902 to 1907. The Simla Conference used the word 'technical' in its broadest sense: Mr. Nathan clearly gave to it the restricted significance which is ordinarily assigned to the word. Mr. Collin in his report of 1890 on the Arts and Industries of Bengal pointed out the vagueness attached to the term. In the present review, technical instruction must be taken to mean that special training for imparting skill, through the knowledge of principles, in any of the careers mentioned. Industrial education again is a branch of Technical Education, as exhaustively described by the Simla Conference; but is to be taken as concerned with the imparting of skill from practice in some handicraft. In other words technical instruction is the instruction necessary for the foreman or the manager, the employer or the director; while industrial education is that which is necessary for the artisan. Expressed in this form, the term technical education should not leave its meaning open to misconception. The Commissioner of Labour to the American Government in his Report of 1902 on Trade Education and Technical Education in various countries assigned to the term "technical education," a meaning, restricted both as to the career involved and as to the nature of the training; it was to give to the workman an understanding of the scientific principles involved in his work. By "trade education," the American report meant the instruction, mainly in the workshop, which consists in perfecting the pupil in the practice of the manipulations and operations of skilled workmen in particular trades. This is synonymous with industrial education as accepted in official correspondence in India.

In 1886 the Government of India pointed out that little progress of a substantial character had been made in promoting technical education. It was in that year that Mr. (later Sir Antony, now Lord) MacDonnell prepared a memorandum on Technical Education in India. From that we learn that the only promising institution in Bengal beyond the Survey schools was an Industrial School in Midnapore district; that Industrial schools in Bengal were merely excrescences on the educational system

The pronouncement of 1886 on Technical Education.

with neither plan nor object; and that from isolated schools no general good was likely to come. Hence it was laid down that all such schools should be subordinate to a Central Institution. The difficulty about teachers was indicated. In 1888 an important pronouncement on the subject of technical education was made by the Government of India. The Resolution which was issued in that year recommended the institution of schools at places where industries were centralized, and in large towns where there would be a demand for superior skill. For each province an industrial survey was suggested; also the appointment of a standing committee of educational experts and professional men; and the possibility of the erection of Technological Institutes and of the enlargement of Provincial Schools of Art was foreshadowed. In Bengal we shall find that an industrial survey was made; that the scope of the Sibpur College and of the Government School of Art has been considerably enlarged, and that practical steps have been taken towards the institution of a Technological Institute; but that the increase in the number and quality of the industrial schools has been slight. This is no more than was anticipated in 1888.

The Bengal Industrial Survey of 1890.

To Mr. Collin, i.c.s., was entrusted the preparation of an industrial survey; and his Report on the existing Arts and Industries in Bengal was prepared at the end of 1890. The second portion of the Report dealt with the subject of Technical Education. He emphasized the point that there cannot be uniformity; that each locality should adopt a system specially suited to its wants; and that it is useless to imitate European systems (except at a distance). The chief proposals made in connection with technical and industrial training, as distinguished from the improvement of industries, were summed up as follows:—

- (1) The institution of a school for training students in connection with the coal mining industry.
- (2) The training of mechanical engineers by the introduction of apprentices into the workshops connected with State Railways.
- (3) The provision of special training for apprentices and intelligent workmen in the Railway and Canal workshops in Calcutta and the suburbs.
- (4) The institution of improved industrial schools and the encouragement of industrial classes.
- (5) The appointment of an Inspector to supervise industrial education.
- (6) Private firms and Municipalities and District Boards should be encouraged to open technical schools.

Its results as regards Technical Education.

It will be found that the Government have done a full share in promoting mining instruction; that there is now a system of apprenticeships in all the large Railway workshops (Kanohrapara, Jamalpur, Kharagpur); that full use has, however, not been made of the large workshops belonging to the State for the training of artisans; that the opening of technical and industrial schools has been encouraged, but that more might be done, though one of the obstacles has been the attitude of the middle classes themselves to manual labour, and another has been the difficulty of obtaining efficient teachers; and finally that while the appointment of an Inspector of Industrial Schools has not yet been made, it is now even more necessary than it was before, but that the Bengal Government have not yet been able to obtain sanction for the appointment, though such an appointment exists in the Bombay and Madras Presidencies.

It is unfortunate that the Report of Mr. Collin was not formally published. The circle of consultants was an official one, and the result is that the very existence of such a report of which practically all the recommendations still hold good is in danger of being forgotten. Five years after its preparation I was informed, when I asked for a copy, that it was confidential. When a question was asked in the Bengal Council in August 1906, regarding an industrial survey of the province, the existence of Mr. Collin's Report of 1890 was formally brought to notice.

In due course the proposals of Mr. Collin were considered in detail. As regards his proposal to utilise the municipal workshops in Calcutta for a technical school, it was found not conveniently practicable. Sir Alfred Croft, the Director of Public

Instruction, considered that the District Boards would devote themselves to the establishment of industrial schools as soon as the demand declared itself. Sir Alfred Croft as will appear from the context, was thinking primarily of the improvement of the artisan, by teaching him improved manual skill and the use of machine tools and by developing his intelligence. The District Boards have however taken up the training of the youths of the middle class who wish to become sub-overseers rather than the training of the artisans. Colonel McNeill, R.E., Secretary to the Government in the Public Works Department, pressed home the point that in order to train youths as mechanics it is essential that they should be where real work has to be done on a commercial basis; and that such youths will never learn in workshops established simply for educational purposes. This is why the existing Industrial School of the East Indian Railway colliery estate at Beniadih is more sound than the Government Industrial School at Ranchi; and why the youths trained in Sibpur have hitherto not won a reputation as mechanical engineers. It is also a strong argument why more use should be made of existing State workshops. Mr. Fourcres who was in charge in 1873 of the Canal Workshops recognised this, and at Dehri-on-Sone created a living industrial school for the children of his workmen which, it is to be regretted, was not kept up on the original lines. Another criticism of Mr. Collin's report, as regards the proposals for training in mining engineering, was that mining engineering was a new thing with a strong element of uncertainty about it. But it is precisely in this direction that Mr. Collin's proposals have borne most fruit. The course of instruction in mining which is now being given both at Sibpur and in the coal districts is much appreciated: expert instructors have been recruited: a Mining Advisory Board has been constituted: certificates of competency in mining engineering are being granted: and for three years the State Technical Scholarships in Bengal have been given in the subject of mining, while the Bengal Chamber of Commerce have recommended in 1908 that this selection should continue in preference to any other industry. Under this head of Technical Instruction it may be said with justification that Government have anticipated the requirements of the industry. During the last twenty years the annual output of the collieries in Bengal has risen from under two million tons to over ten million tons. At the end of 1907 there were over eighty companies with an ordinary capital of over four crores of rupees.

The report of Mr. Collin was itself reviewed by the Bengal Government of Sir Charles Elliott in 1891. It was determined to push on the training of mining assistants; to establish a boarding-house for the training of apprentices in Mechanical Engineering at Kanchrapara; and to establish a school for cotton-weaving at Berhampore. But it was laid down that the advancement of technical education was not a matter which could be pressed regardless of the demand or of economy. It was expected that when Sibpur College had attained its true position as the centre of industrial education in Bengal, it would be of the greatest service to local technical schools, by supplying them with trained teachers, and by receiving the most promising pupils of such schools; and it was to the maintenance of the Sibpur College, together with the Calcutta School of Art, in the highest scale of efficiency and to development on various, if then unforeseen, lines that the Lieutenant-Governor looked for the promotion of technical education. This then has been the policy of the Bengal Government and the history of the Sibpur College will show that it was kept in view. With reference to these orders of 1891, it may be stated here in anticipation of the exact sequence of narration that as regards Sibpur College provision was made in 1896 for a course in electrical engineering, and in 1906 for instruction in mining engineering, as mentioned above, and that, as regards the School of Art, it was reorganized in 1896, and in 1904 steps were taken to revive Eastern ideals in the teaching at the School; that drawing has been introduced into both primary and secondary schools and in training schools, while it has been made a compulsory subject in the latter, and that the provision of teaching in drawing is an essential condition for any grant-in-aid to the other schools including primary schools since 1901; that in 1904 a committee appointed by the Bengal Government recommended the institution of a central weaving Institute at Serampore (instead of at Berhampore), the

Views of the Bengal Government of 1891.

The policy prescribed for Bengal.

appointments for which have been sanctioned by the Secretary of State in 1907; and that in 1908 an apprentice home is being built for the accommodation of the European and Eurasian apprentices at the Kanchrapara State Railway workshops.

The necessity for instruction in drawing.

The position in 1892 was reviewed in Chapter VIII of the Quinquennial Review, 1888—1892, of the Progress of Education in India, prepared by Mr. A. M. Nash. It was considered at that time that it would take half a century to supply from the Calcutta School of Art sufficient teachers for the existing high schools in order to carry out the orders of 1891 regarding the teaching of drawing. But this forecast has been fortunately falsified in the event, as the teachers have been obtained from the training schools. Drawing was made by the Calcutta University an optional subject for the Entrance Examination in 1890; the results however were most discouraging. It had been one of the chief recommendations of Mr. A. P. MacDonnell that instruction in drawing, as a preparation for technical education, should be made compulsory in all schools the teachers of which were competent to instruct in drawing. As regards technical education proper, Mr. Nash wrote that no general scheme had been drawn up for Bengal, and recapitulated the heads of Mr. Collin's proposals.

Affiliation of minor institutions to Sibpur.

After 1892, the first step of importance which was taken was the affiliation in 1894-95 to Sibpur College of the Survey Schools of Dacca, Cuttack and Patna, which had been established in 1876. This act of affiliation was in accordance with the principle laid down in the Memorandum of 1886. The chief obstacle to the advance of technical education had been the want of a governing principle; all progress had been fragmentary and isolated. This was the complaint of Mr. Tawney, who was then the Director of Public Instruction in Bengal. It was laid down that the lower course in a comprehensive system should not only serve its own purpose, but lead to a more complete course elsewhere. Of the affiliated schools the Survey School at Patna was raised in 1896 to the status of a School of Engineering by amalgamation with the Industrial School for Bihar started in Patna in 1892. Under the title of the "Bihar School of Engineering," it teaches now up to the Overseer course. The Survey School in Cuttack still trains only for the survey examination; but at the present time (1908) it is proposed to raise it also to the level of the others under the name of the "Orissa School of Engineering."

Sibpur Artisan Department.

In 1893 the artisan department was reopened at Sibpur; but this has never been a successful department. It is self-evident, and the remark frequently occurs in the literature on the subject, that the practical instruction of the artisan can only be carried on in a commercial atmosphere; and though many improvements in the Sibpur workshops have since been made, they can never take the place of a workshop run on commercial lines, even if the difficulties of residence for artisans at Sibpur were overcome. The attendance of artisans was 35 in 1902, 27 in 1906 and 15 in 1907.

The Review of 1897.

The progress of technical education in Bengal up to 1896 is summarised in paragraph 195 of Mr. J. S. Cotton's Quinquennial Review of the Progress of Education in India, 1893—1897, published in 1898. By that date, Mr. Cotton wrote, no appearance of a system of Technical Education was to be found anywhere in India; the scheme which existed in Madras was rather a scheme of technical examinations, not of technical instruction. It is unnecessary in this review to consider in detail the direction on more practical lines of the general course of study in ordinary schools: only the training in special institutions will be considered. At Sibpur in Bengal considerable improvements had been made in providing instruction in photography and in electrical engineering. The students however found great difficulties in meeting the Calcutta University tests in engineering. The Calcutta School of Art was brought to its present site in Chowringhee in 1893 and was thoroughly re-organised in 1896. The study of design which had been ignored was taken up in a systematic course for draftsmen, drawing masters, industrial art workmen and designers, and the defect was brought to light that oriental art was more or less ignored, whereby Indian Art students were being led in the wrong direction. The prospects of the students of the Survey schools were improved by giving them openings in Government service: it was

found that in private service they found abundant employment at remunerative rates. In the matter of industrial schools, Government contributed Rs. 6,325 and Local Funds Rs. 13,229 out of a total expenditure of nearly half a lakh spread over 23 schools with 623 pupils,—a small enough total for a province with a population of 75 millions. Steps were taken to prepare for the affiliation of suitable schools to the Central College at Sibpur. The Burdwan School was linked up in 1895. The local pupils could thus study for the first two years at the local school, and then proceed to Sibpur to compete for the sub-overseership test on the same terms as those who had read at Sibpur. The only Government Industrial School at Ranchi, where carpentry, blacksmiths' work, cane work, carriage building, besides a little reading, arithmetic, writing and free-hand drawing were taught. The difficulty of persuading ex-pupils to be teachers in the Primary Fund Industrial Schools in Chota-Nagpur was the subject of remark, and this difficulty still exists. As regards Industrial Schools throughout the Province, it must not be forgotten that the most of them and some of the most successful are those under the charge of missionary agencies.

In 1898 Mr. Hill, Inspector of Schools, proposed that technical classes should be opened at the Government district schools; and in 1899 a scheme was prepared by Mr. Slater, who was then Principal of the Civil Engineering College at Sibpur. This led to a consideration of what, in view of the poor results obtained in Bengal, is rather grandiloquently styled the Bifurcation of Studies in accordance with the recommendation of the Education Commission of 1883. In 1900 it was determined that classes be opened at Ranchi, Bankipore and Midnapore and also at Comilla, Mymensingh, Rangpur, Barisal and Pabna of the present Eastern Province for instruction in such technical subjects as are required in the training of sub-overseers. Pupils who were ready to enter the second class of High Schools might decide whether they would continue their studies for the University Entrance Examination, or in the "modern side" classes. Two years' local training was to be equivalent to one year at Sibpur, and was to entitle the pupils to join either the sub-overseer classes of the Technical Schools or the second-year apprentice class at Sibpur. The subjects were English, Mathematics, Drawing and Practical Geometry, Mensuration, Elementary Engineering, Surveying and Manual training. These B classes, as they were called, were started in 1901 with great hopes: other classes styled C classes with a syllabus for Commercial and Industrial training were to be opened in 1903. It was anticipated that there would be a great future for this scheme; but it is no exaggeration to say that in both cases the result has been a failure, and that in the former the parents and guardians of pupils have played at cross purposes with the views of Government. My own observation agrees with what I have found on record. It was hoped that public opinion was awakening to the recognition of the fact that a literary education was not the best training for the battle of life, and that industrial and commercial activity was necessary. Whatever other factors have come into play, as regards the B classes, there is no real "election" to join the modern side. A dull boy who cannot hope to pass the Entrance examination is placed in these classes in the hope that he may squeeze into Sibpur without the full general education which Sibpur demands from direct entrants. The result is good neither for the boy nor for Sibpur. The only hopeful feature is, as stated by Mr. Heaton, the successor to Mr. Slater, in a review written in 1906, that modern classes in other countries have had the same history, and it is a mere question of waiting for the breaking down of the natural apathy.

The attempt through a bifurcation of studies to prepare for a technical education.

The position of technical and industrial education in Bengal was again reviewed in Chapter VIII of Mr. Nathan's Quinquennial Review of the Progress of Education in India up to 1902, published in 1904. By this time it could be said that Sibpur College had well equipped laboratories and workshops and a large staff of European professors. The beginning of practical instruction in mining engineering had been made by sending B. E. students with scholarships for two years to a selected mine. The Calcutta School of Art after its reorganization in 1896 had special classes for engineering and mechanical drawing, wood engraving, lithography and modelling. In its second division, which corresponds to the syllabus of a School of Art in

The Review of 1902.

England, it had classes for those who wished to become painters or sculptors. Paragraphs 861 to 868 of Mr. Nathan's Review are of interest with reference to industrial schools proper. The difficulties encountered by industrial schools are thus explained;—"It may be admitted at the outset that the endeavours made up to the end of the quinquennium under review to provide through State agency or under State control a system of technical education better than routine training of the bazar have met with little success. The subject which has taxed the ingenuity of the educationalists of all countries, presents a specially difficult problem in India. For the organized industries, the conditions are not dissimilar from those which prevail in Europe, but for the industries which are prosecuted on a small scale by the majority of the industrial population they are much more complex and difficult." Mr. Nathan pointed out that there was one class of school which aimed at raising the intelligence and increasing the manual skill of the artisan, and another class which simply trained up boys to earn a livelihood. In Bengal, besides the artisan classes at Sibpur College and the Government school at Ranshi, there were artisan classes at the technical schools at Burdwan and Midnapore; also sixteen aided and three unaided schools. The subjects of instruction were almost entirely carpentry or blacksmiths' work or both; and the teaching in most instances was little better than that of the bazar. Most important of all, he pointed out that Bengal in common with the rest of India had little co-ordination between the instruction in the industrial schools and the local industries of the province.

SECTION II.—THE PROPOSALS IN BENGAL SUBSEQUENT TO THE SIMLA CONFERENCE OF 1901.

The appointment of a Committee on Industrial Education.

From this stage in 1901, starts a cycle of enquiry, discussion, detailed investigation, and resolution, by the Government of India on the subject of technical education; and it is useful to summarise the principles evolved for application to Bengal. The general enquiry by Sir Edward Buck in practical and technical education, the resolutions on technical education at the Simla Educational Conference, the instructions of the Government of India, the enquiries and recommendations of the committee on industrial schools in India, and the resolution of the Imperial Government on the committee's report all follow each other in close succession from 1901 to 1904. These State papers should be examined in original by those who are interested in the subject; but it is useful to place on record what bed-rock principles for application to the Bengal Province can be evolved from this voluminous, suggestive but comparatively infructuous literature. Sir Edward Buck's report of 1901 shows that technical education as applied to industries should be under a separate executive department in each province; and what is required is a special trade school for a particular industry in the locality where a trade is carried on, and only those should be taught who are likely to follow the trade. Part II, chapter III, of the report is full of immaculate common sense. The Simla conference of 1901 pointed out that technical instruction should have a definite object and should be specialized. The letter of the Government of India of the 20th November 1901 considered that, while much had been done and was being done and should continue to be done for higher technical education, yet the development of industrial schools was a matter of supreme importance and instruction in such schools should be dissociated from ordinary literary education. The Committee on Industrial Schools strongly maintained in their report of 1903 that a system of apprenticeship in workshops be relied on for training artisans in preference to a system of class instruction in schools. From the point of view of the Bengal province, it is unfortunate that the committee did not make any local enquiries in the Bengal province except in Calcutta itself. The recommendations of the committee were condemned by the Government of India in their resolution of 14th January 1904 on the report of the committee, because it was believed that the central recommendation of the committee—industrial instruction on the model of the Casanova Boy Artisan School at Naples,—would have as its end the abolition of industrial schools and the substitution of supervision in workshops. It should, however, be remembered that at

any rate as far as Bengal is concerned, the most effective improvement of the artisans in mechanical engineering has been by a system of apprenticeship either expressed or implied in large workshops. The Government of India, while admitting the great difficulty of building up rapidly an enormous fabric of technical education in India, lay down two broad principles. One is that at great industrial centres it should be possible to have whole-time schools for instruction in both workshop practice and theory; and that the active co-operation of employers of labour should be enlisted. The other is that for local handicrafts half-time industrial schools should be started,—for teaching on the one hand through the agency of an approved artisan accuracy of workmanship so as to develop a boy's inherited skill, and on the other hand, for teaching in a primary school such general education as will enlarge his prospects as a craftsman while preventing him from falling into a clerical groove. It may here be stated in anticipation that, as far as Bengal is concerned, a type of the former institution is to be found in the Bengal Technical Institute, which was started in Calcutta in the first outburst of enthusiasm for the *swadeshi* movement as an answer to the partition of Bengal, but which has been kept on proper lines by the level-headedness of its principal engineering adviser; and a type of the latter in the more successful of the village artisan schools started in Hazaribagh district by the Deputy Commissioner Mr. Radice, who was one of the members of the Industrial Committee. The great difficulty in both cases is the supply of competent teachers.

The views of the Imperial Government on the Committee's Report.

One other dictum of the Imperial Government remains to be recorded, especially as it is quoted in later papers in rather a loose fashion. It is frequently broadly laid down that Government should not enter into any industry on a commercial scale. In the first place, Government in India is in fact a manufacturer on a commercial scale of tents and harness, of greatcoats and blankets, of steam-launches and railway carriages; the justification is the economy which benefits the general tax-payer. In the second place as regards the prohibition in question, the dictum is qualified. While maintaining that industrial schools should be primarily educational and agreeing that the industrial schools as at present conducted frequently fail to train their pupils up to the standard of manual skill required for the market and pursue impractical methods, the resolution proceeds as follows:—

Educational versus Commercial Methods.

“It is most wholesome therefore that they (the schools) should be brought to the test of producing saleable articles. But this is a very different thing from requiring progressive and methodical industrial training to be sacrificed to the necessity of showing a profit on the work done by the boys, and in so far as the two objects are incompatible with one another, the Government of India desire to give precedence to the former.”

This qualification should not be overlooked. We may now return to the discussions in Bengal itself from the year 1901 onwards.

On receipt of the letter of 20th November 1901 from the Government of India, Mr. (now Sir Alexander) Pedler, the Director of Public Instruction, Bengal, was asked to prepare a scheme of industrial education in Bengal. Mr. Pedler, writing in January 1902, advocated cautious and tentative steps; and suggested in the first instance the establishment of craft schools at Serampore for weaving and at ten other places in Bengal for other selected crafts. For these schools the most competent local workman, foreman or master was to be selected as an instructor, and instruction in drawing and designing was to be imparted to the artisan pupils. In the second place, Mr. Pedler advocated the importation from Europe of experts for research and enquiry. Nearly two years later at the end of 1903, Mr. Pedler, on the receipt of the views of the Government of India concerning the report of the committee on industrial education, gave his views on the proposed policy for Bengal. They were as follows:—(1) class instruction should be continued; (2) geometrical drawing and designing should be taught; (3) industrial education should be on caste lines; (4) Government, local bodies and the public should help in providing scholarships; (5) in Bengal, a beginning should be made with one of the industries recommended in the letter of 1902, preferably weaving, and preferably weaving in silk, and preferably weaving in silk at Rampur Boalia in Rajshahi district;

The proposals of the Bengal Director of Public Instruction.

(6) the apprentice system should be also encouraged; and (7) if a beginning be made at Rampur Boalia, other weaving schools might be established at Berhampore and in Serampore.

The scheme for a Weaving School at Serampore.

* It is convenient to continue the narrative under this head, namely, the proposed establishment of a weaving school under the guidance of an imported expert. Early in 1904 the Government of Bengal reviewed the discussion from the time of the Simla conference of 1901; and appointed a representative committee to consider Mr. Pedler's proposals, which were estimated to cost annually Rs. 20,000, and also the proposals of the Government of India for whole-time schools at large industrial centres, as well as for half-time schools for handicrafts in small private establishments. The committee duly met in February 1904. The non-official representatives were nominees of the Chamber of Commerce and of the Bengal National Chamber of Commerce. The committee were in favour of cotton-weaving as the primary subject for instruction, in place of silk-weaving, with the suggestion that instruction in weaving in silk and wool should also be imparted. As regards the site for the school of instruction, the committee were in favour of Serampore instead of Rampur Boalia. Other more ambitious proposals for teaching the manufacture of soap, matches, glassware, cutlery and brass were considered but not accepted. The recommendations of the committee were adopted as the basis for the proposals submitted in June 1904 to the Government of India. The more important of these proposals were:—

- (1) that a school for the teaching of improved methods of hand-weaving in silk, cotton and wool should be opened at Serampore under an expert inspector to be recruited from some big manufacturing centre in England, a head-master and a master of drawing and design;
- (2) that a higher class should be opened there for the instruction of men of the Sibpur apprentice type, who would in turn become teachers, assistants to manufacturers and manufacturers; and
- (3) that a lower class should be opened there for the instruction of weavers and their sons, that similar instruction be given at other selected centres and that all pupils at the school be supported by scholarships.

Provision was made for a hostel, and the question of advances for the purchase of appliances was considered. It was mentioned that further enquiries would be made in the leather and brass trades.

The Government of India considered that their proposals were conceived in the right lines and were well adapted to the local conditions and requirements. It was intimated therefore in October 1905 that the proposed establishment would be recommended to the Secretary of State, who would be asked to select the best man who could be found qualified to organize such an institution. By January 1907 the Government of India forwarded a despatch to the Secretary of State regarding the development of technical and industrial education in four provinces including Bengal, and as regards Bengal supported the proposals of the Bengal Government made in June 1904. In April 1907 the Secretary of State sanctioned the appointments of a principal and an assistant for the Central Weaving School at Serampore, but up till April 1908 the officers required for the charge of the school have not arrived from England, as the appointments have not yet been made. In the meantime every preparation for the opening of the school has been made in the purchase of land and the selection of temporary buildings.

It should not be overlooked that Mr. Collin had in 1890 recommended the institution of a weaving school for silk at Berhampore. The policy now adopted is to make a beginning by the establishment of an institution for the improvement of that cottage industry which, judged by numbers, is the most important in the province, namely, weaving. The experience of the Madras Government in their experimental and instructional weaving station at Salem has been fortunate; and the Serampore institute should be similarly successful.

The improvements, however, in mechanical appliances for hand-loom weaving and in the organization of the trade are a separate matter and are dealt with in the separate report on industrial development.

We may now revert to the subject of the inspection of industrial schools. It has been stated above that Mr. Collin had recommended that an inspector be appointed to supervise industrial education. The subject lay fallow till 1902, when Mr. Slater of Sibpur gave illuminating suggestions for its cultivation. After describing the schools then in existence, he desired that European and Eurasian experts be appointed in the various industries which it was proposed to foster; that these experts should be inspectors of local industries; and that the principal of the central technical college should be *ex-officio* director of technical and industrial schools. The Government of India in their letter of 30th September 1903 suggested towards the end that there should be an inspector of such half-time industrial schools as might be created; and in reply the Bengal Government in their letter of the 8th June 1904 proposed in connection with the weaving scheme described above, that there should be one expert inspector of weaving in Bengal, who should also be the principal of the Central Weaving School at Serampore. This proposal, however, did not touch the matter of the inspection and control of technical and industrial schools in the province. The opinion of all observers had been that these schools were found wanting in methods, objects and in teachers. The rather heterogeneous collection of existing industrial schools was reviewed again in 1904, this time by Mr. Heaton, the Principal of Sibpur College, and by Mr. Pedler, the Director of Public Instruction. Mr. Heaton's review was practically an indictment of the existing system. In November 1905, the Bengal Government considered that the industrial education which was under the Education Department should be placed under the Director of Agriculture, with the object of making enquires, visiting industrial schools, collecting information and submitting proposals on the lines upon which industrial education should be developed. Much information was collated by Mr. Oldham, who was the Director of Agriculture at the time, in the course of his tours; but the advantage of this was lost when he left the department on transfer. This is another argument in favour of a whole-time officer in order to ensure continuity. At the end of 1906 the Bengal Government considered that in view of the increasing interest in the subject and the potential results of a sound system, a more effective agency should be created for the direction and supervision of technical and industrial education. It was held that a special officer was required for the province on the analogy of the appointments of an Inspector of Technical Schools in the Bombay Presidency and of a Director of Industrial and Technical Enquiries, who was also to be Inspector of Technical Schools in the Madras Presidency. The views of Mr. Heaton of Sibpur, who was consulted, were:—the maintenance of the paramountcy of Sibpur College; the appointment of the Principal of Sibpur as Superintendent of Industrial and Technical Education for the modern Bengal province, and the appointment of an inspecting officer under him, to be styled the Inspector of Industrial and Technical Education. In the opinion, however, of the Director of Public Instruction, Mr. Earle, what was required was a recruitment from England, preferably from one of the provincial technical colleges, of an officer who would be responsible for inspecting all technical and industrial institutions in the province, and who at the same time would promote the industrial development of the country by making investigations regarding the larger industries, especially the leather, glass and brass industries. Such an officer was to be styled Superintendent of Industries and Inspector of Technical and Industrial Institutions, and was to be attached for the present to the office of the Director of Public Instruction. This view was accepted by the Bengal Government, and the appointment was recommended to Government of India in August 1907. Two portions of the letter of the Bengal Government may be quoted here:—
 “All branches of professional training should finally, in Mr. Earle's opinion, be under the guidance of a co-ordinating authority or department not connected in any way with education, but concerned with the industrial development of the country.” The other was:—
 “The present time is particularly favourable for the development of local industries. His Honour is convinced that only by means of the whole-time service of an expert offices

Proposed ap-
 pointment of
 Inspector of Tech-
 nical and Indus-
 trial Schools.

can the present interest in the question be turned to practical and profitable account." In November 1907 the Government of India stated in reply that there were objections to the recruitment of such an officer from England, and suggested that certain conditions should be fulfilled before the proposal could be submitted to the Secretary of State. The matter is still (April 1908) under correspondence. I may place on record here that my enquiries have shown that in this province what the capitalists, who are anxious to embark on industrial enterprise, most desire is disinterested advice, and this can best be obtained from a Government officer who possesses a scientific training, direct experience of the country, enthusiasm and business capacity and the primary object of whose appointment is to advise and assist such capitalists in industrial enterprise. If it be said that it is difficult to obtain an officer with the qualifications named, then the emoluments should be made sufficiently attractive. I hold strongly that one practical enthusiast who would inspire confidence is more required at this present juncture than any departmental scheme, in order to break down the dead wall of want of enterprise, absence of mutual trust and lack of business capacity, which are the real obstacles to indigenous industrial development in the province.

Proposed classes
in industrial
chemistry at
Sibpur College.

Besides proposals under the heads of Weaving and Industrial Schools, the Bengal Government have considered within recent years the proposal for the teaching of chemistry as applied to manufactures. In 1905-06, the Association for the Advancement of Scientific and Industrial Education of Indians submitted proposals for the establishment of a technical college in Bengal. The model held up for imitation was the Victoria Jubilee Institute in Bombay. This, it should be remembered, is not a Government but an aided institution. A conference under the presidentship of Mr. Oldham, C.S., who was then Director of Agriculture, was held to consider how far the existing College of Civil Engineering at Sibpur might be developed so as to include the departments which it was proposed should be opened. It was recognized that the college already dealt with subjects outside the scope of the title of the college, such as sanitary science, agricultural science, and mining. The subjects proposed for the new technical college were nine in number—mechanical engineering, electrical engineering, spinning and weaving, sheet metal and enamel work, industrial chemistry, dyeing and paints, ceramics, silk, mining and metallurgy. The first, second and ninth subjects were found to be already in the Sibpur curriculum. The third was to be taken up at the proposed weaving institute at Serampore, and the seventh was left to private enterprise. The proposals which Mr. Oldham submitted were:—

- (1) that classes be opened, when the Engineering College is transferred from the site at Sibpur to Ranchi, in sheet metal, enamel and tinsmith's work and in industrial and technological chemistry in connection with dyeing, paint manufacture, leather work and assaying;
- (2) that research work in lac be undertaken;
- (3) that Government grants be offered to persons engaged in the glass industry to proceed abroad for study, and that assistance be given to them in finding a market for their goods; and
- (4) that the Bengal Silk Committee be consulted regarding the opening of a technical school in connection with the silk industry.

Now the college at Sibpur has not yet been removed to Ranchi, although it has been decided that this be done. In the meantime proposals for the tentative opening at Sibpur of classes in technological chemistry, and in dyeing and the chemistry of dyeing coupled with the plan that instruction should be given in the scientific principles underlying the chief industries of the country, and that facilities be given in research work, were submitted to the Government of India in November 1906. This scheme has also been returned by the Government of India in December 1907, in this instance on the basis of the criticism of the Secretary of State that there was an absence of any information regarding the demand in India for men with the training which the proposed classes would afford. The subject is also still under discussion, but the

following points, which have been suggested to me by competent observers, may be noted in connection with that criticism:—

- (1) The whole trend at present is to indigenous industrial development; and it is of importance that those concerns should be started which are capable of being worked in small factories on a small capital.
- (2) This scheme was the outcome of an appeal from representative Indian gentlemen.
- (3) Similar classes have been started by private enterprise at the Bengal Technical Institute in Calcutta.
- (4) Four batches of Indians have been sent abroad under the auspices of the association which submitted the appeal named above, and seventeen of them have taken up chemistry as applied to manufactures.
- (5) Applications have been made to Sibpur College for chemists, who are required for manufacturing concerns.

On the whole then the principle which underlies the action of the Bengal Government within the last twenty years is that technical education is to be improved by the increased scope and efficiency of central institutions,—a principle which the Bombay Government formally recognized in 1906 and which the Bengal Government announced in 1891. The Madras Government have formally adopted the policy, in Sir Arthur Lawley's words, "that Government should rather develop industries in the first instance precedent to the introduction of schools." Mr. Heaton of Sibpur pointed out in 1904 that the history of industrial schools in other countries shows that they follow the establishment of an industry, but they do not precede it. This too has been kept in view in the proposal which the Bengal Government have made in applying for whole-time expert officers to encourage industries. The Government of the Central Provinces have recently put in a plea for caution and circumspection. The Chief Commissioner, Mr. Craddock, has stated that the real requirement for the development of industries is not a system of teaching existing methods, but a system of teaching improved methods, after it has been ascertained what industries seem to be capable of improvement, to those who are likely to carry on these industries. This, I submit, is the principle underlying the proposal for the Central Weaving Institute at Serampore which, as has been stated above, has been accepted. The policy of the Government of the United Provinces is an advanced policy—the establishment of large central institutions officered by the best teaching talent which can be obtained. Sir John Hewett has stated that his personal inclination is in favour of the training of foremen in theory in the first instance, and afterwards in practical work in the factory and mill. This, it should be noted, is the principle of the organization at Sibpur.

The policy of the Bengal Government.

The circumstances of the provinces are not the same. The United Provinces have a natural protective barrier of seven to eight hundred miles of railway freight charges from the seaboard, which gives a bias in favour of manufacture as opposed to commerce. Madras again has very few indigenous manufactures of its own; and the action of its Government in pioneering industries is really not in competition with any existing local enterprise. And finally as regards Bengal, manufactures have generally to compete with imports. The principle accepted at the Simla conference applies especially here, namely, that the supply or development of the existing Indian markets, so far as this is likely to result from technical instruction, is of superior importance to the creation of new export trades.

Circumstances of the Bengal Province.

CHAPTER II.

INSTITUTIONS FOR TECHNICAL INSTRUCTION.

SECTION I.—SIBPUR COLLEGE AND ITS SCHEME OF AFFILIATED SCHOOLS.

An engineering college was established in Calcutta in the year 1856 by the Public Works Department with the object of training engineers and subordinates for

Standards of instruction.

their service. In 1864 it was placed under the charge of the Education Department and transferred to the Presidency College, of which it became an important department. In 1880 the college was removed to the site of the old Bishop's College at Sibpur in Howrah district, where the Public Works Department were building large workshops, and it was there established as a civil engineering college.

There are two standards of education at the college:—

- (1) Engineering standard for the training of engineers for the Public Works Department and other Government bodies.
- (2) The lower or apprentice standard for training men to fill subordinate ranks of the Public Works Department and to carry out similar duties under public or private bodies.

Reason for the development.

It must be remembered that the manner in which the Sibpur College and its connected institutions were organized is due to the fact that it gave an opportunity to students of finding employment in the Public Works Department. The upper subordinate establishment of the Public Works Department contains overseers, supervisors and sub-engineers. These appointments range from Rs. 60 a month to Rs. 500 a month. The lower subordinate establishment are generally called sub-overseers. The pay does not exceed Rs. 40 a month. The overseer and sub-overseer standards may thus be understood with reference to the appointments bearing these names in the Public Works Department. The improvements in the subjects of instruction have already been detailed in the first chapter. The course of instruction for the engineering standard has always been maintained at a high level. Great prominence has been given to practical training in the workshops and in the science laboratories. The course extends over five years, in the last year of which the work is entirely practical. The standard of admission has been since 1892 that of the First Arts, and since 1895 many graduates have joined. The great attraction is the comparative certainty of subsequent official employment. Eight out of every ten students of the Engineer Department find employment under Government, and only one out of ten finds private employment. Mr. Heaton, the Principal, has remarked that this discloses in a startling manner the state of arrested industrial development in Bengal. It is proposed under the new regulations of the Calcutta University that the examination in engineering will take place at the end of the second instead of the third year of the course; and that thereafter the students will have a choice in three branches, namely, civil engineering, mechanical and electrical engineering, and mining.

The course.

higher

Mr. Heaton has proposed to enlarge the scope of the Engineering Department by admitting special persons who have no desire for Government posts, but who desire a superior training in engineering. He thinks that on receiving first class instruction such students of the college will contribute largely to the commercial development of the province. During the fifth year of the course students are placed for their practical training, as far as possible, according to their choice, under the Public Works Department, under the Sanitary Engineer, on a selected railway or on a selected mine or at the college itself. The chief prize of the college is the appointment of an assistant engineer in the Public Works Department which is open for competition amongst those who were being sent under that department for training. There is also a demand by municipalities for those who have been trained under the sanitary engineer. The demand for qualified electricians is increasing, and coal mining requires men who combine practical with theoretical training.

The course.

lower

The lower standard or apprentice standard consists of three stages:—the sub-overseer course for two years, the overseer course for one year and a half, and a course of practical training extending over another year and a half. An examination is held at the end of the sub-overseer course, and the successful candidate receives a certificate showing that he possesses the qualifications required for a sub-overseer in the Public Works Department. Success at the examination held at the end of the second stage entitles the student to a third grade overseer's certificate. After the completion of the course of practical training, an apprentice would be entitled to a certificate of foreman

mechanic and sub-engineer or of a simple foreman mechanic according to the percentage of marks which he may obtain. The practical training throughout the course is considered by foreign critics to be the best that can be devised; and it is solely owing to the equipment of the Sibpur workshops that the practical instruction can be imparted. For the first year the student attends the carpentry shop; in the second, the smith shop; in the third, the pattern-making and foundry shop; in the fourth year, the fitting shop. The fifth year is devoted to all-round practical training. During 1907 the numbers under training in these two departments were 94 in the Engineering Department and 233 in the Apprentice Department. It is a comment on the backwardness of the Muhammadan community that there were only five Muhammadans in these two departments.

The affiliation of certain technical schools with Sibpur College has already been mentioned in the previous chapter. The following schools are at present affiliated:—
 Bihar School of Engineering, Victoria School, Kurseong, Ranchi Industrial School, all under Government; and the Burdwan and Midnapore Technical Schools under their respective District Boards. It is proposed to include also in the scheme the Orissa School of Engineering which is to be formed out of the Cuttack Survey School; and finally St. Andrew's Colonial Homes, Kalimpong. It is intended by Mr. Heaton to re-organize the Apprentice Department also. There will be a junior apprentice class for the first two years, and thereafter a senior apprentice class, to whom he would offer a choice of taking specialised courses, namely, a civil engineering course, a mechanical and electrical engineering course, or a mining engineering course. The first course would be for the training of overseers for the Public Works Department, District Boards and municipalities. As has already been explained, it is open for students of the affiliated schools to appear for the sub-overseership examination at Sibpur, and if successful to proceed to the overseer class there. Pupils who would pass what is known as the B Final examination at certain district schools may enter the second-year class of the sub-overseer course at Sibpur. This scheme applies to the Patna Collegiate School in conjunction with the Bihar School of Engineering the Ranchi Zilla School working with the Ranchi Industrial School; and the Midnapore Zilla School working with the Midnapore Technical School. Mr. Hornell in his quinquennial review of the progress of education in Bengal to 1907, states that the aim of these B classes is general, in so far as their inauguration represents an attempt to give a more practical turn to school education; and that it is specialised in so far as these classes were deliberately intended to impart a preliminary training suitable for a specific profession; but that at any rate the B class experiment has hitherto proved a failure. Since the system was inaugurated, only one-third of the candidates has qualified in the final examination. The door was to be open here for the youth of the country who desire to prepare themselves for an industrial career. The misfortune is that at the present time both in the district schools and in the technical schools those enter who do not desire primarily a mechanical training but who wish a short cut (not being themselves sufficiently quick-witted for a literary career) to a qualification which will give them dignified service under some public body. It should be added that B classes were started at the Bhagalpur Zilla School in 1906, but there the mechanical appliances are of the most meagre description, and, although the applications for admission have become numerous, yet it is a curious fact that many pupils are coming from other districts where there are already opportunities for better technical instruction.

It is not out of place to add here that it is practically settled that in future in order to maintain a uniform standard for sub-overseers and overseers and to take away every suspicion of unfairness, examinations will be held for the two provinces by a board representative of the Public Works Department in both provinces, of the Sibpur College and of the Engineering Schools of Dacca and Bihar. The Principal of Sibpur will be a permanent member and the Secretary of this Board.

A special course for electrical training was started at Sibpur in 1906, and the development of this branch of instruction was due to an electric installation for motive

Affiliated schools.

Sub-overseer classes.

B classes.

Joint examination board for the two Bengals.

Electrical training.

power. About ten of the best apprentices who had passed the overseer course were placed for their special course of practical instruction at the college, where they were entrusted with the charge of the workshops and the electric light installation. It is stated that this training is prized because it leads to well-paid appointments.

Mining Engin-
eering.

In 1904 the Government of India requested the Bengal Government to prepare a scheme for instruction in mining engineering. It was decided not to create a separate school of mining in the mining districts, but to make use of the existing facilities for giving the major part of the instruction at the Civil Engineering College. A mining class has now been formed. A student who has passed the sub-overseer standard may join the class for a specialised course of two years. Six weeks of each year are also to be spent in a mining district, in the study of mining surveying and in practical training. Diplomas are awarded. Under the Indian Mining Act of 1901 certificates of competency are required. The possession of the diploma in mining engineering can exempt the possessor with the permission of the Board of Examiners from a term of two years out of the period of five years' practical experience which is required for a first class certificate. In addition, under the auspices of the college, a scheme has been inaugurated for providing instruction in mining for assistants and others employed in the Bengal colliery districts; and a special Mining Advisory Board has been attached to the college. Since November 1906 there has been a regular course of instruction at the centres, Santoria and Charanpur in the Raniganj coal district, and Jherria and Sijua in the Jherria district. Both from the reports and from my personal enquiries I gather that the scheme has been most successful, and that local committees have been of great assistance in arranging sites and accommodation for the lectures.

This instruction in mining has required the addition of two expert Europeans to the staff—one for the professorship at Sibpur and the other for the instructorship in mining for the district lectures.

Motor driving.

An extension of the scheme is desirable. Continuation schools for teaching arithmetic, physics, chemistry and mechanics are recommended by the instructor, Mr. Griffiths, for Dhanbaid and Asansol, and also evening classes at Ekra, Raniganj, Kalipahari, Barakur and Jamuni.

A further development has been in the establishment of the training of motor-driver mechanics. The course of instruction includes both maintenance and driving. There is a great and increasing demand for competent mechanics who can drive. The beginning was made by taking over from the Public Works Department a second-hand car which had to be practically reconstructed.

It can, therefore, be maintained with justification that the Sibpur College curriculum has kept abreast of the requirements of the time, and that the principle laid down in the Government resolution of 1891 on Mr. Collin's report has been consistently followed, though not always consciously.

SECTION II.—BIHAR SCHOOL OF ENGINEERING AND THE CUTTACK SURVEY SCHOOL.

Origin and pro-
gress of the
School for Bihar
districts.

The Bihar School of Engineering is a handsome building on semi-oriental lines, and with its hostels and workshops forms a striking block on the bank of the Ganges at Bankipore. In 1890 the Patna Survey School was transferred from the Patna College buildings to new premises made over to it by the committee of the Bihar Industrial School Fund, a fund which originated from the balance of the fund raised in Bihar in 1877 for the reception of the Prince of Wales, the present King. In 1893 the Principal obtained particulars of the occupation of more than half of the 75-students: they were found to be employed as overseers, sub-overseers, draftsmen, surveyors and survey teachers both in public and private employment. By 1894 the school was being gradually transformed into one in which all the instruction was given in English. In 1896 the Survey School was amalgamated with the Bihar Industrial School and the new institution at Bankipore was entitled the "Bihar School of Engineering." The course provided complete instruction for sub-overseers. The

next improvements were the appointment of an European foreman mechanic for the workshops in 1899, and the appointment of a European Head-master under the sanction of the Secretary of State in 1890. In the latter year the foundation for instruction up to the overseer standard was made. In 1904 a hostel was erected; and in the following year it was found that this had developed in a marked degree the corporate and social life amongst the students,—setting an example which many colleges in Bengal might follow with great advantage. The curriculum now follows the same ground as that covered by the four years' course of the Apprentice Department of the Sibpur College; and though it has not yet any formal arrangements for conducting the practical training which completes the Apprentice course at Sibpur, nevertheless Mr. Walford, the present Head-master, has been able to arrange for practical training under Executive and District Engineers in Bihar. There is also a one-year class for the training of Amins. The electric light plant has made it possible to give a practical training in electricians' work. Mr. Walford has informed me that the school has acquired a reputation in all Hindi-speaking districts and that enquiries come to him from some Native States and from the Central Provinces.

There has been on more than one occasion a request from the leading residents of Patna that the school be raised to the status of a college. I am not, however, sure that it is on their part quite understood or known what the establishment of a college would entail. The reply of the Bengal Government has been that for the present it is not possible to have more than one civil engineering college thoroughly equipped both in plant and establishment. The number of possible Bihar candidates for Sibpur is still too small to justify the extra staff and expenditure. The history of the school shows, however, a steady advancement, and it is natural that Biharis should desire the prestige which would attach to the establishment of a college. It is an undoubted fact that Biharis at present are unwilling to proceed to the central college at Sibpur situated as it is in a Bengali district. When the Sibpur College has been transferred to Ranchi, a district which has more in common with the Bihar districts, the unwillingness of the Biharis may possibly disappear. But at the same time it is quite feasible that a system of practical training for one year and a half may be formally organised, similar to that of Sibpur; and this is the first natural step in the future progress of the institution. In this way the institution would be able to give a certificate up to the foreman mechanic and sub-engineer standard. If it is possible to generalise, it would appear that the Biharis have a natural aptitude for practical engineering. Professor D. N. Mallik of the Patna College, who has recently visited technical institutions in England, informs me that the Brighton Technical School in its technical branches furnishes an ideal to which the Bihar school should work up in time.

While we can record nothing but success and progress in the scheme for technical instruction at Bankipore, yet it must be admitted that the arrangements for training artisans have been an entire failure, just as at Sibpur, and that the B classes are nothing but a farce. I doubt very much whether it is sound to arrange at the same institution for the instruction of overseers who come from the middle class and for the instruction of artisans. I shall deal with this more fully in connection with the chapter on industrial schools.

The Cuttack Survey School is the only school of its kind in the province. The curriculum includes surveying, road-making and smithwork, but not carpentry or science. Mr. Hornell has explained in his Quinquennial Review of the Progress of Education in Bengal, 1902—1907, that the school teaches up to the sub-overseer standard in the sense that students who pass the final examination are eligible for sub-overseerships in the Public Works Department, but that the school does not yet teach the full sub-overseer course. There is also a class for Amins. The proportion of Uriyas continue to be two out of three students. Practically no change has been made since 1890. The obvious form of advancement is to make use of the existing canal workshops of the Public Works Department at Cuttack and to raise the instruction to the sub-overseer standard. It has been settled that this be done. The school will then be called the Orissa School

School for the Orissa districts.

of Engineering, and in all probability the supply will not be in excess of the demand for qualified subordinates in the Uriya-speaking tracts.

SECTION III.—TECHNICAL SCHOOLS.

BURDWAN TECHNICAL SCHOOL.

Burdwan.

The Burdwan Technical School is administered by the District Board. The subjects taught are carpentry and smithery. The average attendance is 47; more than half are Brahmans and Kayasths, and more than half are boys from districts other than Burdwan district. The course is a sub-overseer course leading up to the overseer standard at Sibpur. During the last three years 25 pupils have been sent up, of whom 17 passed the sub-overseership examination. The workshops I found to be cramped. A local committee takes considerable interest in the school. While this school does not turn out men who are likely to be mechanical engineers, but men who desire to be sub-overseers or possibly overseers, it should nevertheless be continued in its present form as a feeder to Sibpur College, for the demand for well-trained sub-overseers and overseers is not likely to diminish. I advise the committee, however, to refrain from slackening the strictness of the standard of general education required from would-be students.

MIDNAPORE-MAISADAL TECHNICAL SCHOOL.

Midnapore.

This school teaches up to the sub-overseer standard. It is named after a well-known landed proprietor in Midnapore, who was a generous contributor to the fund by which the school was started about twenty years ago. In the first year of the sub-overseership course the work is carpentry, and the second, smithery. The Headmaster is a passed foreman mechanic from Sibpur. As at Burdwan practically all the pupils desire to go in for service. As at Burdwan the accommodation is scanty.

The pupils live in a hostel about quarter of a mile away from the school. What is required is more money and more organized management. In 1905 the condition of affairs was so bad that the Principal at Sibpur recommended that the privilege of affiliation should be withdrawn. A strong committee has, however, been since appointed, in which are included the District Engineer, the Executive Engineer of the Public Works Department and the Chief Mechanical Engineer of the Bengal-Nagpur Railway, the headquarters of which are at Kharagpur close to Midnapore. The school does not, and is not likely to, turn out men who will become practical mechanics. I recommend that on no account should a mistaken kindness be exercised in admitting students who have not passed the Entrance Examination. The system of apprenticeships for the Kharagpur Railway workshops gives an opening to any passed pupil who wishes to obtain practical and remunerative employment, but every applicant must remember that there is far more drudgery to be undergone in a commercial workshop than in the workshop attached to an academical institution. Government has made a grant of Rs. 5,000 for the erection of a new school building.

BENGAL TECHNICAL INSTITUTE.

Calcutta.

This institute was founded by a society called "The Society for the Promotion of Technical Education in Bengal" which was registered under Act XXI of 1860. It was started in August 1906 at 92, Upper Circular Road, where large workshops have been erected—mechanical workshops, smithery, electrical engineering shed, and a carpentry shed. There are also arrangements for teaching drawing, chemistry and dyeing. There are moderately well-equipped physical laboratories. The institute was started under the revulsion which followed the partition of Bengal, but the system of instruction has fortunately been directed on sound lines. For funds the committee are principally indebted to Mr. Palit, Barrister-at-Law, and have the advantage of the assistance of two master minds in the mechanical and educational world of Calcutta. All the courses have not yet been started. The secondary course, as it is called, is for three years, though, it is hoped, it will be extended to four years.

It is proposed to have courses in mechanical engineering, electrical engineering, sheet metallurgy, technological chemistry, commercial course and economic geology. This is an ambitious syllabus, but for the present complete arrangements have only been made in the mechanical engineering course. The governing body propose that the technological chemistry course will deal with the following subjects:—geology, ceramics, tanning, paint and varnish-making, dyeing and bleaching, soap, candle, oil and perfume-making, and the preparation of matches. On the engineering side the instruction will be similar to that given at Sibpur. But there is here an excellent opportunity for young men to become foreman mechanics in reality as well as in name, and to take advantage of the demand which the anticipated industrial activity will promote. The course for industrial chemistry is still in its infancy, but it has anticipated the proposals for the establishment of similar classes in Sibpur, which classes, I hope, may be the nucleus of a Government technical institute in Calcutta, after the engineering branches of Sibpur College have been removed to Ranchi. I advise the governing body of the Bengal Technical Institute to place it on a sound financial footing, and to insist that only those youths who have received a sound general education should be allowed to join its classes. It is quite a mistake to think that only the dullards, who have no chance of success in the usual literary careers, should take up a specialised branch of technical study. John Stuart Mill said in 1866:—"Special knowledge is sought after only by a certain number of young men, and it is only when they have completed their education, properly so called, that they should be permitted to enter upon it. The good or bad use which they will make of each knowledge will depend chiefly on their mental character, and character can be formed only by general education."

TECHNICAL DEPARTMENT OF THE BENGAL NATIONAL COLLEGE.

The Bengal National College has been inaugurated under the auspices of the National Council of Education, Bengal. It has been established at 166, Bowbazar Street, since July 1907. It has a secondary technical course extending over three years. A workshop has been erected with machine plant to the value of Rs. 11,000. The syllabus includes a general course of instruction in physics, chemistry, mathematics, drawing, and a special course in machine drawing, mechanics, machinery tools, pattern making, brass modelling, smithery, turning and fitting. The proposed college course on the technical side, which is to follow, is proposed to be subdivided into (a) agriculture, including forestry; (b) manufacture, including mining; and (c) commerce. The scheme of education has been thought out with a view to help the students in "finding new and independent careers in life in the departments of arts and industry." The instruction imparted is to be theoretical, experimental and manufactural. In January 1908 there was an exhibition of the articles turned out in the workshops and laboratories during the year 1907, and Professor Bruhl from Sibpur was able to say that the articles were not only of solid construction, but that they showed in general that finish which is proper to all first class work, and that some of the models indicated the exercise of great care and patience. This institution like the Bengal Technical Institute was founded in a spirit of independence, and if that spirit will train up youths to aspire, not to seek dignified and somewhat leisurely careers, but to become capable foremen and masters in the indigenous industrial activity which may yet come in this province, the institution will serve a useful purpose. At the present moment, apart from the advice of Indian publicists, the better class youths have been forced, in spite of their traditional prejudices against manual labour, into industrial lines on account of the competition which has closed up the avenues hitherto open to them in literary careers. This institution is also making manual instruction in some form or other a part of a general liberal education, not necessarily with the intention that all the pupils should take to mechanical employment.

CALCUTTA TECHNICAL SCHOOL.

In 1900 Mr. Finlay, the Chief Engineer of the East Indian Railway, with the assistance of some of the leading engineering firms, started a night school with

continuation classes for giving instruction to apprentices who are working in large workshops in Howrah. As it was found that a large number of the apprentices lived in Calcutta, the site was changed to the Doveton College, Calcutta, where classes are held twice a week. The staff consists of three highly qualified European lecturers. The school is fulfilling a useful purpose, that is, supplementing daily practice by theoretical instruction. The accommodation is not suitable and the school is ill-equipped with apparatus. If the institution were improved in these respects, for which improvement I have separately submitted recommendations, there should be no reason why a larger number of Indian apprentices should not take advantage of the school.

RAILWAY TECHNICAL INSTITUTION.

This was started in 1908 at 83, Dhurumtola, Calcutta, to provide a means for acquiring some practical training in the various methods employed in the actual working of railways. Practical training is to be given in telegraphy, signalling, goods and coaching. There is no other such private institution in Bengal. The school is well equipped for teaching practical signalling and practical telegraphy. It has already over twenty students—all natives of Bengal—in the telegraph class. A student can become adept in two months, working for six hours a day, at a fee of Rs. 10 a month. The school deserves encouragement, if it can show that its students are obtaining employment. It has been started on sound lines.

VICTORIA SCHOOL, KURSEONG.

Darjeeling District.

A sub-overseer class for Europeans and Eurasians was opened in 1904 in connexion with the Victoria School, Kurseong, and is affiliated with the Sibpur College. Of the eleven students since sent up for the sub-overseership examination, seven have been successful.

ST. ANDREW'S COLONIAL HOMES, KALIMPONG.

At the annual meeting in March 1908, it was announced that the affiliation with the Sibpur College had been sanctioned, and that the first batch of boys was now being prepared for the engineering curriculum.

SECTION IV.—SCHOOLS ATTACHED TO RAILWAY WORKSHOPS.

This may be considered as part of a system of continuation schools. In Chapter VIII of "Continuation Schools in England and elsewhere" edited by Professor Sadler of the University of Manchester and published at the University Press, 1907, there is a summary of the replies received from 16 railway companies and 56 other employers of labour in England regarding the facilities granted to their employees for the study of subjects dealing with their daily work. The system of requiring apprentices to attend technical schools is extending in England, and facilities in varying degrees are being given to that end. In 1890 Mr. Collin said that the apprentices at the Jamalpur workshops of the East Indian Railway were obliged to attend evening classes, not for technical instruction, but as a continuation of their general education. At that time there were no other railway night schools in the province. In 1908 we find that the technical night school at Jamalpur is giving instruction in technical subjects, such as steam-engine and machine construction, applied mechanics, algebra and mensuration. The average nightly attendance is 50. At the Kharagpur workshops of the Bengal-Nagpur Railway, attendance for apprentices at the technical night school is compulsory. The subjects are geometry, applied mechanics, algebra, mensuration, geometrical drawing and arithmetic. At the carriage and wagon workshops of the East Indian Railway at Lillooah, the technical school for apprentices gives instruction within working hours, one hour in the morning for two days a week. The subjects are arithmetic, algebra, mensuration, applied mechanics, linear drawing, projection and mechanical drawing. There is an attendance of 33 youths, of whom no fewer than 17 are Indian lads.

At the Kanchnrapara workshops on the Eastern Bengal State Railway, there is no technical school or evening class, but it is proposed that on the completion of a hostel for apprentices, which is now under construction, a night school will be held for the apprentices. At Samastipur on the Bengal and North-Western Railway, there is no night school or other means of studying machine drawing or technical subjects. There is also no drawing office here, and so a machine foreman cannot obtain any training in drawing. While, on the one hand, it is too much to expect that commercial undertakings will supply an education in advance of their requirements, yet, on the other hand, it would appear to be in the interest of the employers themselves to give to their apprentices a knowledge of the theoretical principles which underlie their practical work. This should be encouraged. The system at Lillooah is best, I think, namely, that instruction should be given within working hours, and not at night. These schools should teach theoretical work directly connected with practical work, and the minimum qualification in general education should be the Entrance Examination or its equivalent.

SECTION V.—CALCUTTA GOVERNMENT SCHOOL OF ART AND OTHER ART SCHOOLS.

CALCUTTA SCHOOL OF ART.

The School of Art was started in 1864, and until 1893, when the school was removed to the new building in the Chowringhee Road, it had been held in various houses in Bow Bazar which were in every way ill-adapted for the purposes of a school of art. In 1890 it was recorded by Mr. Collin that the Calcutta School of Art had been established partly to develop the native industries, but that it had not accomplished much for industrial art. In 1891 the Bengal Government said that it was not too much to hope that, if duly supported and encouraged, the School of Art might do for Bengal all that South Kensington had done and was doing for industries, both manufacturing and artistic, in England. This ideal has not yet been reached. In 1894 Sir Alfred Croft, who was then the Director of Public Instruction, Bengal, pointed to the popularity of the school and to the fact that there was a remunerative demand for the special skill which was then being developed in the subjects of drawing, designing, wood-engraving and modelling. (Papers relating to Maintenance of Schools of Art in India as State Institutions, Home Department serial No. 23, 1898, page 84.) Mr. A. N. Tagore, Officiating Principal of the Calcutta School of Art, in describing the progress from 1902 to 1907, considered that the School of Art had neither fulfilled the conditions of a truly industrial establishment, nor had it done much towards the improvement of the fine arts of the country. The disposal of all European pictures and the purchase of Indian art ware in 1904 marked a step towards the one ideal of forming a truly Indian art gallery; and the present intention to bring the Industrial Art section of the Indian Museum under the control of the Principal of the School of Art and the recommendation of the Conference of the Principals of Schools of Art in India held in 1905-06, to issue for the use of artisans pattern books containing typical and pure examples of traditional art are an advance towards the other ideal. At present the School of Art in Calcutta does nothing to affect indigenous industrial art outside of Calcutta: a closer touch with the best workmen in the province is required. I also think that the diploma in mechanical and architectural drawing should have a higher value than it now has with a view to remunerative employment.

The course of instruction is in two divisions—one affording a systematic instruction in drawing and design for drawing and technical art teachers, draughtsmen, artisans, art workmen and designers for art industries; and the other for those who wish to study drawing, painting and modelling with a view to become painters or sculptors. The summary on pages 88 to 90 of Mr. Hornell's Progress of Education in Bengal, 1902—1907, gives as full a summary as is necessary to understand the present position of the school. The fault of indigenous art is the slavish imitation of conventional European patterns. The remedy is not altogether in the hands of Government.

Mr. Tagore assures me that he fully agrees as to the necessity of circulating good Indian examples in art designs—the view eloquently expressed by Lord Curzon at the opening of the Art Exhibition of Delhi in 1903: “Indian art will never be revived by borrowing from foreign ideals, but only by fidelity to its own.”

PRIVATE SCHOOLS.

There are three private art schools in Calcutta—the Albert Temple of Science, started in 1875, the Indian Art School in 1895, and Jubilee Art Academy in 1897. The details will be found in Appendix II. None of these is aided by Government. They teach drawing, painting, engraving and modelling and kindred subjects, but they turn out principally artists in painting. At the first-named school I found European casts, European drawing books and European designs for painting. The managers of this school are strongly representative of the *swadeshi* movement. I have pointed out this inconsistency to the Principal of the school.

CHAPTER III.

INSTITUTIONS FOR INDUSTRIAL INSTRUCTION.

Existing defects
and lines of im-
provement.

DETAILS regarding all the technical and industrial institutions in the province will be found in Appendix II. I deal below with various types of industrial schools—in the sense of schools for the instruction of would-be artisans, most of which I have visited. Mr. Hornell has given a short account of these schools at page 109 of the Bengal Quinquennial Review, but this is based principally on departmental reports. In 1890-91 there were in the two Bengals 15 industrial institutions with 580 pupils, and after ten years in 1900-01 there were 27 such institutions, with 887 pupils. In 1906-07 there were in the Western Bengal Province 1,275 pupils in 52 institutions, of which more than half are in the Chota Nagpur Division; many of them have practically no effect on industrial development, and the people themselves do very little without assistance. So industrial education is yet in its infancy. The arguments in favour of a whole-time officer for the promotion of industries and industrial education cannot be better expressed than in the words of Mr. Hornell, at page 111 of his Review, which I reproduce in full.

“There is still apparent that lack of definiteness, both of methods and objects, that want of co-ordination with local industries or trades, and that uncertainty of initiative and support which will always prevail so long as the schools have to depend upon the volition of local bodies rather than upon any sustained policy of Government. Moreover, in the face of the great preponderance of classes teaching carpentry and smithy work, it is difficult to resist the conclusion arrived at by Sir Edward Buck as regards technical and industrial schools in India, viz., that their object appears to be to teach these subjects to boys who have no intention to become carpenters or to engage in any manual occupation whatever. It is not maintained that there are no industrial schools at which sound work is being done. It must, however, be admitted that the effect of the existing schools on the industrial development of the province is practically negligible.

“The reason for this want of progress is not far to seek. A system of industrial schools co-ordinated to the trades and industries of the province can never be created except on the initiative of a department or at least an officer whose business it is to study those industries. If any real and steady progress is to be made, there must be at least one officer possessed of the required capacity who, while it will be his business to be generally acquainted with the larger industries of the province, will be available to conduct special investigations into the conditions of any particular industry which either he or others may think it desirable to develop by some such scheme as that proposed at Serampore. Such an appointment has recently been proposed to Government, and it has been suggested that the officer to be recruited should be styled “Superintendent of Industries and Inspector of Technical and Industrial Institutions.” It is recognised that industrial development,

even in that aspect of it which is called industrial education, lies outside the proper scope of the Education Department, and even though it is proposed that the officer whose recruitment has been suggested should, to start with, work in connection with the Education Department, it is not considered that this is desirable as a permanent arrangement. On the contrary it is hoped that this appointment will lead in time to the creation of a Department of Industry to the control of which all technical and industrial institutions will be transferred."

SECTION I.—MANAGED BY GOVERNMENT.

Mr. Collin on page 21 of the 1890 report made suggestions for industrial schools. He made suggestions for Ranchi, Burdwan and Midnapore; and for Rajshahi and Chittagong, now in the Eastern Province. At Ranchi there was a private Missionary school started in 1870. It was reorganized in 1890-91, and taken over by Government in 1894. Had the school not arisen in this way, Ranchi would have been the most unpromising centre for Government to institute an industrial school; for until lately it was remote from all industrial centres. This school has a certain amount of antique machine plant, sent from Sibpur in 1901; it has also a carpenter's shop; and the course includes cane-work and carriage painting. The instruction given here is for sub-overseers, the B' classes and for artisans. The sub-overseer class should disappear when the Engineering College is removed from Sibpur to Ranchi. The B classes for the same reason should disappear: for the object of the B class is to provide an easy up gradient to the Sibpur curriculum. Strangers came to Ranchi attracted by easy conditions and a good climate. The artisan classes are for blacksmithery, carpentry, cane-work and carriage painting. Instruction is also given in reading, writing and arithmetic. The Munda boys who fill the school are, I am informed, relaxing their traditional repugnance to metal work. There are now practical engineers on the committee, representing the District, the Public Works Department and the Bengal-Nagpur Railway, and I trust that the artisan classes, which represent 60 out of 82 pupils, will be strongly developed. In fact, the school should be primarily an industrial school. A good fitter on Rs. 70 is required for the blacksmith's shop. More room for the teaching of carpentry is required. Mensuration and mechanical drawing should be taught to all boys. Every endeavour should be made to link up the industrial school with the Bengal-Nagpur Railway workshops at Kharagpur and Adra, and to give the boys opportunities for remunerative employment. The school must also act as a Normal Training school for supplying teachers to the local industrial schools in the Chota Nagpur Division. In 1906-07 six from the Carpenters' Department, and one from the Blacksmith's Department passed the qualifying test, and are now earning a livelihood in Ranchi district. There is a further opening in the training of the boys as motor-car *mistris*. There is, and will be a local demand for youths who, while not fully trained mechanics, have the qualification of a "cleaner" in a locomotive running shed. This is the principle followed by Mr. Chatterton in Madras in training youths for the maintenance of the oil-engines which he is distributing throughout that Presidency.

The artisan classes at Bankipore and Sibpur come under this head. They are failure at Bankipore, and declining at Sibpur.

SECTION II.—INDUSTRIAL SCHOOLS CONNECTED WITH COMMERCIAL WORKSHOPS.

The best school in the province is that of Beniadih attached to the workshops of the East Indian Railway Company's collieries at Giridih. Formerly the lower primary standard was the qualification for admission, but this is being raised to the upper primary standard. The Company are primarily concerned with recruiting youngsters who will in time become competent journeymen on the railway staff. The boys from the beginning receive a wage of some kind. A Government grant was allotted; but it was not enough to obtain the stamp of teacher required. A teacher has now been obtained from the Victoria Jubilee Technical Institute in Bombay. He teaches

drawing and mensuration. Since 1904-05, no English has been taught. For three fourths of the working hours of the day, the boys have practical training in the workshop under European supervision. In school hours they receive instruction in simple mechanics from one of the Assistant Managers. The school is visited by educational officers: the remarks of Mr. Stark, the Inspector of Schools, are encouraging and friendly, but the Sub-Inspector and Deputy Inspector do not appear to realize that the class for instruction is an appanage of the workshop; and thus they misapprehend the object in view.

At Samastipur an artisan primary school has been started by the District Board of Darbhanga in conjunction with the Locomotive workshops of the Bengal and North-Western Railway. Here the case is different. The pupils are outside boys of artisan castes who attend a primary school, and who receive practical instruction for half the day in the workshop. It is an approximation to the kind of school suggested in the Government of India letter of 30th September 1903:—(1) "Keeping up and developing a boy's inherited manual skill; (2) giving him a general education which will enlarge his prospects as a craftsman, while preventing him from falling in a clerical groove"; but the practical work was proposed to be "working for half the day; as registered and supervised apprentices under approved artisans." This school is not, however, quite satisfactory; and will not be satisfactory as long as the primary education is considered the more important. A competent teacher is required.

More than thirty years ago at the Dehri-on-Sone Canal workshops, a class for instruction for the young employees was started by the Superintendent; but in time the original idea that it was to be subordinate to the workshop was overlooked. There is a village school now, but it is a regular school under the Educational Department.

I hold strongly that as far as possible industrial education should be given in a commercial atmosphere: that where the school is in commercial surroundings, competent teachers are usually available and a future livelihood for the artisan is open; and that in Bengal more practical effect should be given to the counsels in the Government of India letter of 1903, paragraph 10, which affirms that where there are organization and capital, there must also be the intelligence to appreciate the value of properly trained workers. But this, as will appear from the context, was intended rather for the training of the foreman than for the training of the journeyman.

The State Railway and Canal workshops provide an opportunity for the training of the would-be journeyman. I shall enlarge on this later.

SECTION III.—INDUSTRIAL SCHOOLS IN CONNECTION WITH MISSIONS.

Much good industrial work is being done in the Missionary industrial schools. They have the advantage of European control, usually enthusiastic and frequently practical. Yet even in these schools the fact is not kept sufficiently in view that the teaching which is given is meant to enable the pupils to earn a livelihood, and that the test of their efficiency is whether old pupils are actually earning their livelihood at the craft which has been taught to them. I give short notes on some of the schools—

London Mission Society at Kaurapukkur, 24-Parganas District.—Carpentry and carpet-making are taught; but rather as a training for hand and eye than as a form of industrial education. There is, moreover, no local demand for either craft. The teacher in carpentry is a skilled artisan from a Calcutta shop

Oxford Mission at Ballyganj, Calcutta.—The system is to give manual instruction to all boys up to twelve years of age. Above that age the less clever boys stick to the industrial classes. It is unfortunate that only one in five continues in industrial work after leaving the school; half of the boys who leave go back to cultivation. Still the fault is not with the teaching which is good. Carpentry, carving and viceman's work are taught. There is a good demand for the carpentry.

Church Missionary Society at Hatchapra, Nadia District.—This was started under a mechanical genius, Mr. Blackburn, and continued under Mr. Kamcke. The school has now an engine and some sawing and planing plant. The teaching is good and sound, the intention being that the boys shall earn their living in industrial lines. The school has the local advantage that it is linked up with the Eastern Bengal State Railway workshops at Kanchrapara, and the Nadia District Board helps with scholarships some pupils who go there.

— *Wesleyan Mission at Bankura, Bankura District.*—An attempt is made to attract some of the clever boys away from the literary side. Carpentry, cane-work and boot-making are taught. The carpentry is good. Seven boys have obtained employment in the Adra workshops of the Bengal-Nagpur Railway. I have suggested that there should be a hostel for the boys either at the Kharagpur or the Adra workshops.

American Free Baptist Mission at Balasore and at Santipur, Balasore District.—The work at Balasore is sound: the boys are taught to be artisans, in carpentry, book-binding and shoe-making and the like. The school deserves some Government assistance.

The school at Santipur is doing good work in weaving, carpentry, mat-making and rope-making: it is subsidised by Government.

Society for the Propagation of the Gospel Mission School at Charbassa, Singhbhum District.—The Mission has put considerable stress on industrial teaching; and much good work in carpentry has been turned out. Instruction is also given in carving, in stone-work and in weaving.

SECTION IV.—INDUSTRIAL SCHOOL CONNECTED WITH AND AIDED BY DISTRICT BOARDS.

Khulna District.—The Coronation Technical School is the result of a compromise between the views of those who wished instruction to be given in survey to youths of the middle class, and those who wished instruction to be given to the sons of artisans. There is an Amin class for the former, and instruction in carpentry for the latter. This is a good type of an artisan school, but the boys should be taught to understand and make simple sketches and work for plans. B classes have lately been started here; but I see no good in them.

Saran District.—There are three Dome schools, but these are not very efficient. They are special schools started for the purpose of keeping Dome boys out of mischief rather than with the hope of teaching them remunerative employment. If it were possible, better teachers should be obtained.

Hazaribagh District.—Through the efforts of Mr. Radice, the Deputy Commissioner, 18 half-primary, half-industrial schools have been started on the lines of the Indian Government proposals of 1903. The scheme is to start a class of practical instruction under a competent artisan in conjunction with a primary school, the teacher in which is expected to teach geometrical drawing in addition to the three R's. The subjects of practical instruction are smithery, carpentry, weaving and pottery. A beginning has been made, but much has still to be done. Mr. Radice would be the first to admit that all the schools are not equally successful. Everything depends on the teachers. If he is above the average, and boys will attend both the primary school and his practical school, the boys will improve as craftsmen. But as the schools are subsidised by the District Board, there is every temptation for pupils to join who desire only the general education; and I found at one school well-dressed sons of Baniyas who had no industrial ambitions at all. On the other hand at Palawal, I saw that the teacher was teaching practical work. It should be borne in mind that the conditions laid down by the Government in 1903 were:—(1) only artisans should be admitted; (2) the education should not fit the pupil for clerical employment; (3) scholarships for pupils should be given, and (4) an efficient Inspector should be appointed. In Hazaribagh there is a special Sub-Inspector, but he has not sufficient technical knowledge. A praiseworthy attempt, however, has been made to start the half-time industrial school. But if this is to be continued, there must be

better teachers. The Ranchi Government School should be able to provide some. And there must be a more capable Sub-Inspector. And only artisans' sons should be admitted. There is an increased demand in the Chota Nagpur area for skilled craftsmen, and each of these schools which is successful helps a little in the rural tracts.

Ranchi District.—There were schools at Bandu, Patuahata and Pasunda. The teaching at the last two was inferior, and the District Board proposed to close them. The school at Bandu had an intelligent and qualified artisan. The monthly grant for Bandu was Rs. 19-8; so it depends on the teacher.

Manbhum District.—At Jhalda I saw probably one of the best of these half-time industrial schools. The teacher was competent: the boys were all artisans; one who had left had started for himself as a blacksmith. But only six out of the sixteen were attending also the primary school. The weaving institution at Raghunathpur near Adra had become a farce, and I have endeavoured with the help of Mr. Watson, the Deputy Commissioner, to have it placed on a commercial basis.

Burdwan District.—There is nominally an artisan class at the Burdwan Technical School; but there are no pupils.

Midnapore District.—The artisan class at the Midnapore Technical School could boast of only one pupil.

SECTION V.—PRIVATE SCHOOLS, AIDED AND UNAIDED.

The Muhammadan Orphanage Industrial School in Calcutta is a type which deserves encouragement. The boys really learn and the teachers are competent: the subjects are tailoring, embroidery, carpet-making, press work and lithography. I would ask that more trouble be taken to keep an exact record of all the boys after they leave the school. On the other hand, the Anjumani-Rafiq-ul-Islam Industrial School in Calcutta is not working on sound lines. It is rather a denominational school, with a little sewing and watch-repairing thrown in. I have appealed to those responsible to remember that the boys have to earn their livelihood by what they learn there and that the instruction should be real, not make-believe.

The Lab Chand Matichand Jain Literary and Technical School is the result of a pious foundation, the object of which is to give both a literary education and a training in "practical arts relating to the manufacture of jewellery as well as industrial and technical arts." This has now 80 boys, although it started only in August 1907. I have advised the management to give two-thirds of the instruction to practical training and one-third to literary training, instead of one hour of practical instruction out of five and a half hours' attendance—a proportion which can hardly entitle the school to be called an industrial one—to use standard drawing books, and to insist on the accuracy of the mechanical drawing.

The Fakharpur Carpentry School in Gaya district and the Alalpur Industrial School in Balasore district are two instances of spontaneous industrial training. The former has a competent teacher, but he does not teach properly. In the latter case, the founder is an Oriya gentleman with a practical turn of mind, who has raised the standard of craftsmanship in his neighbourhood. Such schools need guidance, and deserve pecuniary encouragement.

SECTION VI.—INDUSTRIAL SCHOOLS FOR WOMEN.

There is a school called the Mahila Shilpasram in Calcutta; and there are the schools under Missionary guidance for lace work at Ranchi, Khunti, Chaibassa and Kalimpong. These are considered under the heading of this industry in Part II of the Special Report. These lace schools appear to be likely to provide remunerative employment, and are capable of much development under the lace experts, who have been imported by the Missions, provided the disposal of the product is effected on commercial lines.

SECTION VII.—REFORMATORY SCHOOLS.

The Reformatory Schools at Hazaribagh and Ranchi have been treated since 1900 as educational institutions, and crafts are taught which the boys may follow up when they reach the statutory age for their detention. The following tables gives the numbers under instruction at the two schools:—

		Alipore.	Hazaribagh.
Blacksmithy	...	13	7
Bookbinding	...	18	...
Cane-work	...	13	...
Carpentry	...	50	15
Painting	...	9	...
Printing	...	22	...
Shoe-making	...	3	7
Tailoring	...	16	5
Tin-work	...	9	...
Weaving	...	...	13

It is interesting to know what becomes of the boys after they leave the Reformatories. From the figures which have been collected for the past three years, we learn that of the boys who received instruction in trades, 22 per cent. from Alipore and 25 per cent. from Hazaribagh adhere to these trades for their livelihood after their release.

CHAPTER IV.

SYSTEMS OF APPRENTICESHIP.

MR. COLLIN pointed out in paragraph 58 of his Report that whereas a number of handicraftsmen of all sorts was being trained in railway workshops, mills and private firms in Calcutta, yet this training did not reach the educated classes in India, who are required as supervisors and foremen; and that the latter were in most cases imported. In paragraph 61 he further pointed out that proprietors were alive to the advantages of having a local supply of trained youths ready to take the place of foremen, but that they preferred the imported Europeans. I gather that the opinions of employers are now not so rigid, and that the educated youths are now showing a willingness to join as apprentices if they had the opportunities. A youth of good family and good education has informed me that he was willing to indenture himself with Messrs. Burn & Co., but that his guardians disallowed his request. On the other hand I recommended another youth of similar qualifications who seemed to have an aptitude for mechanics to join the motor workshops of Messrs. Kilburn & Co., and he is now earning as a mechanic in private employment five times as much as he would have earned in the clerical line in which I found him. The Superintendent of the East Indian Railway Locomotive Workshop at Jamalpore, Mr. Tomyns Browne, informs me that he is in favour of indentured apprentices and that he would like to see that Government should insist, wherever it was able to do so, that workshops should entertain at least a certain fixed percentage of indentured apprentices to their entire mechanical staff. In the Carriage and Wagon Department of the East Indian Railway at Lillooah I found that out of the 33 apprentices in the workshops, 17 were young Bengalis, nearly all of whom were Brahmins, and some of whom were sons of professional men. The Superintendent, Mr. Danby, is taking a great interest in them, by periodical examinations to test progress and otherwise. His rules of 24th September 1907 should be studied by parents and guardians. The Entrance Examination is the minimum qualification. The Chief Mechanical Engineer

Apprenticeships
in railway and
other workshops.

of the Bengal-Nagpur Railway, Mr. A. S. Bailey, informs me that the Company is ready to engage Indian apprentices. Under the Bengal-Nagpur Railway system the legal guardian of the apprentice is expected to execute an agreement of indemnity in case the apprentice in any way misconducts himself or leaves its service without permission. The Eastern Bengal State Railway issued in 1907 rules for the appointments of literate Indian apprentices. The minimum qualification is the second class of a higher English school, but preference, it was stated, would be given to those who possess higher educational qualifications. The Superintendent of the Samastipur Workshop of the Bengal and North-Western Railway informs me that he is unable to recruit Indians as apprentices, although he has frequently tried to persuade the youths of the middle class to take up mechanical engineering as a profession. Mr. Collin also proposed that each of the railway workshops should take in a number of apprentices, and I repeat this recommendation for all the workshops over which Government has any control. At present the Calcutta Technical School gives theoretical instruction to a number of apprentices working with Messrs. Burn & Co., Jessop & Co., and others. And attendance at this night school is one of the conditions of apprenticeship in the case of certain Calcutta firms. The Bengal-Nagpur Railway Company and the East Indian Railway Company also insist on attendance at their night schools as one of the conditions of apprenticeship. Mr. Collin stated in his paragraph 59 that private firms did not hold a favourable opinion of the passed students of the Sibpur Engineering College as mechanical engineers. The same unfavourable opinion I find still exists, but the training in mechanical engineering at the college has advanced considerably within the last 18 years, and it is possible that the attitude of the students themselves to mechanical engineering as a profession is altering. But even so the practical training which can be given in a commercial workshop must be superior to that given in an academeical institution in the case of those who desire to be master mechanics. I can only urge that guardians or others should allow and encourage young men of the country to make use of the opportunities which even now exist for apprenticeship in mechanical engineering.

CHAPTER V.

TECHNICAL SCHOLARSHIPS.

SECTION I—STATE SCHOLARSHIPS.

Proposals of 1901, of PROPOSALS for the institution of State technical scholarships was one of the results of the Simla Educational Conference of 1901. It was proposed that selected candidates should be sent abroad to undertake definite courses of studies in subjects connected with industrial science and research, and that an allowance of one hundred pounds a year in addition to travelling expenses and fees should be granted for two years on an average. The Government of India proposed that two such scholarships should be allotted to Bengal. Local Governments were to be asked to consider what industries were of importance and which should be best encouraged by scholarships, particularly such industries in which native capital and native enterprise were likely to be engaged. It was added that it should be borne in mind that men who have received an expensive European training could be employed only upon such industries as were susceptible of being organized upon a considerable scale. The principles of the scheme met with the approval of the Secretary of State, and the proposed amount of the scholarship was subsequently fixed at one hundred and fifty pounds a year. It was suggested to the Government of Bengal that the mining industry would find a favourable field for the initiation of the experiment. The scheme was put in force in 1904, and eleven State scholars in mining engineering were selected in that year and in the three subsequent years

and sent to Birmingham in England. Of these three have returned: Mr. H. C. Read is Manager of the Bhaskajari Colliery; Mr. S. C. De is unemployed as, for an apparent technical reason, he has not yet obtained an Indian certificate of competency; and Mr. P. K. Mazumdar joined the bar and gave up mining engineering, whereby the object of his selection by Government was nullified. At the end of 1907 it was determined to offer from 1908 and onwards one scholarship annually to each province. In calling for applications the principles summarised below were enunciated:—

- (a) That the students must have a competent knowledge of English or of the language of the country to which they may be sent. Rules for future selection.
- (b) That Government will also be guided by considerations of the capacity and intelligence of applicants and of the practical interest shown by them in the industries selected, as also of the assurance which they may afford that they will continue to devote themselves to the industries selected on their return in India.
- (c) That a scholar before being nominated should have received the best technical education available in the province in the particular industry which he proposes to study.
- (d) That no age-limit would be fixed for the present.

The representatives of the mercantile and industrial communities were consulted as to the industry which should be primarily encouraged. The Government of Bengal decided in accordance with the opinion of the Bengal Chamber of Commerce that for the present at any rate the coal mining industry should be encouraged and after that the manufacture of leather. The 1908 scholarship has been allotted for the former, and an extra scholarship has been given for the latter industry. The opinions of those consulted varied considerably and included suggestions for the encouragement of power-loom weaving, sheet metal work, mechanical engineering, glass manufacture, chemical industries, paper and match manufacture. The letter of the Government of India of the 9th October 1902 presents a full consideration of the principles to be followed in the grant of such State technical scholarships and should be perused by those who think that Government is not doing enough in this direction.

The difficulty which Government have had in selecting candidates may be judged from the criticism of Mr. Chatterton, the Director of Technical Enquiries in Madras, who stated that he had to reject all the applicants in 1905, because they were not in the least fitted to receive technical education. Most, he said, were carried away with the impression that they could spend a period of two years in an English country at the expense of Government on a stipend of a hundred and fifty pounds a year.

It is interesting in this connection to see what has been done in other provinces; for the current year 1908, the subjects selected have been:—

Madras	...	...	...	Textile chemistry.
Punjab	...	...	...	Textiles.
Bombay	...	...	...	{ (1) Chemistry of bleaching, dyeing and printing. (2) Mechanical and electrical engineering.

SECTION II.—PRIVATE SCHOLARSHIPS.

Within the last three years there has been a movement in all the provinces to enable students to proceed abroad to receive practical training in various industries. The National Fund and Industrial Association of Madras sent students to Japan for training in soap-making, match-making and other industries. In Bombay in the present year an Association called the Indian Industrial Development Scheme has been registered under Act XXI of 1860, for the purpose amongst others of sending Indian youths of promise abroad to complete their industrial training. In Bihar an

Schemes in Madras, Bombay and Bihar

association for the educational and industrial advancement of the Biharis is in process of formation, one of the objects of which, it is understood, will be the provision of increased facilities to the youths of Bihar for receiving technical education in foreign countries, as well as in India; but nothing tangible has been done yet.

Scheme of the Scientific Association in Bengal.

The most ambitious scheme has, however, been launched in the province of Bengal. In 1904 the association entitled the Association for the Advancement of Scientific and Industrial Education of Indians was established. It receives pecuniary support from a large number of the leading men in Bengal, and is not without European subscribers. Under the articles of constitution one of the primary objects was to raise funds for the purpose of enabling properly qualified students to visit Europe, America, Japan and other countries for studying arts and industries. The association has sent abroad 16 students in 1905 and 40 in 1906. In 1907, 96 were selected and 79 in 1908. Scholarships were not given in all cases; in some cases the passage money and fees only. The following is an analysis of the subjects of study in the case of 82 who have proceeded abroad:—

Electrical engineering	6
Applied chemistry	5
Mechanical engineering	12
Pharmacy	2
Dyeing	4
Leather tanning	7
Agriculture	12
Ceramics	2
Cotton weaving	4
Hosiery	1
Sericulture	5
Match-making	2
Pencil making	6
Soap manufacture	2
Printing ink manufacture	1
Button manufacture	2
Tobacco manufacture	1
Rubber manufacture	2
Dentistry	1
Enamelling	1
Watch-making	1
Horticulture	1
Umbrella making	2

This variety of selection is interesting, as it shows the industries which Indian opinion thinks can be capable of local development.

Present employment of former stipend-holders.

It is also interesting to study the subsequent histories of the fifteen stipend-holders who have returned to India:—

Mr. K. C. Nandi, B.A., B.E., studied electrical engineering under Messrs. Telford, Grier and Mackay in England. It is unfortunate that he has not been able to put his special training to any account as he is now the District Engineer of Bogra.

Mr. G. C. Sen, M.A., B.L., F.C.S., returned after a training in dyeing in Leeds and in Germany. He proposed to work with a new joint-stock firm called the Bengal Dye Works, Limited, with a capital of one lakh. It was proposed to use up-to-date methods, employing indigenous materials. But the negotiations fell through, as some members of the syndicate wished to work the dye works as a branch of the Bengal Lakshmi Cotton Mills. This is unfortunate, as the commercial prospects of indigenous manufacture of dyed materials seem to be very hopeful. Mr. G. C. Sen is still without employment.

- Mr. B. A. Taher, B.A., studied leather tanning and manufacturing in America. He has been appointed under the Boot and Equipment Company at Agra in the United Provinces. This took over the old Steuart Factory at Agra. Most of the Directors are connected with Bengal.
- Mr. I. B. D. Mazumdar, B.A., M.S.C., after studying agriculture at Cornell University has been appointed Agricultural Director of the Cooch Behar State.
- Mr. M. C. Roy studied sericulture in Japan and is seeking for employment.
- Mr. M. M. Chuckerbutty also studied sericulture in Japan and is seeking for employment.
- Mr. A. P. Ghose and Mr. P. C. Roy studied the manufacture of matches in Japan and are at present employed in the Bande Mataram Match Factory, of 38 Russa Road, Calcutta, which is financed chiefly by Dr. Rash Behari Ghosh.
- Kumar Amindra Narayan studied pencil making in Japan, and is now employed at Bimlipatam near Vizagapatam in the Madras Presidency.
- Mr. J. P. Bose studied the manufacture of printing ink in Japan, and is now employed in Calcutta.
- Mr. N. Mazumdar studied candle manufacture in Japan, and is now managing a candle factory in Dinajpur.
- Mr. M. C. Sen studied button manufacture in Japan, but is not yet employed.
- Mr. A. Mitter studied pencil manufacture in Japan, and proposes to start for himself.
- Mr. J. K. Das Gupta, B.Sc., M.I.C.E., studied mechanical engineering in Scotland, but is not yet employed.
- Mr. S. Deb studied ceramics at Tokyo in Japan, and is now working as Works Manager of the Calcutta Porcelain Works, 45 Tangra Road, Calcutta.

The Association has on the whole reason to congratulate itself on these results. Advantages and dangers. The *Pioneer* in reference to it has said that when *swadeshi*, divorced from recrimination and violence, spells sympathy and co-operation, it is one of the fairest flowers of Indian growth. It is essential, however, that stipend-holders should obtain genuine industrial employment on their return, each in his own special subject. The criticism has been made to me by competent observers that, as most of the stipend-holders have no large private means of their own, the scholarships should be larger and the funds available distributed amongst a smaller number. It is to be noted that of the 79 candidates selected for the present year, no fewer than 44 come from the Eastern Province. I think that the Association would be well advised in demanding that those who proceed to specialise should have a sound general education and that their knowledge of English should be more than passable.

The Association may well hope that the experience of the great Indian chemist, Dr. P. C. Roy, during a visit to Europe may not be repeated. He has stated that out of 250 Indians whom he met in England not a single one was devoting himself to the sciences or the technical arts. There is one incidental advantage which students who study abroad derive, and that is that the self-reliance and business habits which they are likely to acquire by their sojourn will stand them in good stead when they have to enter commercial life on their return to India. On the other hand, there is disquieting information regarding the pernicious influences to which Indian students are subjected, both in England and in America.

The other important private scholarships in Bengal are those to be maintained out of the Guruprasanna Ghose's legacy of two and-a-half lakhs which was announced at the Convocation of the Calcutta University in March 1908. The scheme that has been approved is that each scholarship should be tenable for three years, that one selection should be made annually, and that the annual value be two thousand rupees. Scheme of the Guruprasanna Ghose scholars.

District Board
scholarships.

in Europe or America and one thousand rupees in Japan. Preference is to be given to Hindus. No particular industry has been prescribed, but each candidate is to set forth in detail the institution in which he proposes to study as also the particular branch of agriculture or the arts, science and industry of Europe, America or the East in which he desires to specialise.

The total annual expenditure in the whole province by District Boards and Municipalities on scholarships in technical and industrial schools is less than Rs. 5,000—Rs. 177 from Municipalities and Rs. 4,794 from District Boards. The Nadia District Board assist some pupils of Hât Chapra School at the Kanchrapara workshops. The Jessore District Board gives scholarships tenable at the Apprentice Department Sibpur and at the Technical School, Khulna. The Burdwan Raj gives stipends tenable at the Burdwan Technical School. At the Bihar School of Engineering are scholarships granted by the Bihar District Boards—Patna, seven of Rs. 5; Gaya, two of Rs. 7; Shahabad, four of Rs. 5; Saran, eight of Rs. 7; Champaran and Muzaffarpur, two of Rs. 5; and Darbhanga, two of Rs. 10. Patna Municipality gives also two of Rs. 5. The District Board of Ranchi gives scholarships at the Ranchi Industrial School, at the Sibpur College and at the Kalimpong Lace School. The District Board of Outtaek gives a scholarship of Rs. 30 at Sibpur College, and one of Rs. 10 at the Calcutta School of Art.

CHAPTER VI.

CONCLUSIONS AND RECOMMENDATIONS.

Progressive ex-
penditure.

INDIVIDUAL institutions have been considered; it now remains to sum up for the province. The distinction between technical and industrial institutions, though possibly considered one of convention, should be retained. I first show statistics of the annual expenditure at different periods from which it will appear that the outlay on specialised education has been greater than is generally supposed.

INSTITUTIONS.	Years.	CONTRIBUTIONS FROM			
		Govern- ment.	District Boards.	Municipal- ities.	Private sources. including fees.
Sibpur Civil Engineering College.	1890-91	Rs. 60,888	Rs. ...	Rs. ...	Rs. 11,499
	1900-01	1,26,509	...	...	26,255
	1905-06	1,29,249	...	...	28,667
	1906-07	1,82,521	...	...	29,198
	Government School of Art ...	1890-91	26,292	...	...	4,081
Engineering and Survey schools	1900-01	34,707	...	...	19,625
	1905-06	59,508	...	...	19,139
	1906-07	35,710	...	100	19,207
	1890-91	6,259	...	...	4,081
Industrial schools	1900-01	39,066	...	...	8,832
	1905-06	33,066*	...	...	6,286*
	1906-07	36,327*	...	...	8,580*
	1890-91	2,971	2,814	476	7,218
	1900-01	5,415	18,265	384	30,144
	1905-06	7,954*	9,745*	314*	21,480*
	1906-07	12,231*	9,655*	364*	33,947*

Excluding expenditure in the Eastern Bengal Province.

Change in gene-
ral Education.

Now Government can, in the words of the Government of India resolution of the 28th June 1888, support technical education as an extension of general education;

it can also promote and countenance technical education of a special character. For the former object, the compulsory teaching of drawing was introduced in Bengal in 1891 and 1901; and besides the University of Calcutta will have from 1909 for science students and Intermediate Science Examination corresponding to the First Examination in Arts, which has been divided into an Intermediate Examination in Arts and an Intermediate Examination in Science. Chapter XXVII of the Regulations of the University and section 21 of the Indian Universities Act show what measures have been taken to promote the improvement of the opportunities for practical study in chemistry and physics. As for education of a special character, it has been shown that the policy from 1891 has chiefly been to maintain the efficiency of the central institutions; the Engineering College and the School of Art. Let us see first what are the requirements of the province.

Men are required: (1) as managers, engineers, subordinates, draftsmen, surveyors mechanics, estimators in the various forms of engineering—civil, mechanical, electrical, and mining engineering—in Government and private employment. Men are also required: (2) as foreman overseers and managers in organized industries in Bengal, such as matches, soap, leather, etc., financed by the small capitalist. Now from the large literature—English, American and European—on the subject, I find that the leading principle is that each place must make arrangements to suit its own needs. The following are, I think, the requirements of Bengal:—

The requirements of Bengal.

(1) An engineering college proper, to teach civil, mechanical, electrical, mining and sanitary engineering. This should be Sibpur College in its present form, with the improvements which its enthusiastic Principal has suggested, though not on its present site. It has, I understand, been settled that the college will be removed to Ranchi.

Engineering College.

(2) A technological institute, the nucleus of which should be the industrial and chemistry classes, which it has been proposed will be started at Sibpur. This institute should be in Calcutta itself and should be affiliated with the classes in chemistry and physics at the Presidency College, and with the textile instruction at the new Serampur Weaving Institute. The syllabus should be the same as that provided at the Victoria Jubilee Technical Institute at Bombay, or at the University of Leeds in what is known as technical chemistry, and should embrace the chemistry of leather and tanning, of the manufacture of commercial chemicals, and the chemistry of the processes required in the dyeing and printing of textiles, and in the manufacture of dyes, perfumes, soap, ceramics, varnishes and paints. The subject, however, has not yet been fully worked out in Bengal. The duplication of departments has to be avoided, and it has to be considered whether an institute for technology should be developed apart from, or in conjunction with, the Presidency College, where pure science as opposed to applied science is taught.

Technological institute.

(3) So far for engineering and industrial chemistry; there is also required a central school of design. Mr. Collin proposed a school of drawing and design for industrial purposes and the circulation of designs amongst native workmen. I do not propose a separate school of design, but recommend that the School of Art be brought more in touch with the industrial art of the province (its influence at present on indigenous art is imponderable), by the influence of the Principal, by the transfer of the Industrial Art Section of the Indian Museum to the School of Art, and by carrying out the proposals of the 1905 conference of the Principals of Schools of Art in preparing and circulating design books for workmen. On account of the fact that Calcutta must maintain an Imperial Museum for all India, the establishment of a separate Bengal provincial museum of industrial art, similar to those in Lahore, Lucknow and Madras, has been vetoed; but there is no reason why the Bengal School of Art should not fulfil the same function.

School of Art.

As for the technical institutions, including classes affiliated to Sibpur, I advocate the following:—

(1) The Cuttack Survey School should be made into a school of engineering up to the sub-overseer standard; the amin's certificate given after one year's training should be abolished and only a surveyor's certificate given after the final survey

Affiliated technical institutions.

standard examination at the end of a two years' course. There is no reason why at Cuttack an inefficient type of Bengali sub-overseers should be turned out as is done at present.

(2) The Bihar School of Engineering which at present teaches to the overseer standard, should be allowed to give practical instruction, so that the certificate of the qualification of upper subordinate could be granted; moreover, the amin's certificate should be abolished, and only a surveyor's certificate should be given after a two years' course in surveying.

(3) The Technical Schools at Midnapore and Burdwan should leave artisans alone, and should train youths up to the sub-overseer standard of Sibpur, on the condition that the passing of the Entrance Examination be the minimum qualification in general education.

(4) My own feeling is that the system of bifurcation known as B classes should be dropped entirely. It is stated in Mr. Hornell's report (page 102) to be a failure in Bengal. The object of Government in giving a "taste for an industrial career" is frustrated by the parents or guardians. All that happens at present is that boys join them for the same object as others join the sub-overseer classes, hoping to obtain the same qualification ultimately with a smaller stock of brains. This affects the classes at Patna, Bhagalpur, Ranchi, Midnapore, Burdwan and Khulna.

(5) On the other hand, I propose that the B class of Bhagalpur, the arrangements for which are almost a farce in connection with the zilla school, be changed into a proper technical school, teaching to the sub-overseer standard, and be financed and managed by Government instead of by the District Board. It should be a model school.

(6) Among the unaffiliated technical schools are those managed by the railway companies and the Calcutta Technical School. The latter has a niche of its own in the framework of technical education. As a night school for those who are apprentices in factories in or near Calcutta, it should be assisted. Among railways the theoretical training of apprentices, who are to be the future foremen and heads of departments, is recognized. The State Railway Workshop at Kanohrapara was specifically mentioned in 1890 by Mr. Collin; but no system similar to that at Kharagpur, Lillooah or Jamalpur is yet in existence there. The best scheme, in my opinion, is that at Lillooah: it recognizes that the theoretical training should not be given at night after recognized working hours, but should be given within the Railway Company's hours. Two hours, twice a week in the mornings, do not interfere much with workshop practice. The syllabus at these three railway centres is fairly uniform and gives what is wanted.

(7) The other important private technical institutions are the Bengal Technical Institute and the technical department of the Bengal National College. The former at present does not desire affiliation, and independence is part of the creed of the latter. There is quite enough room for the Bengal Technical Institute; it should be placed by its supporters on a sound financial foundation. It is at present a composite institution for instruction in engineering and chemistry, and does not furnish the same temptation to the Bengali youth to aspire to service as sub-overseers or overseers under Government or quasi-Government departments, as the Government college does, and therefore it opens out a direct avenue to industrial employment.

Industrial schools.

The future of industrial schools is a difficult problem. As has been indicated in the first chapter, an industrial school is one dealing with the improvement of the artisan. There is: (1) the school for centralized industries growing in importance, and (2) the school in large stations and municipal towns, where there is a demand, which will repay those who acquire in local industrial schools superior skill (Government of India Resolution of 1888); there is also, (3) the school proposed for local handicrafts, half-time primary and half-time industrial, with apprenticeship under approved artisans (Government of India Resolution of 1903). It has been shown in the summary in Chapter I that the proceedings of the Bengal Government of 1904 ended in the scheme for the improvement of weaving in Bengal. The committee of 1904 resolved to take no action

regarding large manufacturing centres and did not press the system of half-time schools. In only two divisions has any attempt been made to put that system into practice: in Chota Nagpur, principally in the Hazaribagh district by Mr. Radice, who was a member of the Industrial Education Committee and is now the Deputy Commissioner; and, in Patna Division, where the only outcome of a prolonged discussion was the subsidizing of an existing school attached to a railway workshop. It seems to me that there is room for each kind of school in different localities; and that it is inexpedient to dogmatise about the comparative merits of the "class" system or the "apprentice" system.

Let me first clear away some misconceptions. One is that manual instruction is industrial education. I am afraid that many in Bengal, both pupils and teachers entertain this belief. Manual education is now-a-days held in Europe to be part of a liberal education; it is the training of the hand and eye. One of the objects of the free use of manual instruction through the curriculum of the Bengal National College is to overcome the traditional prejudice amongst certain classes against manual labour. Manual instruction is used in certain Missionary schools in the hope, not always realized, that the boys, who do not belong to the artisan castes, will earn a living afterwards in a handicraft. But in neither case is it really industrial education. Another misconception exists as to the principles and objects of the half-time system; notwithstanding the fact that the Government of India in 1901 said that they attached great value to the dissociation of technical from ordinary literary education. Another misconception is that it is assumed that the employers of subordinate Indian labour are satisfied with manual dexterity in their journeymen. It is a fact, I find, that many employers have not given special attention to the improvement of the intelligence of their journeymen, but many have stated to me that a journeyman who could work the first four rules of arithmetic in English figures and who could make and understand simple drawings would be a more useful workman than one who has not this knowledge. Paragraph 66 of Mr. Collin's report shows that in 1890 employers, while admitting the benefits of a course of theoretical training, did not appear to have felt the absence of it, that they looked for practical training only, and were satisfied if they obtained that. But since 1890 a change has come across the attitude of employers in Europe.

Misconceptions concerning Industrial Education.

(1) As for the school attached to a centralized industry, the best example in the province is the Beniadih School of the East Indian Railway Colliery Workshops which have been described in section II of Chapter III. Literary education is kept apart as the upper primary standard is the qualification for admission. It realises what the Indian Government said in 1888:—"To the Government railway workshops and factories may undoubtedly with great advantage be attached schools of drawing and design and of practical instruction in the scientific principles of the handicrafts there carried on." Now at Beniadih mechanical drawing is taught, and also simple mechanics and mensuration. It has just received the unqualified approval of the newly-appointed Chief Inspector of Mines, Mr. J. Wilson.

Schools for centralised industries.

The advantages are—

- (i) a commercial atmosphere;
- (ii) teaching and discipline under European control, and
- (iii) an assured livelihood.

I have asked the superintendents of the large workshops of the Bengal Iron and Steel Works at Barakar, of the East Indian Railway Carriage and Wagon Works at Lillooah, and of the Canal Workshops of the Public Works Department at Dehri-on-Sone and at Midnapore to consider this. The young artisan gets a small money-wage in proportion to his skill. In the words of paragraph 10 of the Resolution of 1904, it is necessary to enlist the active co-operation of employers of labour: the principle applies to the training of journeymen, as well as to the training of apprentices of the foreman type. My proposal for this co-operation is that, if a large employer of labour will maintain a school attached to his workshop, on the lines of the Beniadih school,

Government should assist by paying for the teacher up to Rs. 60 a month. The principle that under certain conditions Government would pay for a teacher was enunciated in Government Order No. 2584 of the 30th July 1904 in connection with the Khulna School. If we had a provincial inspector of Industrial Schools, he would, I am sure, have several such schools in working order. At present the Beniadih School suffers from unnecessary inspection by subordinate educational officers, who do not understand its object. I think that no industrial school should be inspected by an officer under the status of an Inspector of Schools, and possibly in time such schools may cease altogether to be under the Education Department.

Schools in large towns.

(2) The next kind of school is an industrial school in large stations and municipal towns, where there is a demand which will repay those who acquire superior skill. In Bengal such schools have sprung up under no system. Apart from Missionary schools, for example, those at Hatchapra, Chaibassa and Ballyganj, which supply a demand for good material, but unfortunately not a demand from the Indian community, there is no genuine school of this kind in the province, except that at Khulna. The Khulna School is miscalled a technical school. It gives an improved knowledge of carpentry to boys of the artisan castes, and its chief defect is that the boys leave to earn their livelihood before they have learnt enough, partly owing to poverty, partly owing to short-sighted policy on the part of their parents. Outside the metropolitan area and away from the vicinity of large workshops, it is not possible to have the commercial atmosphere. But the next best thing is that the work to be taught should be that kind for which there is a remunerative local demand, if it be done well. Some officers desire a graduated syllabus for this form of instruction. It is acknowledged that a training of three or four years is required, and something definite for each year is demanded by the non-expert inspecting officer. In my opinion a too elaborate syllabus defeats its own object. Mr. Ward, the Superintendent of the East Indian Collieries, says that to ask a boy to attend to fires in a blacksmith shop for a whole year is to damp any spark of enthusiasm the boy may have, while Mr. Heaton, the Principal of Sibpur, says that the best training is to make the boys proceed from simple articles to more difficult articles, and that it is impracticable to ask a boy to spend a whole year on one operation such as planing. In this connection I note that it is impossible to give practical training of any value, unless articles are made which are meant to be sold, otherwise boys will leave with knowledge neither of the cost of materials nor of market rates. I have not yet come across any institution in which progressive and methodical training was sacrificed to the necessity of showing a profit, as the Government Resolution of 1903 foreboded. In fact either from want of business methods, or from the fear of the above imputation, the work is all the other way; as commercial undertakings, the schools are carried on at a loss. The theory that industrial schools should be primarily educational and not commercial enterprises is accepted without cavil, and has no objectors; but it was never intended to mean that nothing must be produced for sale. In fact, the resolution of 1903 has recorded that it is wholesome that schools should be brought to the test of producing saleable articles.

In this class of school, the pupils cannot afford to pay fees; they have to be supported either by a Mission or some local body. I think the industrial section of the Khulna school under the Khulna District Board is a good example for imitation. The conditions should be: (a) the pupil should be of the artisan caste; (b) no literary education should be given; the pupils should have reached the lower primary standard, and in the more advanced districts the upper primary standard, but simple mensuration and drawing should be taught; (c) Government should provide the salary of a teacher-superintendent, or preferably a passed foreman mechanic, up to Rs. 60; (d) the pupil should be maintained by progressive stipends at Rs. 1, 2, 3, and 4 per month respectively in each of the four years; (e) to prevent pupils leaving too soon, they should receive at the end of the period, but not before, a certificate of competency, and in cash the total of the credits which should be placed opposite their names, month, month by in accordance with their work; and (f) in all cases the District Engineer should be a member of the Board of Management.

I think that if Government paid for the teacher, as proposed above, other District Boards would start similar schools for carpentry and blacksmithy work. The Government school at Ranchi should be worked on the conditions above mentioned. A similar Government school at Muzaffarpur should be started; and the District Boards of Cuttack, Gaya and Champaran should start similar schools for carpentry alone at Cuttack, Gaya and Bettiah, and the District Board of Birbhum at Suri for blacksmithy.

(3) The half-time industrial primary school was suggested as a type for the whole of India, in the hope that a "practical beginning" might be made. Although I think that some little good has been done in the attempts made in the Chota Nagpur areas, yet it must be admitted that Bengal is one province, at least, in which the attempt to add literary to a practical education will fail. To add practical to a literary education is another matter; this is being done. The proposal is "that the boys should spend half the day at the primary school, and the other half on working as registered apprentices under approved artisans, who would receive a monetary reward for each apprentice on the conditions: (i) that they taught them the trade thoroughly, and not merely the elementary processes; (ii) that they accepted supervision from a Government expert," while at the same time "scholarships for all the pupils would be provided." The crux is to find the approved artisan. The artisan selected in many places is no better than the bazar *mistri*, and officers complain that money is being uselessly spent in pretending to teach just as much as would be learnt without any Government or District Board scheme. If a good local artisan teacher can be obtained, if some of the ex-pupils of the Ranchi school can be tempted to be teachers in these local schools and make the teaching a reality, then some good may be effected; but I should like to see the money of the local District Boards granted for scholarships only in places where these conditions prevail. Elsewhere, as so many have said, the large workshops of Bengal are the real industrial schools, and in this province the dissociation of technical from literary training, mentioned in Sir John Hewett's letter of 1901, should be recognised. The chief advance which should be made should be in making all reasonably possible use of such workshops and in obtaining the co-operation of the employers. And this can be effectively done rather by one officer, such as the proposed Superintendent of Industries, who can act personally, than by a department through correspondence.

Half-time Industrial primary schools.

As will be seen in Appendix II, there are several private schools, either philanthropic or Missionary, which provide a training in a handicraft. My advice to them has been that the chief test of their efficiency is whether the ex-pupils keep up as a means of livelihood the crafts which they have learnt. Applications come from these schools for assistance; and the schools are treated as special schools under rule 17 of the Grant-in-aid Rules. The criterion of these schools is not a literary one; and in the past the Director has frequently had to apply to the Principal of Sibpur College for his expert opinion. There is also in the Department no separate grant for the aid of industrial schools; all grants are debited to the Grant-in-aid Fund, on which there are already heavy claims. It would be more satisfactory, in order to avoid delay and circumlocution, if the new Inspector of Industrial Schools received a lump grant, similar to that given to the Inspector of European Schools, and distributed it in accordance with the results of his personal inspections. It is in accordance with the declared policy of Government to assist such institutions when they further or develop a local industry when it appears to be capable of expansion by the application of superior methods and implements.

Subsidies to private schools.

It must be recollected that the advance movement in England dates from 1834, only twenty-four years ago; and that much of the expenditure in that country has not come from the public exchequer, but from local bodies (Report on Technical Education in Great Britain, Chapter VIII of Report of the United States Commissioner of Labour, 1902); that in America the advance was due, in a great measure, to private benefactions, with "a great variety of organization and practice and a marked impression of the personal element" (Address of Sir William Preece on Technical Education in America, *Journal of the Society of Arts*, 10th April 1908); and

that in Germany the advance was due in some measure to the education and opportunities for research study provided by the Universities (Industrial Education, by Sir Philip Magnus, 1888, page 215). But in India generally, and in Bengal particularly, the circumstances are different. It is Government from whom the initiative is expected, and the Government purse from which funds are provided. That being so, it is sound that expenditure by Government should primarily be on the central institutions; and secondarily in co-operation with the large industrial concerns in the improvement of apprentices and journeymen. On the other hand, I doubt very much whether a complete system of village industrial schools is either practicable or desirable throughout all the divisions of Bengal, but any industrial schools which are under private management should be encouraged, if they pass the test of producing intelligent artisans, who will follow the trades which are taught to them.

J. G. CUMMING, B.A., I.C.S.,

On Special Duty, Industrial Enquiries.

APPENDIX I.

LIST OF REFERENCES FOR SPECIAL REPORT, PART I

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APPENDIX II.

Technical and Industrial Institutions in Bengal, arranged geographically.

NAME.	Date of foundation.	Place.	Subjects-taught.	NUMBER OF STUDENTS BEING TRAINED.						Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY--				REMARKS.	
				Engineer.	Overseer grade.	Sub-overseer grade.	Amin.	Artisan.	Total.				Private source.	District Board.	Government.	Total.		
PROVINCIAL.																		
<i>Engineering College.</i>																		
Civil Engineering College, Sibpur.	1858	Sibpur, Howrah district.	Civil, Mechanical, Electrical, Mining and Sanitary Engineering.	100	90	38+92=130	...	23	242	Yes ... ..	.....	.....	Rs. 29,208	Rs.	Rs. 1,82,621	Rs. 2,11,729	Excluding Agricultural Departments.
<i>Schools of Art in Calcutta.</i>																		
Government School of Art	1864	28, Chowringhee Road	1. Drawing 2. Modelling. 3. Lithography. 4. Engraving.	...	...	.....	...	...	253	Elementary, architectural and mechanical drawing.	Nil	.....	Rs. 5,969	Rs.	Rs. 17,223	Rs. 23,191	
Indian Art School	1896	13, Wellington Street	1. Music 2. Painting. 3. Photography. 4. Engraving. 5. Lithography. 6. Printing. 7. Drawing.	...	...	.....	...	...	97	Free-hand drawing, etc.	Nil	.....	Rs. 3,680	Rs.	Rs.	Rs. 3,680	Includes grant from the Calcutta Municipality, Rs. 100.
Jubilee Art Academy	1897	92, Bowbazar Street	1. Printing 2. Modelling. 3. Sculpture. 4. Photography. 5. Electro-plating.	...	...	.....	...	...	125	Free-hand and model drawing.	Nil	.....	Rs. 6,360	Rs.	Rs.	Rs. 6,360	
Albert Temple of Science	1875	337, Upper Chitpore Road.	1. Engraving 2. Lithography. 3. Modelling. 4. Painting.	...	...	.....	...	...	41	Model drawing	Nil	.....	Rs. 2,112	Rs.	Rs.	Rs. 2,112	

PRESIDENCY DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.			Total.	Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.	
					Sub-Overseer grade.	Amins.	Artisans.					Private source.	District Board.	Government.	Total.		
24-Parganas	Kaurapukur London Missionary Society Industrial School.	1896	Kaurapukur, Tollyganj.	Carpentry and durl weaving.	...	...	13	13		Lower Primary course (night school).	Rs. (1) Pay of establishment. 116 (2) Head mistress 21 (3) Other mistresses and sewers. 110 (4) Materials 224 (5) Tools 9 480	Rs. 480	Rs.	Rs.	Rs. 40	500	Director of Public Instruction's No. 13594, dated the 15th July 1907.
	Church of England Widows' Industrial Home.	1901	Baranagar	Setting of loom, washing and dyeing wool and embroidery, yarn making, chutney and curry powder making.	...	...	...	35	No	Simple reading and writing is taught for an hour.	Head Mistress 55 2nd " 15 3rd " 15 4th " 10 Head mate teacher 16 Second ditto 15 Cost of maintaining pupils in boarding. 234 Monthly 360	Rs. 3,840	Rs.	Rs.	Rs. 480	4,320	Director of Public Instruction's No. 13071, dated the 20th July 1907.
	Church of England Orphan Boys' Industrial School.	1906	Ditto	Brass moulding, turning, fitting, engineering and lock work.	...	...	...	20	Yes	English, Bengali, arithmetic (Lower Primary course).	Rs. A. Head Master 20 0 2nd " 10 0 3rd " 9 0 Turner " 8 0 Coolie " 10 0 Head Pandit (night school) 10 0 2nd Pandit (night school) 5 0 3rd Pandit (night school) 4 0 Rent 4 0 Dhobi and cook 18 8 Boys' boarding 68 0 Monthly 163 8	Rs. 1,590	Rs.	Rs.	Rs. 360	1,950	Director of Public Instruction's No. 11678, dated the 29th June 1906.
Calcutta	Alipore Reformatory	1878	Alipore	Carpentry, tin-work, printing, cane-work, sewing.	...	...	...	203	Yes	Lower Primary course	.....	Rs. 2,755	Rs.	Rs.	Rs. 31,068	34,418	
	Calcutta Orphanage Technical School.	...	12-1, Balaram Ghose's Street, Shambasair.	(1) Carpentry (2) Tailoring.	...	...	26	26	Free-hand drawing.	Lower Primary course, Bengali.	Masters' salary 319 Miscellaneous 48 Students' boarding charges. 135 486	Rs. 126	Rs.	Rs.	Rs. 360	486	Government order No. 271, dated the 30th February 1906.
	Oxford Mission Industrial School.	1896	1, Ballygunge, Calcutta.	(1) Carpentry (2) Smithery. (3) Weaving.	...	...	59	59	Free-hand model and mechanical.	Up to 3rd class standard of a high school.	Salary of Master and assistant. 2,400 Tools, etc. 180 2,580	Rs. 2,220	Rs.	Rs.	Rs. 360	2,580	Director of Public Instruction's No. 6541, dated the 30th April 1906.
	Mubammaden Orphanage Industrial School.	1892	8, Syed Lane.	(1) Tailoring (2) Printing and lithography. (3) Embroidery and wool-work. (4) Sewing (girls).	80	80	Urdu, Persian, elementary English and arithmetic.	Rs. 6,800	Rs.	Rs.	Rs. 600	7,500	Includes grant from the Calcutta Municipality, Rs. 600. Director of Public Instruction's No. 20651, dated the 12th November 1907.

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PRESIDENCY DIVISION—continued.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.			Total.	Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Sub-Overseer grade.	Amms.	Artisans.					Private source.	District Board.	Government.	Total.	
Calcutta	Anjuman-e-Rafiq ul-Islam Industrial School.	1903	87, Jhawtala Road, Ballygunge.	(1) Tailoring (2) Watch repairing	...	...	30	30	.....	Urdu, English Bengali and Arithmetic.		Rs. 310	Rs. ...	Rs. 360	Rs. 730	Calcutta Municipality, Rs. 50. Government order No. 273, dated the 21st February 1905.
	Mahila Shilpasram for Females.	1906	9, Sibnarayan Das' Lane.	(1) Weaving (2) Tailoring (3) Painting. (4) Engraving. (5) Music. (6) House-hold management.	...	...	70	70	Model and free-hand drawing.	Bengali, English and Arithmetic.	.....	3,648	.....	3,648	7,346	Calcutta Municipality, Rs. 50. Director of Public Instruction's No. 4783, dated the 13th March 1903.
	Industrial Home for the Blind.	1897	68, Elliott Road, Calcutta.	(1) Bamboo and cane work. (2) Chik-making, etc.	...	...	15	15	.....	Bengali, English and Arithmetic.	..	2,400	.....	960	3,360	Calcutta Municipality, Rs. 250. Director of Public Instruction's No. 10312, dated the 30th May 1907.
	Bengal Technical Institute.	1900	92, Upper Circular Road, Calcutta.	Carpentry, smithery, moulding and chemistry.	...	...	...	200	Yes ... ..	.....	.....	.....	.....	...	...
	Bengal National College, Technical Department.	1906	164, Bow Bazar Street.	Mechanical engineering.	...	...	...	...	Yes ... ..	.....	.....	..	..	...	...
	Lalchand Motchand Jain Literary and Technical School.	1907	61, Dhurumtollah Street.	Jewellery	...	...	30	30	Free-hand drawing.	Bengali, Hindi, Sanskrit and English.	.....	.....	.....	...	...
	Calcutta Technical Night School.	1906	Dorseton College	Mathematics, drawing and mechanics.	...	...	...	49	Yes	Nil	Establishment ... 2,150	2,050	.....	450	2,480	Director of Public Instruction's No. 18571, dated the 6th October 1907.
	Railway Technical Institution.	1908	83, Dhurumtollah Street.	Electricity and railway working.	...	...	...	...	No	Nil ... ..	.....	.....	.....	...	...

BURDWAN DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.				Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Sub-Overseer grade.	Amins.	Artisans.	Total.				Private source.	District Boards.	Government.	Total.	
Burdwan	Burdwan Technical School.	1893	Burdwan	Carpentry and smithery work.	47	...	2	49	Yes	Sub-Overseer standard	Establishment ... 2,638 Contingencies ... 611 <u>3,204</u>	Rs. 1,188	Rs. 1,416	Rs. 300	Rs. 3,204	Burdwan Municipality, Rs. 240. Director of Public Instruction's No. 5260, dated the 5th December 1893, and No. 5263, dated the 10th December 1895, and Government order No. 2513T.—G., dated the 24th September 1907.
	Baniganj Industrial School.	1897	Karsoli, Baniganj.	Carpentry	...	...	12	No	Lower standard. Primary	Head Master ... 180 Second " ... 180 Teacher of carpentry ... 168 Materials, etc. ... 900 <u>1,428</u>	Rs. 1,188	Rs. 240	Rs. 240	Rs. 1,428	Director of Public Instruction's No. 14327, dated 30th October 1906.	
Bankura	Wesleyan Mission Middle Vernacular Technical School.	1901	Bankura	Carpentry, shoe-making, weaving, cane and bamboo work.	...	...	19	Yes	Middle Vernacular standard.	Establishment ... 117 Contingencies ... 15 <u>132</u> Monthly total ... 132	Rs. 984	Rs. 600	Rs. 600	Rs. 1,584	Director of Public Instruction's No. 17655, dated the 13th December 1906.	
	Koalpara Weaving School.	1907	Koalpara	Weaving	...	...	14	No	Nil	Establishment ... 10 Contingency ... 15 <u>25</u>	Rs. 300	Rs. 300	Rs. 300	Rs. 300		
Midnapore	Malsadal Raja's Technical School, Midnapore.	1885	Midnapore	Carpentry and smithery work.	41	...	1	42	Yes	Sub-Overseer standard	Establishment ... 192 Contingent ... 50 Expends ... 20 Extras ... 5 <u>267</u> Monthly Total ... 267	Rs. 1,098	Rs. 1,098	Rs. 600	Rs. 2,778	Director of Public Instruction's No. 10324, dated the 30th May 1907.
	Kharagpur Railway Night School.	1906	Kharagpur	Arithmetic, Algebra, Drawing, Geometry, and Applied Mechanics.	...	...	...	Yes	...	...	...	...	...	...	...
Howrah	Lilloah Railway Technical School.	1903	Lilloah	Arithmetic, Algebra, Mensuration, Applied Mechanics, Linear Drawings, Projection and Mechanical Drawing.	...	...	32	...	...	...	Head Master ... 60 Sud .. 30	Rs. 1,650	Rs. 1,650	Rs. 1,650	Rs. 1,650	

PATNA DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.					Whether any drawing is taught.	What literary training, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Overseer grade.	Sub-Overseer grade.	mins.	Artisans.	Total.				Private source.	District Board.	Government.	Total.	
Patna	Bihar School of Engineering.	1896	Mahendra, Bankipur, Patna district.	Mathematics, Surveying, Engineering, Science, Smithery, Fitting, and Carpentry.	8	36	38	...	145	Yes	.....	Rs. 7,383	Rs. 3,432	Rs. 42,700	Rs. 53,525	Patna Municipality, Rs 128.	
Gaya	Fakharpur Industrial School,	April 1906	Fakharpur, thana Arwal subdivision Jahanabad.	Carpenter's trade	.....	...	...	...	10	.....	Elementary Hindi	Cost of wood, tools, etc., and remuneration to mistress, and stipends to pupils at Rs. 2.	468	...	...	468	
Shahabad	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	.....	.....
Saran	Dome Technical School.	1903	Mirzapur	Bamboo work	.....	...	...	...	14	Elementary Free-hand Drawing.	The three R's	On masters ... 85 Sattu to boys ... 75 160	...	160	...	160	
	Ditto	1903	Manjhi	Ditto	.....	...	...	...	15	Ditto	Ditto	On masters ... 180 Sattu to boys ... 85 Cost of raw materials ... 33 298	...	398	...	398	
	Ditto	1903	Masrakh	Bamboo work and weaving.	.....	...	...	...	10	Ditto	Ditto	On masters ... 156 Sattu to boys ... 89 Cost of raw materials ... 10 255	...	255	...	255	
Champaran	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	.....	.....
Muzaffarpur	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	.....	.....
Darbhanga	Artisan School.	Primary 1905	Samstipur	Carpentry, Smithery and Painting.	16	Free hand Drawing.	Up to Lower Primary standard.	Fifteen stipends to students at Rs. 3 One Literary master ... 10 Contingencies ... 10 Monthly total ... 65	...	780	...	780	

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BHAGALPUR DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.				Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Sub-Overseer Grade.	Amins.	Artisans.	Total.				Private source.	District Board.	Government.	Total.	
Darjeeling	Lace School for women.	1905	Kahmpong	Lace making	...	...	100	100	Nil	Teaching one hour in the morning.	Rs. A.	Rs.	Rs. A.	Rs.	T. A. and scholarships.
	Embroidery School for women.	1906	"	Embroidery	...	...	41	41	"	Ditto	80 0	...	80 0	80	
	Weaving School for women.	1907	"	Weaving, crocheting	...	...	2	2	"	Ditto	87 8	...	87 8	175	
	General Industries for women.	1908	"	Sewing, knitting	...	...	207	207	"	Ditto	...	...	...	...
	Carpentry and Carving School for boys.	1905	"	Carpentry	...	...	19	19	"	Night school	154 0	...	...	...
Monghyr	Jamalpur Railway Night School.	Mechanical drawing, Science, Applied Mechanics, Mensuration, Steam Engine and Algebra.	"		
Bhagalpur	"		
Furnee	"		
Southal Parganas.	"		

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CHHISA DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.					Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Overseer grade.	Sub-Overseer grade.	Amins.	Artisans.	Total.				Private source.	District Board.	Government.	Total.	
Cuttack ...	Survey School ...	1876 ...	Cuttack ...	Surveying ...	...	50*	55	...	105	Yes ...	English Composition.	Rs. A. Practical surveying and repairs to surveying instruments. 350 0 Purchase of books ... 30 0 School scholarship ... 359 0 Establishment, general ... 4,638 0 Scholarships ... 90 0 Private sources ... 111 0 ----- 5,778 0	Rs. 1,289	Rs. Nil	Rs. 4,489	Rs. 5,778	* Survey final.
Balasore ...	Alalpur Industrial School	1891 ...	Alalpur ..	Carpentry, weaving, blacksmith's work and cane work.	...	...	...	21	...	No ..	Up to standard IV of Vernacular course.	Carpenter ... 13 0 1st Weaver ... 11 0 Literary teacher ... 9 0 2nd Weaver ... 8 0 Blacksmith ... 8 0 Cane worker ... 7 8 Servant ... 1 0 Contingencies ... 1 0 Prize ... 1 8 ----- Monthly ... 60 0	Rs. 540	Rs. ...	Rs. 180	Rs. 720	Director of Public Instruction's No. 1547, dated 19th December 1904.
	Santipur American Free Baptist Mission Industrial School.	1887 ...	Hatigarh ...	Weaving, carpentry, sewing, mat-making, rope-making, rattan work, wood-carving and gardening.	...	...	...	70	...	No ..	No ...	Superintendent ... 24 0 Head weaver ... 10 0 2nd " ... 6 0 3rd " ... 5 0 Head carpenter ... 11 0 2nd " ... 5 0 Time-keeper ... 5 0 Tailor ... 9 0 Stipends to students ... 5 0 ----- Monthly ... 80 0	Rs. 480	Rs. ...	Rs. 480	Rs. 960	Director of Public Instruction's No. 6508, dated 22nd April 1905.
	Balasore American Free Baptist Mission.	1800 ...	Balasore ..	Carpentry, cabinet-making, rattan work, shoe-making, book-binding and tailoring.	...	...	...	33	...	No ...	Evening school four nights in the week.	For teaching ... 67 0 " overnight ... 18 0 " book-keeping ... 6 0 ----- Monthly ... 93 0	Rs. ...	Rs. 1,200	Rs. ...	Rs. 1,200	Sanctioned in District Board's letter dated 18th February 1907.
Furl ...	.....	...	...	.....	...	...	...	Nil	.....	.....	.....	.....	.....	.....	.....	.....	.....
Angul ...	Angul Survey School	November 1899	Head quarters at Angul.	Nil	Nil	...	25	...	...	Both Theoretical and Practical (Printing scales, Geometrical and Map-drawing).	Nil	Teacher's pay ... 300 Contingency .. 120 ----- 420	Rs. 420	Rs. Nil	Rs. Primary grant.	Rs. 420	
Sambalpur	...	...	...	.....	...	...	...	...	...	...	...	.....	.....	.....	.....	.....	.....

11.

CHOTA NAGPUR DIVISION.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.				Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Sub-Over-seer grade.	Amins.	Artisans.	Total.				Private sources.	District Board.	Government.	Total.	
Hazaribagh	East Indian Railway Collieries Industrial School.	1905	Bennadih	Smithery and carpentry			26	26	Geometrical, isometrical and mechanical drawings.		One teacher on Rs. 50 a month.	Rs. 1,123	Rs. 120	Rs. 120	Rs. 1,363	Director of Public Instruction's No. 16186, dated 14th November 1906.
	Bhandra	1903	Bhandra	Smithery			2	27	Geometrical drawing.	Lower Primary course	Stipend ... 48 Special class ... 21 Total ... 69		69		69	
	Baddambazar	1905	Baddambazar	Do.			15	15	Ditto	Ditto	Stipend ... 48 Special class ... 60 Total ... 108			108	108	
	Pursoni	1905	Pursoni	Do.			12	12	Ditto	Ditto	Stipend ... 48 Capitation allowance ... 29 Total ... 77		74		47	
	Falawal	1906	Falawal	Do.			14	14	Ditto	Ditto	Stipend ... 48 Special class ... 68 Total ... 116		116		116	
	Bugda	1906	Bugda	Do.			13	13	Ditto	Ditto	Stipend ... 33 Capitation fee ... 11 Total ... 44		44		44	
	Chitarpur	1906	Chitarpur	Do.			15	15	Ditto	Ditto	Stipend ... 12		12		12	
	Bagodar	1906	Bagodar	Do.			9	9	Ditto	Ditto	Stipend ... 48 Capitation fee ... 16 Total ... 64		64		64	
	Bishungarh I	1906	Bishungarh	Do.			10	10	Ditto	Ditto	Stipend ... 28 Capitation fee ... 8 Total ... 36		36		36	
	Bishungarh II	1906	Ditto	Carpentry			10	10	Ditto	Ditto	Stipend ... 48 Capitation fee ... 14 Total ... 62		62		62	
	Damadardih	1906	Damadardih	Do.			15	15	Ditto	Ditto	Stipend ... 48 Capitation fee ... 8 Total ... 56		56		56	
	Chitarpur	1906	Chitarpur	Weaving			6	6	Ditto						25	
	Gurry	1906	Gurry	Pottery			18	18	Freehand drawing.	Lower Primary course	Stipend ... 48 Capitation fee ... 40 Total ... 88		88		88	

	Bugdā	1906	Bugdā	Pottory		21	21	Freehand drawing.	Lower Primary course	Stipend ... 48		67	67
										Capitation fee ... 19			
										Total ... 67			
	Harloong	1907	Harloong	Smithery		16	16	Geometrical drawing.	Ditto	(Unaided) ...			
	Achaljamoo	1907	Achaljamoo	Do.		13	13	Ditto	Ditto	Ditto ...			
	Potarbar	1907	Potarbar	Do.		8	8	Ditto	Ditto	Ditto ...			
	Hazaribagh Reformatory.	1888	Hazaribagh	Weaving and agriculture.		188	188	No ...	Primary course			36,144 0	36,144
Ranchi	Ranchi Government Industrial School.	1891	Ranchi	Carpentry in all its branches. Fitter's work, including motor and cycle repairing Blacksmith's work. Carriage repairing and painting. Cane work in connection with furniture.	23 (B class boys.)	70	83	Drawing is compulsory in the Sub-Overseer Department of the school, it is also taught to the artisan boys, though in an elementary form.	In the Sub-Overseer Department, boys are taught up to the Sub-Overseer standard of Sibpur. Artisan students are taught in Hindi, elementary calculations, also free-hand and geometrical drawing.	Establishment ... Rs. 7,464 Stipends to artisans ... 1,128 Contract contingency ... 60 Library allowance ... 18 Coal expenditure for the engine ... 900 Raw materials ... 1,000 Municipal rates and taxes ... 72 Total 10,636	120	10,516 0	10,636
	Patrahatu Industrial School.	1904	Patrahatu	Blacksmith's work		14	14	No ..	Nil	Establishment ... Rs. 6		73	73
	Barenda Industrial School.	1890	Barenda	Ditto		21	21	No ...	Nil	Ditto ... 6		73	73
	Bandu Industrial School.	1898	Bandu	Smithery and carpentry		24	24			Ditto ... 19½		234	234
	German Mission Lace School.	1907	Ranchi	Lace work		44	44			Establishment and material ... Rs. 1,014	536	924	1,460
	Roman Catholic Women's Lace School.	1905	Do.	Ditto		100	100			Establishment and material ... 3,646	2,404	60	3,046
	Khunti Convent Lace School.	1905	Khunti	Ditto		95	95			Cost of establishment ... 2,688	2,688		2,688
	Khunti Weaving School.	1905	Do.	Weaving		13	13			Cost of establishment ... 1,920	1,920		1,920
Manbhum	Jhalda Industrial No. I.	1903	Jhalda	Smithery		15	15	No ..	Course of the 2nd and 1st-year infant class.	Establishment ... 6		73	73
	Jhalda Industrial No. II.	1903	Do.	Ditto		16	16	No ...	Ditto	Ditto ... 6		24	48
	Tanasi Industrial	1905	Tanasi	Ditto		3	13	No ...	Ditto	Ditto ... 4		48	Nil
	Baghunathpur Weaving Institution.	1904	Baghunathpur	Weaving		15	15	No ...	Lower Primary course in p r t.	Ditto ... 13	36	120	Nil

CHOTA NAGPUR DIVISION—concluded.

DISTRICT.	NAME.	Date of foundation.	Place.	Subjects taught.	NUMBER OF STUDENTS BEING TRAINED.				Whether any drawing is taught.	What literary teaching, if any.	Details of expenditure.	AMOUNT CONTRIBUTED BY—				REMARKS.
					Sub-Overseer grade.	Amins.	Artisans.	Total.				Private source.	District Board.	Government.	Total.	
Singbham ...	R. C. Mission Industrial School.	1905 ...	Chaibassa ...	Weaving Needlework Gardening	...	...	...	45	No ...	No ...	Raw materials ... 117 Maintenance of children (boarding) 39 Two teachers ... 80 Stipends ... 3 Monthly total ... 239	Rs. 2,868 4	Rs. Nil	Rs. Nil	Rs. 2,868	
	S. P. G. Mission Industrial School.	1900 ...	Ditto ...	Carpentry, stone-carving and weaving.	...	...	...	27	Yes ...	No ...	Superintendent ... 20 2nd teacher ... 15 3rd " ... 8 4th " ... 8 Stipends to apprentices ... 65 Tools ... 5 Prizes ... 2 Library ... 2 Monthly total ... 128	1,536 0	.....	.....	1,536	
	Ghatella Industrial School.	1894 ...	Ghatella ...	Carpentry and Smithery.	14	No ...	Lower Primary standard in Night School.	Teacher's salary ... 525 Stipend ... 276 Contingency ... 24 Other expenditure 146 Balance in hand ... 55 Total ... 1,026	554 0	480	1,034	
	Chaibassa A. M. Industrial School.	540	
	Blind Industrial School.	150	

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