

Educational (1902) Department.

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ORIGINAL

[Despatch Abstract.]

Industrial Education

Letter from the D.P. I. Subu
is framed by Mr Chakerton
actions drafted by the Committee

BACK PAPERS.

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

FURTHER PAPERS.

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

Government {1902} of Madras. EDUCATIONAL.

Recd.

Regd.

} 1902.

Enclosures

Spare copies

ORIGINAL

G.O., No. 41, 29th January 1902.

JANUARY.

Industrial Education.

Recording letter from the Director of Public Instruction submitting the replies of Mr. Chatterton to the service of questions framed by the Committee on —.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper :—

From the Hon'ble Mr. G. H. STUART, M.A., Barrister-at-law, Director of Public Instruction, Madras, to the Secretary to Government, Educational department, dated 18th January 1902, R.C. No. 9425.

With reference to paragraph 3 of Lieutenant-Colonel Clibborn's letter communicated with G.O., No. 768, Educational, dated 20th December 1901, I have the honour to submit herewith in original Mr. Chatterton's letter, No. 509, dated 15th instant, which furnishes the information required. As regards paragraph 4 of the former letter, I beg to invite the attention of Government to my telephone message of the 14th instant stating that the Committee may visit the technical institute, Madura, and the Wesleyan Mission industrial school, Karur.

2. I request that I may be furnished with a few spare copies of Mr. Chatterton's letter and appendices, if it is printed.

ENCLOSURE.

From A. CHATTERTON, Esq., B.Sc., Inspector of Technical Schools, Madras, to the Director of Public Instruction, Madras, dated 15th January 1902, No. 509.

In reference to your endorsement No. 9425 of 1901, dated 23rd December 1901, I have the honour to forward herewith replies to the questions raised by the Industrial School Committee. The answers referred to in the answers will be sent to-morrow.

INDUSTRIAL SCHOOLS.

IMPROVEMENT OF LOCAL INDUSTRIES.

(a) WHAT HAS BEEN DONE SO FAR.

1.—Description of schools, Government and private, with methods of instruction.

(1) The list of industrial schools, Government and private, in the Madras Presidency with date of foundation, industries taught, average attendance and output of artisans annually is given below. The list is nominally not complete, inasmuch as a number of petty schools and industrial classes have been omitted.

Number.	Name of school.	Date of found- ing.	On 1st April.			Industries taught.		Receipts.	
			Year.	Number of pupils.	Average attend- ance.	Name.	Standard.	Provincial funds.	Other public sources.
Government Schools.									
1	School of Arts, Madras.	1850	1897	638	411	Metal work ..	Advanced ..	..	..
			1898	546	368	Silversmith ..	Intermediate.	..	..
			1899	525	329	Jewellers work.	Do.	..	..
			1900	568	388	Cabinet-making.	Advanced ..	..	..
			1901	461	374	Carpet-weaving.	Intermediate.	..	..
2	Reformatory School, Chingleput.	1887	1897	153	152	Cotton-weaving.	Do.	..	..
			1898	151	153	Pottery ..	Do.	..	..
			1899	149	148	Engraving ..	Advanced ..	..	..
			1900	156	149	Modelling ..	Do.	..	..
			1901	154	153	Carpentry ..	Intermediate.	..	..
3			1897	153	152	Blacksmithy.	Do.	..	..
			1898	151	153	Metal work (Al.).	Elementary.	..	..
			1899	149	148	Weaving ..	Intermediate.	..	..
			1900	156	149	Tailoring ..	Elementary	..	..
			1901	154	153	Tape-making ..	D	..	..
Board Schools.									
	Board Technical In- stitute, Madras.	1890	1897	125	94	Cabinet-making.	Advanced.	3,492 1 6	1,000 0 0
			1898	117	115	Metal work ..	Do.	3,212 2 3	1,000 0 0
			1899	112	115	Blacksmithy ..	Intermediate.	3,068 2 0	1,000 0 0
			1900	160	142	Blacksmithy ..	Intermediate.	4,095 5 3	1,000 0 0
			1901	167	135	Rattan ..	D	4,870 4 5	1,000 0 0
	Board Technical In- stitute, Tinnevely.	1895	1897	38	29			210 14 0	..
			1898	46	42	Carpentry ..	Elementary.	840 14 6	..
			1899	47	42	Blacksmithy.	Do.	381 12 0	..
			1900	60	46	Rattan work ..	D	2,464 2 7	..
			1901	52	46		..	..	..
	Board Industrial School, Bezwada.	1890	1897	32	26		..	862 8 0	..
			1898	33	33	Carpentry ..	E	810 0 0	400 0 0
			1899	37	33	Blacksmithy.	E	1,150 0 0	..
			1900	38	35		..	550 0 0	200 0 0
			1901	31	32		..	..	..
Schools under private management.									
	Anjuman - Mufidi- Ahlai Islam, Madras.	1884	1897	156	107	Carpentry ..	Elementary.	1,930 10 8	3,755 4 10
			1898	178	109	Embroidery ..	D	1,848 4 0	3,255 0 5
			1899	100	87	Tambour ..	D	1,330 3 0	3,208 2 8
			1900	100	90		..	1,067 15 8	2,728 7 0
			1901	100	93		..	979 2 3	2,988 13 3
	Wesleyan Mission Industrial School, Karur.	1888	1897	87	81	Cabinet-making.	Advanced.	3,956 8 1	..
			1898	88	88	Blacksmithy ..	Do.	4,485 12 8	72 0 0
			1899	71	94	Weaving ..	Intermediate	5,499 7 0	88 8 0
			1900	71	75	Rattan work ..	D	4,017 7 7	81 0 0
			1901	63	64	Band ..	D	4,423 14 5	103 8 9
	Art Industrial School, Nazareth.	1878	1897	158	150	Carpentry ..	Intermediate.	4,571 6 2	390 0 0
			1898	178	172	Cabinet-making.	Do.	5,721 0 0	390 0 0
			1899	192	180	Blacksmithy ..	Do.	5,721 0 0	390 0 0
			1900	159	151	Fitter's work ..	Do.	4,618 14 9	390 0 0
			1901	147	140	Weaving ..	Do.	4,618 14 9	390 0 0
	American Mission Industrial School, Manamadura.	July 1897	1897	4	6	Tailoring ..	Do.	..	..
			1898	17	9	Lace-making ..	Do.	..	..
			1899	43	30	Indian embroi- dery.	D	..	..
			1900	65	59	Carpentry ..	Elementary.	84 0 0	..
			1901	65	59	Blacksmithy ..	A.	84 0 0	..
	American Arcot Mission Industrial School, Arni.	1887	1897	64	57		..	96 0 0	..
			1898	67	65	Carpentry ..	Intermediate.	3,958 8 0	..
			1899	74	48	Tailoring ..	Do.	1,159 8 0	..
			1900	86	70	Printing ..	Element- ary.	1,159 8 0	..
			1901	71	68	Blacksmithy ..	Intermediate.	2,045 14 0	..
Receipts.									
Other public sources.									
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		Expenditure.										Actual cost of educating each pupil.	
Private sources.		Sale-proceeds.		Industrial operations.		Office establishment.		General education and drawing.		Total.			
RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.	RS.	A. P.
2,165	7 0	7,377	15 3	18,128	2 1	(a) 14,556	3 6	(b) 2,028	0 0	34,712	5 7	48	0 0
1,822	5 6	5,137	8 5	18,661	13 10	15,125	8 7	3,292	8 2	37,079	14 7	53	8 0
1,512	4 2	9,439	6 9	21,822	5 0	14,548	4 3	3,302	11 3	39,673	4 6	61	4 0
1,515	8 6	9,384	14 9	35,384	11 4	15,855	6 10	3,475	15 11	54,716	2 1	88	8 0
1,309	2 6	17,322	10 11	30,922	13 8	12,821	8 8	6,846	12 7	50,591	2 11	64	4 0
..	..	2,893	8 6	3,893	8 5	6,427	1 0	1,776	14 1	12,097	7 6	60	8 8
..	..	2,214	10 0	3,563	1 2	6,476	5 2	1,662	0 7	11,701	6 11	62	0 1
..	..	2,430	4 10	3,784	0 5	7,261	13 9	1,641	8 11	12,687	7 1	69	4 10
..	..	2,646	11 11	3,922	10 6	6,555	9 10	1,718	4 3	12,196	8 7	64	1 5
..	..	3,034	3 1	4,781	4 9	7,404	12 9	2,113	0 1	14,299	1 7	73	10 0
302	13 0	2,138	15 0	1,535	7 4	1,926	1 11	3,474	11 8	6,936	4 11	75	0 0
177	8 6	2,790	12 6	2,136	1 8	2,713	13 4	2,435	6 8	7,285	5 8	64	0 0
163	14 0	3,103	0 7	3,146	5 5	3,034	1 5	1,716	2 6	7,896	9 4	65	0 0
196	11 9	6,084	11 11	7,074	7 6	3,832	13 4	1,811	14 0	12,719	2 10	58	0 0
151	9 0	8,231	11 6	8,321	9 10	3,982	14 7	2,435	13 5	14,740	5 10	70	0 0
..	..	277	9 1	2,381	5 6	108	0 0	285	8 0	2,774	13 6	78	0 8
..	..	799	6 9	3,654	15 7	102	0 0	408	0 0	4,164	15 7	74	10 8
..	..	1,222	5 0	4,900	4 9	131	0 0	619	0 0	5,650	5 3	92	4 0
..	..	1,044	4 9	5,293	8 9	202	9 3	913	6 7	6,409	8 7	102	11 9
..	..	1,481	0 1	6,950	0 0	294	0 0	1,081	8 9	8,325	8 9	104	15 2
..	..	732	12 0	3,118	10 8	96	13 5	480	0 0	3,695	8 1	113	15 3
..	..	317	6 0	3,438	13 8	72	0 0	480	0 0	3,990	13 8	111	5 1
39	5 0	306	9 0	3,374	14 5	76	14 0	480	0 0	3,931	12 5	109	13 8
..	..	919	8 9	3,360	3 3	156	0 0	480	0 0	3,996	3 3	87	14 11
..	..	291	2 0	3,025	5 6	156	0 0	540	0 0	3,721	5 6	107	3 1
359	5 0	3,819	11 10	7,392	6 0	2,011	0 0	552	0 0	9,955	6 0	53	15 3
696	12 6	2,233	10 10	6,336	12 2	2,025	5 11	552	0 0	8,914	2 1	54	10 0
137	5 0	1,679	3 4	5,077	13 11	1,780	3 2	552	0 0	7,410	1 1	56	0 0
245	10 8	2,864	1 3	5,374	10 8	1,494	12 0	462	6 5	7,281	13 1	41	11 6
2,114	6 11	1,416	0 11	6,039	5 7	1,377	8 0	436	0 0	7,852	13 7	43	3 6
100	13 7	12,762	3 11	18,438	3 1	3,941	8 11	1,202	0 3	23,581	12 3	133	0 2
..	..	10,674	0 4	16,815	6 3	4,321	7 2	1,760	9 11	22,897	7 4	138	2 0
239	10 0	23,882	10 4	22,732	13 1	4,221	11 1	1,174	4 0	28,128	12 2	45	2 0
150	6 4	12,027	4 3	13,385	4 3	4,820	6 6	1,032	3 5	19,237	14 2	95	8 1
444	13 11	10,021	1 2	11,955	14 3	4,190	10 5	1,521	0 10	17,667	9 6	119	7 7
7,220	9 1	2,600	4 5	7,821	2 4	1,814	0 0	5,147	1 7 1/2	14,782	3 8	77	1 7
7,155	14 8	1,976	10 0	8,162	10 5	2,373	0 0	4,707	14 3	15,243	8 8	74	8 6
9,796	13 1	2,260	7 8	10,287	11 1	2,276	0 0	4,112	8 5	16,676	3 6	75	1 4
7,513	3 11	1,505	2 5	8,052	10 7	1,484	2 0	2,595	1 1	12,131	13 8	66	15 9
6,655	7 9	1,505	2 5	7,408	8 9	1,392	0 0	1,914	9 5	10,715	2 2	62	10 5
..	..	670	0 0	1,486	0 0	30	0 0	..	..	1,516	0 0	49	12 3
..	..	1,433	0 0	2,009	0 0	59	0 0	108	0 0	2,176	0 0	17	4 10
..	..	1,833	0 0	2,393	0 0	70	0 0	115	0 0	2,578	0 0	11	7 4
71	3 0	3,707	8 1	9,618	14 7	..	..	1,716	6 11	11,365	5 6	118	8 7
..	..	2,938	12 2	4,430	5 8	..	..	906	1 9	5,336	7 5	35	12 6
50	0 0	4,969	8 10	9,626	8 1	..	..	603	8 5	10,232	0 6	70	7 0
..	..	2,070	6 1	9,068	12 4	..	..	572	0 0	9,640	12 4	88	0 0
3,763	0 0	3,842	10 2 1/2	9,948	1 5 1/2	..	..	614	2 6	10,562	3 11 1/2	41	1 3

(a) General.

(b) Artistic.

(2) The schools included in the list are—

(i) The School of Arts, Madras, which was started in 1850 by the late Dr. Hunter as a private concern. In 1855 the school was taken over by Government and since then has been attached to the Educational department. It is now difficult to say why the present location was selected as the school was started in Popham's Broadway and was moved to the present site in 1857. A brief history of the school written by the head clerk Mr. S. G. Daniel is appended to these replies.

(ii) The Reformatory School at Chingleput was started in 1887. The site selected was an old native fort within a reasonable distance from Madras and at the head-quarters of a district where there are the necessary European officers for proper supervision.

(iii) The Anjumani Mufidi Ahlai Islam, Madras, was started in 1884 with a view to encourage poor Muhammadans to earn their livelihood as artizans. For a long time it was located in very suitable premises in the middle of Triplicane, but quite recently it has purchased much less suitable premises on the Mount Road. The only reason I can imagine for the change in site was the desire on the part of the Muhammadan community to place the institution in a more conspicuous position in Madras where it is hoped that it will attract more attention from the public and command a greater degree of support in consequence.

(iv) Of the other schools, those at Madura, Tinnevely and Bezwada are maintained by the district boards. The first two are situated at the head-quarters of the districts and the third at the most important commercial centre in the district.

The remaining schools on the list all belong to various Christian missions and they have been started at the head-quarters of the missions.

(3) In the Madras Presidency there has been an Inspector of Technical schools since April 1900 and the policy pursued in all industrial schools whether maintained by Government, district boards, or missions is practically determined by that officer subject to the approval of the Director of Public Instruction. The School of Arts is a Government institution, which was formerly under an officer of the Indian Educational Service; but since February 1901, the school has been placed under me during the period I am on special duty. At the present time the art department is under Mr. M. Velayuda Asari, who is responsible for all the art teaching. The industrial section is directly under me and I have two industrial assistants, Sub-Conductor G. E. Brand, whose services have been borrowed from the Public Works department, and Mr. J. W. Coombes, who has lately returned from a course of technical study in England. The former devotes most of his time to the metal work department and the latter has been specially appointed to assist in the development of the weaving industry.

The Chingleput Reformatory is in the charge of the Medical officer of Chingleput district, assisted by a Deputy Superintendent, who lives on the spot. There is a board of visitors, appointed by Government; but the control of the institution is practically in the hands of the Educational department. The district board schools are under the management of the Presidents of the district boards. Each school has a superintendent appointed by the district board; but his powers are very limited and as the Inspector of Technical schools is only an advising officer, the responsibility for the efficiency of the school rests almost entirely with the President of the district board.

The mission schools are usually managed by the senior missionary of the circle in which they are situated. He is invariably an European and generally a man with some mechanical knowledge. At Nazareth there is a Native Christian superintendent, at Karur an European mechanic is the superintendent, whilst at Arni he is an American. At Salem and Manamadurai, the missionary manager is also the superintendent of the school. Grants-in-aid to these schools are given from Provincial funds and they are visited once a year by the Inspector of Technical schools, who reports upon their efficiency and advises the managers as to their control and working.

(4) None of the schools are self-supporting. The nearest approach to this is in the industrial side of the School of Arts, the aluminium department of which is quite self-supporting and the other branches are nearly so. The following table shows

first the total number of apprentices in the school, the total expenditure on industrial operations and office establishment, the total sale receipts and the net annual cost of each apprentice:—

Name of institution.	Year.	Number of apprentices on 1st April.	Receipts.			Expenditure.						Net cost.	Cost of educating each apprentice.							
			Sale-proceeds.	Industrial operation.	Office establishment.	Total.														
School of Arts.	1897	200	RS. 7,377	A. 15	P. 3	RS. 18,128	A. 2	P. 1	RS. 11,472	A. 12	P. 7	RS. 29,600	A. 14	P. 8	RS. 22,222	A. 15	P. 5	RS. 111	A. 1	P. 10
	1898	190	5,137	8	5	18,961	13	10	12,041	8	7	30,703	6	5	25,565	14	0	134	8	10
	1899	200	9,439	6	9	21,822	5	0	11,464	4	3	33,286	9	3	23,847	2	6	119	3	9
	1900	239	9,384	14	9	35,384	11	4	12,771	12	0	48,156	7	4	38,771	8	7	162	3	7
	1901	222	17,322	10	11	30,922	13	8	12,137	8	10	43,060	6	6	25,737	11	7	115	15	0

(5) Industrial schools in this presidency owe their origin to the necessity which the Christian missions experienced for finding employment for the children brought up in mission schools. As Christians the boys could obtain no instruction in the bazaars and it was doubtless felt desirable to keep them as much as possible within the sphere of Christian influence. The establishment of industrial schools was the obvious solution of the difficulty. Carpentry, blacksmith's work, rattan work and weaving were the trades which it was thought it would be most desirable to teach. The first two were trades, about which the missionaries generally knew something themselves; and for the outturn from their workshops they were certain of a limited demand from the Europeans and officials in the district. Rattan work was started, partly from reminiscences of the industrial schools in England and partly because it was convenient to keep a rattan maistry in the school to cane chairs and make baskets. The weaving was undoubtedly started through seeing the great commercial success which has been achieved by the Basel Mission on the West Coast. Till quite recently no attempt was made to teach anything in industrial schools beyond these four industries; but of late the Education department has advocated a bolder policy and the managers of industrial schools are beginning to follow it.

(6) The superintendents of district board schools were originally the superintendents of the district board normal training schools, and as may be imagined their qualifications were of the slightest possible character and their pay correspondingly small. At the present time the superintendent of the Madura industrial school has developed into a good business manager and he devotes the whole of his time to the industrial school. His pay is Rs. 200 a month and he is worth it. The superintendent of the Tinnevely school has also been relieved of his normal school work, but he shows no aptitude for industrial work and he will shortly be transferred from the post. His pay is Rs. 90 a month. At Bezwada, there is no permanent superintendent and the district board apparently cannot make up their minds to allow sufficient pay for a suitable man. The Anjuman usually employs a pensioned officer from the Gun Carriage Factory as superintendent and his pay, Rs. 50 a month, is generally rather more than he is worth. As the school is in an unsatisfactory condition, as Inspector of Technical schools I have suggested to the Director of Public Instruction that a competent European superintendent on a salary not exceeding Rs. 500 a month should be appointed, in the hope that he will be able to place the school in an efficient state and thus render it capable of being a real help to the Muhammadan community in Madras. In the mission schools, the appointment of superintendents and managers entirely rests with the authorities of the mission and the results are on the whole much more satisfactory than in the district board schools. At Karur and Arni the superintendents are practical workmen, and though I cannot say much for the efficiency of the latter institution I have no hesitation in saying that Karur is the best carpentry and weaving school in the presidency.

(7) With reference to superintendents it will be seen from the replies to No. (6) that no regular arrangements have been made for turning out a suitable class of men. The College of Engineering is the only place in the presidency where the necessary theoretical and practical instruction can be readily given; but the pay which has

hitherto been offered to superintendents of industrial schools has not been sufficient to attract students from that institution. As Inspector of Technical schools, I find great difficulty in getting suitable men and I lately proposed that the students of the engineer class in the College of Engineering should be allowed to undergo their practical course under my supervision in the workshops of the School of Arts, with a view to future employment in industrial schools, but the proposal was negatived by Government. It is to be hoped however that when the workshops of the School of Arts are in a more thoroughly equipped condition, Government will consider them sufficiently satisfactory to allow a certain number of engineer students to attend them for practical training. The instructors in the industrial schools were in almost all cases workmen drawn from the bazaars or from engineering establishments managed by Europeans. Latterly, a certain number of them have been trained in industrial schools; but owing to the unsatisfactory instruction given in these schools, they have not proved to be much better than the untrained men. The necessity for central training schools is greatly felt, and it is hoped that the industrial side of the School of Arts will be able to undertake this work for some industries.

(8) In mission schools the pupils are all Native Christians and the majority of them are probably orphans who have been received into and brought up in homes supported by the missions. With regard to the School of Arts and the district board schools it cannot be said that hitherto there has been any particularly definite object. It was considered desirable to have industrial schools and to afford instruction in certain industries. It was lately felt that a fair proportion of the students should be drawn from the artizan classes; but so long as the rolls of the school showed a sufficient number of pupils, no particular effort was made to attract one class more than another and the preponderance of the artizan class in certain schools is probably due to the influence of the artizan maistries and not to any definite attempt on the part of the school authorities to influence the artizan class. It is the scholarships and stipends offered by the school that attract pupils and without these there would be at the present time no pupils. I am strongly of opinion that in institutions supported by public funds, the majority of the stipends and scholarships should be awarded to pupils belonging to the artizan classes. In the first place, they prove much more apt pupils and secondly the artizan classes are suffering so much from the competition of Indian mills and factories and imported goods that I think it is undesirable to add to the numbers by the indiscriminate training of outsiders.

(9) There are no generally adopted rules regulating the points referred to in this question. The most satisfactory reply will probably be to state the practice of the School of Arts. Boys who wish to join in the industrial classes should be over 14 years of age and have undergone preliminary training in drawing. If satisfactory they are admitted as probationary apprentices for one year, during which time they get instruction in drawing and attend the workshops. If at the end of one year their progress and conduct have been satisfactory, they are enrolled as apprentices for five years. During the first year they receive three rupees a month, during the second four rupees, third five rupees, fourth seven rupees, and fifth ten rupees, and it is within the power of the superintendent to grant additional stipends to specially deserving apprentices in their fourth and fifth years. All but the sanctioned holidays have to be taken on loss of pay and one-eighth of the stipend is placed in the Post Office Savings bank, where it is retained till the pupil completes his term of apprenticeship. It may be forfeited for misconduct, irregular attendance or non-completion of the full term of apprenticeship. The system gives us a hold on the boys and provides those who leave the school on the completion of their full course with a sufficient sum of money to enable them to purchase a good outfit of tools if they wish to set up in business for themselves. At the end of each year the apprentices are examined by the school staff to ascertain their fitness for promotion. Each boy is supplied with a service book and in this book a complete record of the work done is entered every month, and once a year the nature of the progress he has made as tested by the school examinations is recorded. At the end of the period of apprenticeship a certificate as to his qualifications and fitness for industrial work will be entered by the superintendent and the service book handed over to the boy. By this plan there is a complete account of the boy's training and any one wishing to employ him will be able to very easily ascertain what his previous

experience has been and what opinion has been formed of him by the school authorities. For the maintenance of discipline among the apprentices of the School of Arts occasional thrashing of the younger boys is found very efficacious, and among the older boys the only practical form of punishment is fining; but latterly the system has been adopted of paying the fines into the boy's Savings Bank account. This does away with most of the objections to the system of fining as a punishment and automatically increases the hold on those boys, over whom it is necessary to have some kind of tangible power.

(10) Hitherto the majority of the students in the School of Arts have learnt a trade in order that they might get free instruction in drawing; but the regulations now in force practically prevent this occurring in the future. No accurate record is available regarding the after careers of students who have left the industrial schools in this presidency. Attempts have been made to keep such records, but in practice it has not been found possible to do so and I should think that probably no more than 25 per cent. of the pupils follow the trade they have been taught in the schools. A considerable number become drawing masters and I have not the least doubt that more boys would follow the trade if it were possible for them to get remunerative employment. The fact, I think, must be confessed that, judged from this, the most crucial test that can be applied to the efficiency of industrial schools, the system of industrial education has been but a very partial success. The new policy which we have adopted and which is best exemplified in the School of Arts and the Madura Industrial school will, it is hoped, lead to more satisfactory results.

(11) In all industrial schools the materials and tools are provided by the school authorities, and it is only in the Aluminium department of the School of Arts that the piece-workers are required to supply their own tools. In all industrial schools the useful work turned out is sold and the sale-proceeds help to defray the working expenses of the institution. One of the greatest difficulties, which the managers of the industrial schools have hitherto experienced, has been to find a ready market for the school products. It has never been considered that the disposal of articles manufactured in the school is a matter of vital importance and of late, in my capacity as Inspector of Technical schools, I have very strongly urged the necessity for making industrial schools more businesslike in their methods of working. The value of time is an item which is generally regarded of no importance and boys trained in industrial schools are seldom smart or efficient workmen. They may be able to turn out work of good quality; but they are nearly always very slow and the result is that their labour is extremely costly. In consequence, the work turned out in industrial schools is always sold at a loss; and so long as this continues it is pretty evident that whatever the schools may be doing for the benefit of the pupils, they are doing very little to advance in industry.

(12) It is only in the School of Arts that any methods of special instruction have been applied and these have met with great success. A few cases will exemplify the method of procedure adopted. For a long time there was a demand for sepoy's water bottles which we were unable to get our workmen to turn out. It seemed likely that there would be a big trade in them if we could teach the men how to make them. I accordingly kept the best maistry I have got at this special work for three months, at the end of which time he had succeeded in making what was wanted and he was then told to teach each piece-worker maistry the way to hammer up these bottles; and they were required to produce a certain number. I then took an order for a hundred bottles and executed it at a considerable loss. Further orders were taken and as the men increased in skill the rates were reduced till at the present time we turn out at a fair profit about 1,500 water bottles every month and there are at least 150 men and boys in Madras who are capable of making them. In all more than twenty thousand of these bottles have been made and about a quarter of a lakh of rupees has been disbursed by the School of Arts as wages. Another example may perhaps be taken from the weaving department, where the principal work at the present time is the manufacture of Madras handkerchiefs by the European hand-loom, in which a fly-shuttle is employed. Weavers who already know the native trade are employed on piece-work and are first put through a preliminary course of dungaree weaving and when they have acquired sufficient skill in the mechanical manipulation of the loom they are set to weave the finer handkerchiefs and their piece-work rates

are fixed at a high level to induce them to turn out the best result they can. The old methods of teaching are satisfactory enough and the main thing at the present time is to get the artisans to adopt new processes of working and to familiarize themselves with the use of better tools. In consequence in the School of Arts we pay more attention to the training of the workmen than to the training of the apprentices. Till the former have been dealt with properly, it is useless to attempt to do much with the latter. We have plenty of good metal workers now and the metal work apprentices are put to work with these men, who spend a good deal of time in teaching them so that they may reap the benefit of their services. Broadly speaking, the most efficacious way of teaching is to make a visible pecuniary result the reward of diligence and application.

(13) In all industrial schools in the Madras Presidency, each apprentice is supposed to learn only one trade, but the rule is not rigidly adhered to in some schools. There is no objection to a carpenter learning a little blacksmith's work or a metal worker fitting, since these are allied trades, but it is not much good teaching metal workers weaving or carpenters rattan work.

(14) Most of the industrial schools in the Madras Presidency devote a certain amount of time to general education and the boys are in some cases prepared for such recognized examinations as the primary and lower secondary. The condition in Madras as compared with the rest of India are quite exceptional; and it is, I think on the whole, advisable that artisans should acquire a colloquial knowledge of English. Europeans in this presidency do not speak the vernacular languages with facility and it is therefore desirable that the better class of workmen should be able to talk to them and receive instructions from them without the intervention of a third party.

(15) It is now the accepted policy of the Madras Educational department that the only *raison d'être* for the existence of industrial schools is that the work turned out should be an improvement upon anything that can be obtained locally or that the industry should offer prospects of material improvement. The establishment of the Aluminium industry by the Madras School of Arts is the best known example of work done in this direction in recent years; but I would also draw attention to the pottery industry which is well established in this presidency owing to the initiative of the School of Arts. It will therefore be no longer carried on by us as a commercial industry as has been the case for the last 50 years. The schools at Madura and Karúr are the only efficient institutions in the districts, and in both of them the work turned out and the methods of working are very much superior to anything previously in existence in those localities. The wood-carving and the metal work at Madura are excellent, and I have already mentioned that the wood work and weaving at Karúr are the best in the presidency.

(16) From the replies to the previous question it will be seen that the system of industrial education in the Madras Presidency is now passing through a period of transition. I am convinced that the methods we have adopted in the Madras School of Arts are the best that can be devised to meet our local circumstances and the only improvements that can be expected lie in the direction of extending the sphere of operations. A thoroughly satisfactory industrial training can only be given in a workshop, where the best work is turned out in sufficient quantities to render it practicable to employ the best methods of manufacture and thus turn out work at the least possible price. This can only be done when operations are carried on as in a commercial factory and the same attention must be paid to the development of business as is done in private firms. The artisan classes are in an extremely backward state; not only do they want a much better education in their trade, but their trade itself wants developing and it is the development of the indigenous trades of India that is the crux of the whole problem. It is quite useless to turn out good workmen unless there is work for them to do, and at the present time it is difficult for good workmen to get good work and receive adequate remuneration for their labour.

2.—Native system of apprenticeship.

(1) In the south of India there are few workshops or factories in which native arts and trades are carried on. Most of the work is done by petty groups of artisans who work in their own houses and in the bazaars. The artisans all belong to certain

castes or sub-divisions of castes and practically outsiders have no chance of learning those trades. The native master workman usually employs a certain number of his relatives and a certain number of hired men belonging to the same caste. If he has sons, they are brought up in the workshop from early childhood and much in the same way as they learn their mother tongue they pick up a knowledge of their father's craft. The workmen also bring their children and, without any elaborate system of apprenticeship being enforced, the same results are obtained as in countries where such exists. The great bulk of artisans are very poor; and it is necessary that their children should commence to earn their livelihood at as early an age as possible and it is the practice in the bazaar to give all the children, whose work in the workshops is worth anything at all, small wages which gradually increase as the boys get older and become more useful.

(2) So far as I am aware the supply of artisans for all trades is by the methods described above.

(3) The native system was well adapted to the industrial condition of India till the time when manufactured goods were imported from abroad and artisans were first subjected to the stress of foreign competition. The native system is in practice that of a rigidly closed trade guild. It prevents the number of artisans in any one trade becoming unduly large and protects the members of the caste from the pressure of the competition in India itself. This advantage, however, is more than counterbalanced by the fact that the artisans are cut off from the rest of the industrial world and continue to pursue the most antiquated methods of working notwithstanding the fact that they have long been superseded everywhere else.

(4) Good workmen generally obtain a local reputation in the neighbourhood where they live; and in certain localities where a particular trade flourishes there are often a considerable number of skilled men. Native artisans pursue very primitive methods of conducting business. They only work to order and have seldom anything in stock which would enable one to ascertain the possession of unusual skill. A certain number of artisans are well known to dealers in Indian art wares, but the bulk of the work done for them is cheap and very shoddy. When one sees a particularly good specimen of native work of any kind, inquiries may lead to finding out who executed it and in this way the majority of the good artisans have been discovered. In the School of Arts and in some industrial schools a number of first-class workmen have gradually been collected or trained and not the least important part of the work which has been done by these institutions in the past is providing continuous work for these men.

(5) The native system of apprenticeship is distinctly inferior to that of the typical industrial school in the Madras Presidency. It is unsuited to the times and it would be impracticable for the Educational department to interfere with it in any way. The native artisan is very conservative, very ignorant and very prejudiced and is not likely to allow himself to become subject to outside influence except when employed as a workman in a workshop or a factory.

(6) Native apprentices never pay any fees but, as before stated, they are usually paid according to the value of the work they can do. Some of the sons of the better class artisans go to vernacular schools, where they learn to read and write; but very few and only under exceptional circumstances ever get more than a very elementary education.

(7) Craftsmen never or at any rate very rarely take as apprentices boys belonging to other castes than their own.

(8) I have never heard of any native agency whereby famine sufferers have been induced to take up any trade other than that of their hereditary calling.

(9) I think it would be useless to attempt to devise any system to offer inducements to native artisans to extend or improve their method of teaching. Hitherto industrial schools have had no influence whatever on the great bulk of the artisan community and it is to obtain this influence that I advocate so strongly the employment of large numbers of artisans in all industrial schools.

(10) & (11) I am not aware of the existence of any trade guilds in this presidency, except at Madura, where the weavers who belong to the Sourashtra community have started an association with the avowed object of improving the

conditions of their trade. They have recognized the evils from which they suffer but so far they have been unable to do anything to improve the condition of affairs and on several occasions they have appealed to me for assistance, but hitherto I have not been in a position to do anything for them. If the weaving experiments I am now carrying out result in any material improvement of the handloom industry, I have no doubt that the Sourashtras of Madura will be very glad to avail themselves of our experience. It must be remembered, however, that the artizan community have very little capital, and as the introduction of improved methods invariably entails expense and as it is impossible that any material changes can be effected without it the supply of capital must be obtained from some source. In the first instance industrial schools find this capital and if they succeed in demonstrating the commercial success of their improvements, there will probably not be much difficulty in inducing the flow of capital into the industry. The only example that I can give of this at present is the establishment of the two aluminium companies which are now working in Madras and which are the direct offshoots of the metal work department of the School of Arts.

3.—The principal industries of the province.

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

- (a) Building trades, including brick-making, carpentry, stone mason's work.
- (b) Metal-work trades, including goldsmiths, silversmiths, coppersmiths, brass and bell metal workers, tinsmiths and a great variety of minor sub-divisions.
- (c) Textile trades, including cotton-weaving and printing by hand blocks, silk-weaving and the manufacture of carpets.
- (d) Wood working such as cabinet-making, coach and carriage building, boat building and ornamental wood work of various kinds.
- (e) Tanning and the preparations of hides and skins for export trade.
- (f) A variety of miscellaneous industries such as glass manufacture, fire-works, paper and mat-making.

(2) & (3) I am not prepared to make any special recommendations at the present moment, as without detailed investigation and probably experiments it is impossible to say what can or cannot be done to improve the prospects of any branch of industry. By accident I was forced to pay attention to the metal trade in this presidency, and as my experience extends so it seems to me to do the possibilities of the trade. The quantity of metal work imported into India is very large and I see no reason why the greater part of it should not be profitably manufactured in well-equipped factories in this country. Excluding from consideration the engineering trades there is a sufficient market in India for several factories making locks, hinges, buttons, lamps and miscellaneous Birmingham brass work. The native methods of smelting iron are certainly worth investigating and could probably be greatly improved and it seems to me not impossible that a trade in cutlery and light Sheffield goods might be successfully established if funds were available for the preliminary work. Native metal workers are very clever and, if properly organised and trained, could turn out a great variety of ornamental work such as is now made in Paris and other continental cities. The weaving trade is by far the most important in this presidency and the weavers are in a very impoverished condition through the competition of piece-goods. For some time past we have been experimenting with this industry; and though no conclusive results have yet been obtained, I am hopeful that improvements in native methods of weaving can be effected which will increase both the quality and the rate of output. Experiments are now in progress at Madras, Chingleput and Karúr and it will be possible for the Commissioners if they so desire to investigate the methods of procedure for themselves. In the School of Arts, a good deal has been done to develop an export business in high class cabinet work and every year a good many thousand rupees worth are sold, but the business is not one capable of any great

expansion. I think it is probable that, if works were set up in a suitable locality, glass of sufficiently good quality could be manufactured to compete with the very extensive imports of glass bangles and beads from China; and if success were obtained other developments might follow. This, however, is hardly the work which should be done in an industrial school.

In a paper presented by Dr. Watt to the Educational Conference at Simla, of which copies have, I presume, been furnished to the Commissioners, he discusses the question of applying chemical knowledge to the improvement of the processes of preparing for the market many of the agricultural productions of the country; and although I am not quite so sanguine as is the Economic Reporter to Government regarding the improvements which would follow, yet I fully endorse his views as to the necessity for the establishment of a chemical research laboratory, and I would strongly urge the desirability of extending the sphere of operations of the industrial side of the School of Arts so as to include technical chemistry.

(4) I think it is probable that every industry would be the better for a complete examination of its process by a technical expert, and I have not the least doubt that in some cases important improvements could be effected. It is purely a matter of expediency which should be dealt with first, and I think it is quite likely that a great deal could be done for industries which are now very insignificant.

(b) WHAT IS PROPOSED TO BE DONE TO CARRY OUT THE EDUCATIONAL CONFERENCE RESOLUTION.

1.—Proposed alterations and additions in system and methods.

(1) & (2) The methods adopted in the School of Arts, Madras, when fully developed are the best that I had been able to devise, and I think they are to some extent adequate to the needs of the presidency. Our greatest deficiency at the present time lies in the absence of competent experts to train the workmen and generally to supervise the manufacturing processes. Personally I am not an expert in any trade or industry, and the improvements that I have introduced are only such as any scientific engineer would devise, and my work is constantly hampered by lack of experience and consequent inability to introduce any radical changes in industrial operations. If my assistants and foremen had been trained in European shops, where the same class of articles are manufactured, we should doubtless have been able to make much more rapid progress.

(3) I do not consider it desirable to make any special provision for advancing specially promising students from an industrial institution to one of a higher class. Very exceptional merit can always be dealt with by exceptional methods, but the great bulk of the artizan community are very slightly educated, and by the time any unusual ability is likely to be discovered in an industrial school it would be too late to remedy the defects of early education sufficiently to enable the pupil to take advantage of courses of instruction in technical schools.

(4) Up to the present time men engaged in industrial education have picked up their knowledge and experience as best as they could, with the exception of the superintendents of the industrial schools at Karúr and Arni. Very rarely men belonging to the artizan class are sufficiently well educated for the posts of foremen or assistant managers. I have, however, come across one or two such and in every way I think they were better than the average man who comes out from England. I think it is essential that boys destined for employment in the higher posts in works and manufactories should be well educated, and in this presidency that means that they should receive a university education up to at least the F.A. standard. Their special training should be given in the Engineering College. Unfortunately, there is no special course of instruction arranged which is exactly suitable. The subjects of study should include mechanical drawing, mathematics, applied mechanics and elementary science and the student should spend from one-third to one-half of his time in the workshops. The course might last two years and the pupil should then be transferred to the industrial department of the School of Arts, or to some large workshop, where he would get a wider range of practical experience.

(5) I am of opinion that the only way in which indigenous industries can be placed on a better footing is by the introduction of the factory system. Capitalists will have to set up the works and employ the artizans and the managers or foremen

will have to be men not only with technical knowledge of the trade but with business experience also. It is therefore impossible that their training should be completed in either a college or an industrial school unless indeed the latter be run on commercial lines as I have already advocated.

(6) Presuming that the boys have undergone a course of training in an engineering college, I do not think that the final training should be given in large workshops, where the operations are minutely sub-divided and the chain of responsibility for the management of the works extended to people to whom the boy would not ordinarily have access. A much more generally useful experience is likely to be acquired in a small workshop doing a miscellaneous but good class of business. I do not think that in any case a fee should be paid to a workshop for training boys who have already some acquaintance with the work. Personally I should much prefer to pay such boys and recoup myself by employing them on useful work. The system of pupilage has almost died out in England, and I know no adequate reason why it should be more successful here.

(7) Private industrial schools do not and are never likely to exist in this presidency. The schools not under the management of Government will be under the management of missionary bodies, district boards or municipalities, and as they are certain to apply to the local Government for grants-in-aid from Provincial funds I do not think there will be any difficulty in making them conform to any general policy that may be adopted. Subject to such restrictions as conformity with this policy necessarily entails, I should allow all these schools as free a hand as possible and should simply inspect them from time to time to see that they were maintained at a high standard of efficiency. The present system of grants-in-aid is unnecessarily elaborate and it would be much better if simplified to an annual lump sum grant for maintenance and to grants on account of capital outlay. Such expert advice as Government may be in a position to place at the disposal of the managers of industrial schools should be given gratuitously, and it should be part of the duty of the Inspector to see that such advice was followed as far as circumstances would allow.

Proposed alterations and additions in schools and of the want of new schools.

(1) Even the best of the industrial schools in the Madras Presidency are very imperfectly equipped in the matter of tools and plant and their teaching staff is far from as good as is necessary. Much work is done by hand which could be much more efficiently performed by machinery, and every industrial school should be supplied with an oil engine or small steam engine so as to get rid of the crowds of coolies who now furnish the motive power. If Indian industries are to be improved it is no use going in for half measures in industrial schools. Each school should be well ahead of the workshops in the neighbourhood and should be in a position to assist private enterprise by undertaking machine work, especially when the machines are expensive and the saving obtained by using them is of material importance. To give examples of these would necessitate going into considerable details, but when the Commissioners are in Madras I shall be glad to show them several instances in which we have been able to carry out the ideas I have just formulated.

(2) I am not in favour of the institution of a large number of industrial schools at the present time as I think we have yet much to learn before we begin to teach. I am strongly of opinion that India and not merely one province requires one for each of the more important trades. There should be at least one school which might be termed a central technical or industrial school which should possess a thoroughly competent staff of experienced men in the trade, a complete equipment of tools and machinery for carrying on the trade with the highest degree of excellence possible and such a school should be allowed to turn out sufficient work, which would be disposed of by commercial methods, to give full employment to both staff and machinery. I have already formulated proposals for developing the metal-work department of the School of Arts into such a school, and I have suggested that it would be possible to do all that is required with an output of about four lakhs of rupees a year. It is not a matter of much importance whether these schools are under imperial or provincial control so long as they are well known throughout India and arrangements are made so that students from all parts of India can freely take advantage of the facilities they offer. I think it is much more important to start half a dozen such schools, each dealing with only one trade, than it is to fritter away our resources over

a large number of industrial schools of the type which have so far been established. I am not in a position to propose any definite scheme for the establishment of these schools, but tentatively I would suggest that the following trades might be dealt with:

(a) A school of metal-work in Madras dealing with all kinds of work—brass, copper, aluminium, silver, tin, lead and zinc.

(b) A school of weaving for the location of which any number of localities appear to be suitable. In this presidency, Madras, Madura or Salem appear to be the most favourably situated towns. In this school instruction would be given in the preparation of yarn for dyeing, in the operations of the dye house, in warping, sizing and in hand weaving. Probably both silk and cotton might be advantageously dealt with in the same place; but it is possible that it would be desirable to treat these two materials as the basis of two distinct industries.

(c) A school of wood-work which should be located in some situation where a great variety of timbers are readily available. In this presidency the best site would be either in Madras, Coimbatore or Calicut, but probably the best site in India would be either in Bombay or in Calcutta, where there would be a large local market for the productions. In such a school high class carpentry would be taught and a specialty would be made of the production of art furniture suitable for foreign markets. There is a fair amount of such work done in Madras, and I believe that if proper steps were taken to develop the business a large export trade would spring up with countries where labour is expensive. Already China and Japan have done a great deal in this way, and there seems to me no reason why India should not participate in the advantages which these countries are reaping.

(d) A leather trade school.—For this Cawnpore obviously possesses unequalled advantages, but Madras and Bombay are both of them ports from which immense quantities of hides and skins are exported, and speaking for Madras I have not the least doubt that such a school would go a long way towards arresting the decay of our local tanneries.

(e) Iron workers' school.—By this I do not mean an engineer's shop, but a school for the training of native iron workers. The work would be mainly what is generally classified as light blacksmiths' work, which would include the manufacture of agricultural implements, ornamental iron work and light fitter's work. A good deal might be done to improve native cutlery, and if such a school were established in one of the old iron-working centres, it would be a proper place in which to endeavour to improve native methods of iron smelting. It is practically certain that the production of cast-iron is an operation which can only be profitably carried on in a large blast furnace; but as regards the production of pure iron or high class cutlery steel there is still room for experiment. For instance, it is a well-known fact that a small percentage of aluminium will reduce the melting point of wrought iron by about 700 degrees and that if to cast-iron added at its exit from the cupola it greatly improves the quality of the metal. The application of these two facts to the native smelting process might result in improvements of great importance.

Under a school of sericulture.—An experimental farm has been established in Langartizans, Mr. Tata, and I am inclined to think that the plan he has adopted there is capable of very great expansion, and I would strongly recommend the establishment of a properly organised farm in any one of the silk districts of India.

Detailed inquiries might lead to the discovery of a number of other trades which would be greatly benefited by the establishment of central industrial schools. The principal functions of these schools would be the training of men for the posts of foremen or managers, the training of a limited number of first-class artisans who would become maistries, piece-workers or gangers, the improvement of native processes of working and the introduction of new materials, new appliances and new systems of working. The officers and staff of such schools will in the first instance have to be recruited from other parts of the world and the trained students would supply the staff for local schools and provide private enterprise with as good a technical skill as it could now import from Europe. Each of these schools would necessarily be a manufacturing concern, but if its operations were managed with discretion and tact it does not necessarily follow that it would in any way compete with private enterprise. I have already submitted a scheme for the establishment of new schools to the Director of Public Instruction and modified as he may think fit

it will probably be submitted to the Commissioners. I would only add that I am strongly of opinion that the improvement of existing schools is of very much greater importance than the opening out of new ones. It may be well to mention here that there exists in Madras a body of trustees in charge of certain funds amounting to about 2½ lakhs of rupees which have been subscribed for the promotion of industrial education to commemorate the first jubilee of the late Queen-Empress and as a memorial to her long and glorious reign. The first fund was subscribed fourteen years ago and the latter one last year. Both are invested in Government paper and practically nothing has ever been done either with principal or interest, and nothing seems likely to be done in the immediate future as the committee has always studiously avoided obtaining any expert advice and have invariably ignored any practical suggestion that have been made to them. The fund would provide sufficient capital to establish one of these central industrial schools, but the maintenance would inevitably become a charge on the provincial revenues.

(3) We have a drawing class from 6 P.M. to 8 P.M. three nights a week in the School of Arts. It is moderately successful, and the students who attend pay fees, but I am not in favour of evening schools in this presidency though possibly in the north of India, where the climatic conditions are materially different in the cold weather, they might be started with advantage.

(4) If night schools are started in any place they should be managed by the general educational department. I am entirely in favour of the complete separation of general education from industrial education, and I see no reason why night schools should be an exception. This matter was discussed at the Simla Conference and the conclusion then come to received the unanimous support of all the Directors of Public Instruction.

(5) This question has been answered in my reply to No. (a)-1-(7).

(6) In Madras we have three special institutions devoted to technical or industrial work—the College of Engineering, the School of Arts and the Agricultural College. To a certain extent the three institutions overlap one another, and if the three were more intimately connected more use might be made of the expert staff available and in consequence better instruction given. The College of Engineering is at present too much an appanage of the Public Works Department and in my opinion it does not sufficiently provide for the general engineering requirements of the presidency. They are comparatively small it is true, but if anything is to be done for their development it would be preferable to utilize the by no means insignificant resources of that institution. To some extent I did this for a period of three years—1898, 1899, 1900—during which time I was connected with both the institutions, and my experience so far as it went was distinctly favourable to an extension of the principle. If this is done it would be quite possible to provide all the necessary scientific and technical instruction in existing institutions and it would only be necessary to obtain special experts for instruction in particular trades and industries.

2.—How the Neapolitan scheme would apply.

(1) to (5) The account of the Casanova boys' artizan school, which Mr. Radice published as appendix 3 to Sir Edward Buck's report on practical and technical education does not give sufficient details to enable one to express any definite opinion. I should very much like to see a school started on this system under the most favourable conditions that could possibly be obtained in India, and I understand that the experiment is to be tried in Lucknow, where the conditions are as favourable as are likely to be obtained anywhere. It appears that at Naples the boys enter the school at the age of seven years and leave it after an 8-years' course at fifteen. During the first three years the boys receive a general education and during the last five an industrial education. The Simla Conference decided that both these should not be undertaken by the same management and that provision should be made for general education in industrial schools. I presume therefore that if the Neapolitan system were introduced into this country it would be modified so far as to omit the first three years of the course. So far as my experience in Madras goes I do not think that much good is done by admitting boys into industrial schools before the age of 14. But there is no doubt that in the bazaars boys often learn a good deal of their fathers' trade long before that age. Industrial conditions in Italy are so extremely

alone.

different from those which prevail in India that the Neapolitan system by itself would, I think, effect very little. If, however, there were a number of central industrial schools for the training of maistries and foremen I think it might be possible to adopt the Neapolitan system as a means of extending the work and improving these industries all over the country. I do not think that craftsmen working at their trades and financing them will come to work in an industrial school under the control of a superintendent. But I think that many of the passed pupils of our industrial schools would be able to take advantage of this system as a means of getting a start in life. Assuming that an attempt must be made to start such a school in Madras, I think it would be necessary to construct a double row of shops, something like the Burlington arcade, to which the public could have free access. Behind these shops on either side would be the workshops of the school. Each master craftsman would be allowed a certain amount of space and a certain number of workmen and pupils. It is quite impossible to say without any experience how the details should be arranged. Some kind of start would have to be made and gradually as experience was accumulated a practical system of working would be evolved. At the outset at any rate the most important function of the school would be to secure a sufficient number of orders for good work to keep the artizans employed and I am almost certain that it will be necessary to supply each artizan with all the capital that he would require for carrying on business. It will be difficult to get any security for advances of capital from workmen and it will be necessary to a large extent to trust to their honesty. Probably the school will have to supply each master artizan with an outfit of tools with which to carry on his work; and these tools will be kept in the school buildings and remain the property of the school till such time as the master artizan is in a position to repay their original cost to the school by a system of monthly instalments. Certain materials might be advantageously supplied by the school where the school could purchase them in a bulk on more favourable terms than the artizans would be able to obtain: e.g., metal-workers might be supplied with sheet brass, copper, or aluminium; wood-carvers with timber; chucklers with leather; weavers with yarn; but it would be impracticable for the school to supply all the odds and ends required in a workshop for the execution of orders.

Under a system of working like this, there would probably be very little waste of material as it is not likely that the artizans would allow their apprentices opportunities of wasting much material. Work, when finished, would be exposed for sale in shops and it would not be possible for the school to take any responsibility regarding its disposal. There will be no necessity to have any special exhibition; but if the school were in a position to do so it would be desirable to establish one central show room in which might be kept for sale specially fine pieces of work executed in the school by the master craftsmen under the orders of the Principal and paid for when finished from a capital sum at the Principal's disposal for the purchase of such works. By making a small profit on the resale of such works to the public, it would be possible to keep the capital sum intact and pay the expense of maintaining the show room.

Under this system, if it succeeded, the bulk of the apprentices would be the sons of artizans, and as they are very poor it would be necessary to pay small stipends and the school authorities would have to maintain a very close system of inspection over the methods pursued in each workshop to ensure that the boys who received stipends were adequately taught by the master artizans. It would be difficult to ascertain what profits were made by the master artizans and I think it would be probably necessary to leave the question of division of profits entirely in the hands of the master artizans. If this system were a success and the master artizans found it profitable to work in the school, their relations to their apprentices would adjust themselves automatically. The boys would not work for them if they did not get an adequate reward for their labour and the master artizans would have to be ejected from the school if they do not keep a sufficient number of apprentices at work.

As regards holidays I should close the school on Sundays and on all the more important native festivals. At all other times the school would be open from 7 A.M. to 6 P.M. I should only insist upon the attendance of apprentices within certain specified hours of the day. The fewer the regulations the more the likelihood of success. I should not allow boys in the shops down the central arcade and I should

enclose the whole of the premises behind each side of the central arcade and allow no one inside them except the apprentices, the master artisans, and their recognised employés. It would of course rest with the Principal to admit visitors at his discretion. It would probably be desirable for the school to provide instruction in drawing, English and possibly in elementary technical subjects connected with the scientific principles underlying the trade. It would also be desirable for the Principal from time to time to give simple lectures to the artisans on general commercial matters connected with the trades and to introduce to their notice new inventions or improved processes. At the outset it would be impracticable to charge fees. But it is possible that if once a system were established and made a success, fees might be charged; and in such cases it would be better to make the fees take the form of rent charge paid by each master craftsman rather than a fee paid by each individual apprentice. For the protection of the master craftsmen as well as boys, each apprentice or rather the guardian of each apprentice would have to enter into some simple legal agreement with the school authorities by which boys would be bound to remain a certain number of years in the school as apprentices and the school would undertake to provide proper instruction in the trade during the whole of that period. It will also be necessary for the school to obtain some legal hold over the master craftsmen and their property within the school premises to provide all sorts of contingencies such as might arise from causes under the control of the artisans or from causes beyond their control.

(6) I should certainly attempt to improve the craftsmen's practice of work or else the *raison d'être* of the school would cease. But the question to decide how this could best be done is a difficult one to answer. The school might purchase expensive tools and after demonstrating their value might lend them to the artisans under special conditions. The school should certainly set up an engine and machinery, which the artisans might avail themselves of. But the terms would have to be left to the discretion of the Principal. The efficiency of the school as a means for improving the practice of the artisans would largely depend upon the tact and discretion of the Principal and upon the personal influence which he would be able to exert over the master artisans. Profitable work is what the artisans would want and if the Principal was able to arrange for a continuous supply of orders he would have little difficulty in getting the artisans to adopt the best and cheapest methods of production.

In concluding my remarks on the Neapolitan system of industrial schools, I should like to say that I do not think that the system is suited to many of the trades practised in India and that it will not prove a very important factor in the general development of indigenous industries. For bazaar trades which must always remain in the condition of petty industries it seems admirably adapted and might probably be suitable. But in dealing with this question of the improvement of indigenous industries, I have in mind the undertaking of methods and processes which can only be carried on in what may be termed "factories." For this more ambitious programme the Casanova school does not seem to me to be suitable.

3.—Would you accept experts from abroad in each industry.

(1) to (5) As from my previous replies it will be seen that I advocate in the first instance the establishment of one central industrial school for each trade and as I think that the greatest amount of good work can be done by making each of these institutions thoroughly efficient in every respect, it naturally follows that such experts as are engaged will place the whole of their services at the disposal of a single school.

I think it is quite possible to obtain a sound general expert for each school and such a man should I think occupy the position of Superintendent or Principal, but as I contemplate that each of the industrial schools should carry on operations on a fairly extensive scale I think it will be necessary to engage other experts to control the working of the various departments. For instance supposing that we established a school of metal work in Madras, I should place at the head of that institution a man who had a thorough knowledge of mechanical engineering and a fair acquaintance with physics and chemistry. Under him it would be desirable to employ a number of departmental managers, each a special expert in that particular branch of the trade which he would have to look after. Most of these men will have to be obtained from Europe and their pay can only be justified by working on such a scale as it would

be sufficient to fully employ them. In a metal-work school there would be a number of departments and these men would be the managers or foremen and they would be required to have a thorough practical knowledge of every detail of their trade. The list of such experts as it is desirable to employ might be a very large one, but I think it would be sufficient to get (1) a general machinist to look after the drawing presses, lathes and polishing machinery; (2) a general brass finisher to superintend the various polishing processes and lacquering, bronzing, enamelling and so forth; (3) a coppersmith to superintend the hammering department and all work connected with the construction of vessels and plant made out of sheet metal, and under him would be all the hammermen, braziers and rivetters; (4) a foundry man to look after the pattern shop and metal foundry; and (5) a first-class fitter to superintend that very important branch of metal-working establishment. These men would occupy in England similar positions, and if brought out here they require to be paid from Rs. 300 to Rs. 500 a month, depending upon their qualifications. Whether they are engaged by the Provincial or by the Imperial Government is not a matter of great importance and would be determined by the status of the school itself. The balance of advantages would probably be in favour of putting both school and staff under the Imperial authorities and of having, as suggested by Sir Edward Buck, an Imperial officer to control them.

(6) The methods by which these experts would proceed to improve the manipulation practice would be to apply a special knowledge and skill to the devising of tools and methods for manufacturing articles for sale. In some cases the work would be the execution of orders and it would be the business of the experts to show their workmen the simplest and best way to carry out the orders, but in the majority of cases new articles would be made as an experiment, after considering the probability of finding a market for them at the price at which the school could turn them out. It has been my practice in the School of Arts, whenever we were short of work, to hold consultations with my assistants and they nearly always resulted in suggestions being put forward for the manufacture of new articles which have subsequently been readily disposed of in large quantities. The methods that I have used in the School of Arts on a small scale might be generally applicable to most of the schools. In the weaving industry we are dealing with different class of problems. For everything we manufacture it is easy enough to get a market at a price and the whole of our exertions have to be concentrated on devising methods for producing a certain article of a certain quality at a certain cost. We are now making Madras handkerchiefs and enquiries have placed us in possession of the main items which go to make up the cost of manufacture, so much for raw material, so much for preparing warps, so much for weaving, so much for waste, and so much for miscellaneous expenses and management. Each of these items can be sub-divided and each of these sub-divisions has to be carefully scrutinised to see if it is possible to reduce it by any means. The two main items in the cost of manufacture are warping and weaving. To reduce the first of these we are trying to use warping mills instead of hand-warping and to reduce the second we are using European hand-loom instead of native hand-loom. Should we succeed, either the cost of production would be decreased or the wages of the workmen increased without adding to the selling price of the handkerchiefs. The introduction of new processes will only be a benefit to the working class where it necessitates an increased skill and experience on the part of the operators.

4.—Proposed department of control, central and local, for urban and rural schools.

(1) Schools must either be under the control of local authorities or under the control of the Provincial agency. My own experience of district boards and municipalities is not favourable, and I think that if any extensive development of industrial education takes place it will be absolutely necessary to place all the schools under the control of officers appointed by the Provincial Government. As the local authorities are constantly changing and as they possess no special qualifications which will enable them to effectively superintend the working of such schools where they are desirous of spending part of the public funds under their control on industrial education, the most efficient system will be for them to make such provision as they can for the

object in question and appoint a small committee to negotiate with the Provincial authorities. A proper scheme can then be prepared and submitted for approval to the local authorities and when the preliminaries are settled a superintendent can be appointed and the schools started, leaving inspection and control of the working of the school to the Provincial authorities.

(2) The local control in this case would be confined to receiving an annual report on the working of the institution and the power to withdraw support from it should they be dissatisfied with the results obtained.

(3) & (4) If technical and industrial education is to be developed I think it would be best to create either a separate department for the work or to divide the education department into two main branches. This is a matter however on which I have no data necessary for forming a decisive opinion, and it seems to me that it must rest with the Government and the head of the education department to say whether the present system is satisfactory or whether from their point of view some change is desirable.

(5) I am inclined to think that industrial education would be most satisfactorily managed under a system of imperial control. If these central mono-industrial schools, which I am in favour of, were established their sphere of operations would not be limited to any one province or sub-division of the empire, and it would therefore be distinctly desirable that, since they are working for the whole of the country, they should be under the Imperial Government. So far as my own experience goes I do not think it would have made any difference to my work during the past three years if I had been under the Imperial instead of the Madras Government, but if there are a number of these schools, some in one presidency and some in another, each under a different Government, it is obvious that many difficulties will arise which would be avoided if they were all under one central controlling authority. The difference between industrial education and general education lies in the fact that each province is able to maintain a perfectly complete and efficient system of general education, whilst at the present time it is hopeless to expect that every province in India can maintain in efficient working order a complete system of industrial schools. Probably a working compromise could be arranged on the basis of the Imperial Government maintaining and supervising the working of all the central industrial schools whilst each local Government look after the much more numerous secondary schools.

5.—Exhibitions and sales whether required.

(1) As a means of advancing the industrial condition of the country the part played by exhibitions in India must always be a comparatively secondary one. They are useful for bringing to the notice of the people new products and new manufactures, but there are other means of doing this which are generally much more effective. An exhibition in this country is a success only when it is arranged as a *tamasha* and I am doubtful if the trouble and expense which exhibitions entail are repaid by the results achieved. I do not think that industrial exhibitions, whether local or provincial, should be organised by the authorities concerned with the development of industrial education. Both provincial and local exhibitions have been held in Madras for many years past and since I have been engaged in opening out a market for aluminium in India I have freely availed myself of the opportunities they have offered, but although they have certainly proved useful I do not think they have materially advanced the work. The time and expense which they have entailed might have been equally profitably used in other ways. Of the value of Imperial exhibitions I do not feel competent to express any opinion as I have had no opportunities of judging what results have followed them. The last one was held in Calcutta about 18 years ago and I do not know what good may be expected to follow if another be held in the immediate future. I am inclined to think that exhibitions in this country are more likely to benefit the importers of European and American manufactures than they are to encourage or assist the progress of Indian manufactures. Personally I am not inclined to take any active part in the organization of exhibitions, but when such exhibitions are held I think it is wise to take advantage of them.

(2) My remarks in reply to the above question apply only to the purely industrial products and the case is different with the art industries. I think that provincial exhibitions are of some value, but what I think would be of much greater value is the institution of a permanent exhibition of the products of artistic industries in the three great capital cities of India. I have suggested the establishment of such an exhibition in Madras as a suitable way of utilizing the funds of the Victoria Jubilee and the Victoria Memorial Committees and the details will be found in some papers which I append to this report. *Vide* paper on "Industrial Education."

(3) The procedure which I have adopted in the School of Arts would perhaps best explain the methods that I find in practice most suitable for the disposal of the work of an industrial school. In the weaving department I have a contract with the local firm of piece-goods dealers and to them I consign the whole of the outturn of our weaving department and they ship the handkerchief to London, where they are sold by auction for reshipment to the West Indies, to the West Coast of Africa and the Southern States of America. Wood-work and wood-carving have so far only been made to order, but I now propose to extend the business by keeping a certain stock in hand, as I find by experience that people much prefer to buy ready-made furniture, partly because they see what it is like and partly because they object to waiting for it to be made. The pottery department mainly supply Government institutions such as the Medical Stores department and the Commissariat. Occasionally large contracts for terra-cotta have been taken and small quantities of ornamental pottery and various domestic articles were made and kept in stock for sale in the school room. The bulk of the work done in the carpet-weaving department is previously ordered, but when there are no orders stock carpets are made and they can generally be disposed of without much difficulty. If it were worth while to extend the scale of operation I should make large number of carpets of standard market sizes and ship them to England for sale at the quarterly carpet auctions in London. These are the ways in which we dispose of all the outturn of the departments which have not been specially pushed for commercial reasons. In the aluminium department, where the sales average 18 thousand rupees a month, a great number of methods for effecting sales have been tried. In the school sale room about 500 rupees worth a month is sold to casual visitors. I employ three agents at Calicut, Coimbatore and Salem, and I pay them a small fixed salary and a commission on the sales they effect. This system in some instances has worked extremely well; in others it has been a failure. In nearly every large town in the north of India we have a firm who act as our agents. We sell them goods at favourable rates of discount. The business we do in this way is very considerable. About one-third of the regiments in the British and Native Army have obtained large quantities of equipment direct from us and we sometimes get large Government orders. Since the opening of the aluminium department we have sent out thirty or forty thousand illustrated price lists and the orders which the recipients of these price lists send to us are the most profitable part of our business, as we charge the usual retailed rates and I have no commissions to pay. A similar case to the aluminium department is not likely to arise in other industrial schools, and I have only detailed our methods at length because it is my opinion that an industrial school may use any legitimate method for disposing of the outturn. To avoid interference with private trade industrial schools will have to pay much more attention to what they manufacture than to how they sell, and the only recommendation I would make is that as far as possible full use should be made of such recognised commercial channels as are available for the disposal of productions and that established trade practices should be strictly observed. With reference to the question of prices being marked or fixed, my own experience covering transactions amounting to at least six lakhs of rupees is that it is quite impracticable to do business on at all a large scale with fixed prices. The cost of selling articles varies enormously in different districts and allowance has to be made for this and for many other circumstances.

(4) The cost of production is in some cases unduly high through excessive railway rates and I am quite certain that a more liberal treatment of Indian industries by the railway companies will in the long run lead to a permanent and important increase in traffic receipts. Cheap production can only be effectually achieved by the concentration of industries in a few centres and heavy railway rates militate against these.

(5) Within the range of my own experience, I have not the least hesitation in saying that expensive fine work is far more profitable than cheap common work. Wealthy people will pay very high prices for extremely good work and with anything less they are not satisfied, but poor people who are content with inferior work want it turned out at the lowest possible rate and the margin of profit is therefore very small. The great difficulty which the best Indian artisans experience is in the disposal of their work. They are not able to place it on the market and middlemen receive an undue share of the price paid by the purchaser. The establishment of the permanent exhibitions that were mentioned in my reply to question (1) seem to me to be the most promising way of bringing native art craftsmen into immediate contact with those who would be their patrons.

(c) HOW ARE FUNDS TO BE PROVIDED.

(1) This is a matter for Government to reply to.

(2) Industrial schools will never be self-supporting. The most that can be hoped is that industrial education should not cost more than any other form of education. To make industrial schools absolutely self-supporting would necessitate running them absolutely and entirely for the sake of profit. A school for a time may, under exceptional circumstances, secure a large amount of profitable business, but that very fact will engender outside competition and the percentage of profit will rapidly dwindle. This has been the case with the Aluminium department and it will be so with any other industry or material. I do not think that any scheme of supplying capital to pupils who have been taught at industrial schools is likely to be a success. If the schools succeeded in establishing new industries or improving old ones, the necessary capital would be readily supplied from private sources.

(3) & (4) I think Government can render material assistance to the artisan community by some scheme which will admit of financial assistance being rendered to pioneer enterprises. In the case of the aluminium industry, I have greatly assisted private enterprise by keeping the supply of metal under my control, whereby I have been able to purchase it on the most favourable terms and sell it to manufacturers in India at very slightly enhanced rates, allowing them from three to six months' credit. This has enabled them to carry on their business on a comparatively small capital and thus obtain a much larger profit. Practically at the present time the aluminium industry is being run with Government capital to the extent of at least two-thirds of the total employed in the trade. This way of rendering assistance has proved in practice very easy to work and involves comparatively little risk. It is useless to attempt to propose a scheme for assistance to industrial workers without complete details. But I am quite certain that it would not be difficult to devise means of rendering them effective help whenever occasions arise, provided sufficient funds are available.

A BRIEF HISTORY OF THE MADRAS SCHOOL OF ARTS.

Succession list of Superintendents.

	From	To
Alexander Hunter, Esq., M.D. (Founder) ...	1850	1858.
Dr. Charles Murray Duff, Acting ...	1858	1859.
Alexander Hunter, Esq., M.D. ...	1859	1873.
Major W. S. Hunt, M.S.C. ...	1873	1877.
R. F. Chisholm, Esq., F.R.I., B.A., Officiating.	1877	1883.
Captain C. H. Simpson, Officiating ...	1883	1884.
E. B. Havell, Esq. ...	1884	Jan. 1886.
Captain C. H. Simpson, Acting ...	Jan. 1886	April 1886.
E. B. Havell, Esq. ...	April 1886	March 1889.
Alfred Chatterton, Esq., B.Sc. (In charge) ...	March 1889	June 1889.
E. B. Havell, Esq. ...	June 1889	April 1892.
E. Holder, Esq., Acting ...	April 1892	June 1897.
J. P. Lewis, Esq., Acting ...	June 1897	Sept. 1897.
E. Holder, Esq., Acting ...	Sept. 1897	Dec. 1897.
Alfred Chatterton, Esq., B.Sc. (In charge) ...	Dec. 1897	Sept. 1898.
W. D. Porterfield, Esq. ...	Sept. 1898	Feb. 1901.
Alfred Chatterton, Esq., B.Sc. (In charge) ...	Feb. 1901.	

The Madras School of Arts owes its origin entirely to the active and disinterested exertions of the late Dr. Alexander Hunter. Soon after his appointment as Surgeon in the Black Town district, Dr. Hunter opened a School of Arts in Popham's Broadway on the 1st May 1850 at his own expense "with the object of improving the taste of the Native public and making them familiar with beauty of form and finish in the articles in daily use among them." The school was located in his own house and he set apart a portion of his pay and the proceeds of his private practice in Black Town for its upkeep. He also gave up his library and marching sketches with regiments for the use of the pupils, from whom a fee of one rupee per month was levied for instruction. The number on the rolls at the end of the first year was 180 and the subjects taught were drawing, painting, modelling, lithography, wood-engraving and etching on copper.

The success which attended the School of Arts led Dr. Hunter to enlarge his plans in the following year by establishing in connection with it a "school of industry" for giving instruction in the various branches of useful arts. This school of industry was opened on the 1st June 1851, "the object of its establishment being to afford to the rising generation of the country the opportunity and the means of acquiring useful handicrafts to improve the manufacture of various articles of domestic and daily use, now largely made in the country, but rudely and uncouthly, and also, by developing the latent natural resources of the country, to create a local supply of several articles in general demand which hitherto have been almost entirely imported." The cost of maintaining this institution was also undertaken by Dr. Hunter. But after some time, he found that, for equipping the school with the necessary apparatus, he should resort to extraneous help and accordingly he appealed to the public and obtained a small contribution in aid of its funds. At the same time he induced the following gentlemen to form themselves into a committee to assist him in its management:—

J. D. Bourdillon, Esq.
Reverend A. R. Symonds.
Major J. F. Smith.
„ F. C. Cotton.

Major G. Balfour.
Edward Elliot, Esq.
Edward Balfour, Esq.

This committee brought the school to the favourable notice of Government in March 1852, and in doing so they pointed out what they conceived to be the chief wants of the institution and submitted, among others, the following recommendations:—

(1) That Dr. Hunter should be relieved from medical duty and be placed in charge of the school, so that he may devote his whole time and attention to its management.

(2) That Government should give a grant of Rs. 6,000 to be laid out in procuring from England such machinery, models, casts and studies as would place the school on a satisfactory footing.

The Government approved of the proposals of the committee in general, and the Court of Directors not only sanctioned the grant of Rs. 6,000 recommended by the committee, but also expressed their readiness to sanction a moderate monthly contribution for a limited time on being furnished with complete information as to the expenses of the institution and as to the prospects of its eventually becoming independent of Government assistance, this latter point being one which they thought indispensable. The Court, however, refused to relieve Dr. Hunter from medical duty, though he was left free to give to the institution the benefit of his supervision and control.

In 1853 miscellaneous experiments were conducted in the manufacture of paper, fibres and cordage. Some good papers were made for sketching purposes from mixtures of aloe, plantain and gunny fibres. There were, however, several defects in the native process, which were pointed out to the leading native paper-makers in Madras. It may be interesting to note here that the rope and string were made chiefly by blind paupers in the Monegar Choultry and idiots in the Lunatic Asylum. The manufacture of pottery which was first introduced in the Male Orphan Asylum was now transferred to the School of Industrial Arts.

In 1854 a further representation was made by the local Government to the Court of Directors and they assigned a monthly grant of Rs. 600 towards the working expenses of the institution and sanctioned Dr. Hunter's withdrawal from medical duties in order that his whole time might be devoted to the supervision and control of the school. The school had now become, to all intents and purposes, a Government institution and early in 1855 its supervision passed from the committee to the Director of Public Instruction who was just then appointed under the great Educational Despatch of 1854. In the same year Dr. Hunter, who was relieved from medical duties, became the full-time superintendent of the school, which had now its location in the spacious Old College buildings at Nungambakam.

In the early part of 1856, Mr. Cole, who was selected and sent out by the Court of Directors as Professor of Fine Arts, arrived from England and took charge of the Arts department. He introduced the system of class teaching and gave regular instruction in practical geometry, freehand drawing, machine and plan drawing and flower painting. A few got instruction in wood and copper-plate engraving also; most of the pupils in this department sought the education with the object of getting employment as draughtsmen in the Public Works or other departments of the Public Service.

The industrial department dealt with the manufacture of bricks, firebricks, paving and roofing tiles, pottery and water-pipes, etc., blacksmith's work being also taught to a certain extent.

In 1857 the school was removed to its present site on the Poonamallee road.

In 1858-59 Dr. Hunter went home on sick leave and during his absence the institution was under the charge of Dr. Charles Murray Duff.

In the course of the next year 1859-60 the school was deprived of the services of Mr. Cole, who was compelled by ill-health to proceed home on leave where he died subsequently.

Different opinions having been expressed as to how far the school was realizing the ends of its existence, the Director of Public Instruction in his report for 1859-60 suggested the appointment of a committee of practical men to report whether it should be continued or abolished. Such a committee was appointed by Government in April 1860, with the Hon'ble W. E. Maltby, a member of Government, as president. The committee recommended the continuance of the school and made several important suggestions for the successful working of the two departments—artistic and industrial. Among other things it laid stress on two important points—(1) that the school should be a place of instruction rather than of manufacture, and (2) that the two departments should be brought into as close a connection as practicable. The committee also thought that Dr. Hunter should be retained at the head of both departments on a salary of Rs. 1,000 per mensem. In passing orders on the committee's report, Government accepted the principle that the business of the school should be to furnish the means of instruction, but considered it necessary that orders for manufacture should continue to be received in the Industrial department. Dr. Hunter, as suggested by the committee, was retained at the head of both the departments on a salary of Rs. 1,000 per mensem.

In 1862-63 photography was added to the list of subjects taught and some stereoscopic views were taken of ancient buildings and other striking objects. In 1863-64 there were 266 pupils under instruction and a photographic and sketching tour was undertaken with success by some of the students. During this tour photographs were taken of scenery about Coonoor and of the antiquities of Humpi and Tadpatri. In 1866-67 several photographs and casts were sent to the Paris and other exhibitions and to some of the important schools of art. Lessons on this subject were continued till 1876.

A course of lectures was commenced to be delivered in 1863-64 to the students of the College of Engineering attending the school on the composition, qualities and modes of testing clays, rocks, limes and cements and they were taught to make bricks, pipes, tiles and cements. This course was continued till 1868-69.

During the next five years the school seems to have made little progress and nothing of importance occurred.

In 1873 Dr. Hunter retired from service and was succeeded by Major W. S. Hunt. The condition of the school again attracted the attention of Government and a strong committee composed of the gentlemen named in the margin was appointed to enquire into and report (1) on the result already obtained by the establishment of the school, (2) on the course best calculated to secure in future the greatest advantage to the public from its maintenance as a means of improving and developing the industrial arts in the presidency.

As regards No. (1) the committee thought that while the artistic department had succeeded in sending out a large number of good draughtsmen, no tangible evidence was to be found of what the committee deemed to be a far greater and a higher object, the dissemination of artistic taste among the people through the direct instrumentality or indirect influence of the school. At the same time they acknowledged that one branch of useful art, viz., wood engraving, was unknown in Madras before the establishment of the school and that etching, engraving on copper and photography were other useful arts, the knowledge of which the school had greatly helped to diffuse among the natives. The committee brought to the special notice of Government the disadvantages under which the school had laboured and suggested several remedial measures. Among these the following are the most important: (1) the appointment of a thoroughly efficient superintendent for the whole institution, (2) the employment of an artistic instructor with a British reputation, (3) the gradual expansion of the school into a central industrial college on the model of the German industrial colleges; (4) the formation of a moderate gallery of paintings, engravings, sculpture and other works of art as a necessary adjunct to the institution; (5) the organization of a museum to contain a well arranged collection of the raw materials of the country; (6) the introduction of a proper system of inspection and examination from a technical and educational point of view; and (7) the appointment of a special committee to manage and control the work of the institution along with the superintendent.

These proposals were generally approved and in its order No. 187, Educational, dated 26th May 1874, Government sanctioned the employment of a superintendent on Rs. 500, of an instructor in the artistic department on Rs. 350 and of an instructor in the industrial department on Rs. 300, but the services of a full-time superintendent were not secured till 1884. The post of an instructor in the artistic department was filled only for a short time and then suspended, while that of instructor in the industrial department was never filled.

In 1876 the despatch received from the Secretary of State raised some important questions regarding the ultimate constitution of the school and an executive committee of management consisting of the gentlemen noted in the margin was appointed to report on the questions raised therein. This committee suggested certain reforms, both in the artistic and industrial branches, which were subsequently introduced.

In September 1877, Mr. R. F. Chisholm relieved Major Hunt of the charge of the institution. During this year a girls' branch was opened in the artistic department and the course of study reorganized on the model of the South Kensington course. Two new branches of industry, viz., enamelling glass and decorating in oil colour, were also introduced and two others, metal work and wood carving, were revived.

The Fine Arts gallery was completed in 1881 at a cost of Rs. 7,948 and the museum attached to the school was rebuilt in 1882 at a cost of about Rs. 1,400.

Mr. Chisholm, who officiated as superintendent, proceeded to Europe on furlough in April 1883, and Captain Simpson had charge of the institution till 21st January 1884, when Mr. E. B. Havell, the first superintendent appointed by the Secretary of

W. Robinson, Esq.

M.R.Ry. V. Ramaiyangar.

Col. A. Stewart, R.A.

Surgeon-Major G. Bidie, M.D.

Major H. Rogers, R.E.

R. F. Chisholm, Esq.

Major W. S. Hunt, M.S.C.

President.

The Hon'ble Sir W. Robinson, K.C.S.I.

Members.

The Hon'ble P. Macfadyen.

V. Ramaiyangar, C.S.I.

Dr. G. Bidie.

Mr. R. F. Chisholm.

Mr. R. Orr.

Mr. J. Deschamps.

State, assumed charge of the school. Mr. Rea of the archaeological department was temporarily employed after Mr. Chisholm's departure for Europe to assist in supplying architectural and art designs to the school for works in connection with the public buildings of the presidency and for private orders.

At the suggestion of Mr. Havell, the Director of Public Instruction recommended in July 1884 a revised establishment, in which he proposed to abolish the post of instructor in the industrial department, to fix the salary of the instructor in the artistic department at Rs. 400 and to appoint an assistant in the pottery branch on Rs. 100. His proposals received the approval of Government, and the services of an art instructor in the person of the late Mr. E. Holder were secured in 1886. The Government technical examination scheme which was sanctioned in March 1886 necessitated certain changes in the course of instruction, and a code of regulations in conformity with these changes was drawn up towards the close of that year.

For the benefit of the apprentices a general education branch was started in November 1886. Lacquer work painting was introduced in 1887 and two looms for carpet weaving were set up in 1888. A night class to teach elementary drawing to those who cannot attend in the morning was also started in July 1887.

For about three months in 1886, when Mr. Havell was placed on special duty as reporter to Government on arts, Captain Simpson was officiating as superintendent, and during Mr. Havell's absence on leave from March to June 1888 Mr. Alfred Chatterton of the College of Engineering was in charge.

In December 1889 Mr. Havell submitted certain proposals for the reorganization of the school. He proposed among other things (1) the abolition of the post of art instructor on Rs. 400, (2) the employment of four teachers of drawing on salaries ranging from Rs. 40 to Rs. 50, and (3) the employment of an overseer for the industrial department on Rs. 100—5—125. Mr. Grigg, the then Director of Public Instruction, did not express any opinion on the above proposals. Probably it seemed to him, as it seemed to his successor Dr. Duncan, that to abolish the art instructorship would be a retrograde and suicidal step.

Towards the end of April 1892, Mr. Havell proceeded to England on 15 months' furlough and Mr. E. Holder, the Assistant Superintendent, was put in charge of the school, Mr. M. Velayuda Asari, a former student of the school, succeeding him as Assistant Superintendent. Mr. Havell on the expiration of his furlough resigned his appointment and the above arrangements continued till the end of 1897, when Mr. Holder retired on account of ill-health and subsequently died.

In the beginning of 1894 a despatch was received from the Secretary of State questioning the expediency of continuing the Schools of Arts in India as Government institutions. In January 1895 the Director of Public Instruction recommended to Government that the Madras School of Arts should continue as a Government institution and submitted certain proposals for its reorganization.

The Government in its Order No. 471, dated 7th June 1895, decided that the school should continue as a Government institution, but thought it advisable that the question of reorganization should be referred to a committee, and the marginally-noted gentlemen were accordingly requested to form themselves into a committee and submit proposals for its reorganization.

The Hon'ble Dr. Duncan (President).
 " Mr. C. S. Crole.
 " G. L. Chambers.
 Mr. R. G. Orr.
 " John Adam.
 " C. E. Phipps.
 " Edgar Thurston (Secretary).

This committee, however, was not unanimous in its views and no definite orders were passed on its report.

In November 1897, the aluminium industry was started on a small scale in the metal working class by Mr. Chatterton who brought with him on his return from furlough from England about 100 lb. of this valuable white metal. Since then it has gradually grown into a big department doing a great deal of business and providing situations of a remunerative kind for about a thousand workmen.

From the date of Mr. Holder's retirement till 4th September 1898, Mr. A. Chatterton was in charge of the school in addition to his duties as Professor of Engineering and Officer in charge of the Aluminium department. Mr. W. D. Porterfield

who was appointed Superintendent by the Secretary of State entered on his duties on the 5th September 1898 and continued to hold the office till 7th February 1901. Since then Mr. Alfred Chatterton who has been placed on special duty for the development of technical education has been in charge of the school. After he took charge several changes were introduced in the organization of the school. The following are the most important:—

(1) An industrial assistant on Rs. 400 was appointed in the person of Sub-Conductor Mr. G. E. Brand whose services were borrowed from the Public Works Department for the purpose.

(2) Cotton-weaving was introduced and Mr. J. W. Coombes who returned from England from a course of training in technical subjects was appointed to look after that branch.

NOTES ON THE SYSTEM OF TRAINING APPRENTICES BY

M.R.R. M. VELAYUDA ASARI.

(1) In the many different varieties of industries each native workman is acquainted with only one or a branch of one of the industries. The best men of such works are generally called maistries. This name is generally applied to men who have long experience in work and who are generally considered to possess a better knowledge than the others around him. Such maistries generally get more orders from the public. To execute them all in time, he takes the assistance of his men whom he engages on daily wages, sometimes on monthly payment. The wages generally are from As. 3 to Rs. 1-8-0 a day. Annas 12 is generally paid to all ordinary good workmen and As. 14 and more to the best workmen according to their merit and the nature of the work they will have to do.

These maistries, with a few workmen of their kind, have their working places called shops or bazaars in some public places along the road side. They generally seek verandahs of houses, empty stables, etc., as their suitable places for work. They have no sign-board of any kind. They will supply tools, etc., for the workmen under them. To attend to other business in the shop such as cleaning, etc., he engages the sons of poor artisans aged about twelve or more. Boys so engaged are what are called apprentices. Every maistry who conducts business independently has a few such apprentices.

There will be no working place, however small it may be, without at least one apprentice. All maistries who are known to be skilful will be voluntarily offered by the other workmen to admit their sons as apprentices in their shops.

In the beginning apprentices are admitted free and no fee is charged; neither the boys demand anything from the maistries; but some of the ordinary workmen who conduct an independent business will be in need of a few apprentices and they will even offer at the beginning a small amount as monthly stipend to each of the boys. The sons of very poor artisans and helpless artisan boys who are in need of some pecuniary help generally seek admission in such places where they can get greater amount of stipend in these cases.

The apprentices or their guardians care very little for the knowledge of the maistries in their work—all that they want is some income for livelihood. The first business the apprentices are made to learn is the cleaning of their tools, etc., and to supply workmen tools required while they are at work. By so serving them for a certain number of days they come to understand the names of tools and their use. If they find small intervals they even try to use some of the tools in the same manner as they had seen the maistry and other workmen using them. Thus gradually and by constantly observing different workmen while at work, they gain the power of imitating some of the simple works. At this stage the apprentices are given a small stipend of Rs. 2 or 3 according to their taste in work and thus the maistry makes use of them for all simple orders.

In this manner their knowledge is mostly cultivated by their frequent observation and constant practice with almost no teaching whatever. These apprentices after some practice like this come out as workmen with merit in proportion to their taste.

This is the common system of teaching apprentices; everything they are made to learn by themselves, but the advantage they gain by being apprentices is that they are indirectly compelled to observe all that is being done by the workmen in course of assisting them. "What eyes see the hands will do" is frequently repeated to apprentices as a sort of proverb to them.

It is all by the apprentices' own endeavour and perseverance *plus* the knowledge gained by observing their master at work that they are capable of becoming good workmen—sometimes better to a certain extent than their own master if they are possessed of greater talent than their master.

(2) So far as I have seen, all traders adopt one common system of training apprentices. They do not know whether there are any other systems; even if they know any, they won't adopt if it is in any way interfering with their other works.

(3) There is that very great advantage of the apprentices carefully observing all that is being done by their maistries and thus gaining the power of imitating their style of work.

The disadvantages are—

1st.—That the apprentices are treated more or less like servants by making them do all their masters' private works which do not concern them, thus wasting a good lot of time required for their practice in work especially in the early ages.

2nd.—That they don't give them general education, neither so advise them to seek a means of refining their knowledge.

3rd.—That the native boys by being apprentices under a native workman, whether good or bad, learn only that much as their masters and very scarcely more. If these apprentices were to be educated, they will understand what is required for the market here and what to markets outside; ignorance in this keeps them in darkness in every way. If an attempt is made to remove this by giving them general education, I am sure that a beginning for the progress of industry will soon start among the artisans of all castes. It is very scarce to find educated men among them. This is specially due to the fault of their own parents who themselves are ignorant of education and who are unable to appreciate the value of it.

Some artisans who really understand the value of education are so poor that they cannot get their sons educated and some of the very few middle class people educate their sons not with any interest to develop their own trade. Even if they come out successful by passing an examination in general education, they try to seek appointments as clerks and entirely forget about industry—the trade of their fathers and grandfathers. They sometimes think that it is beneath their dignity to sit with workmen and do work. Thus all class of people, both sons of handicraftsmen and others, if they are a little educated, think low of industry. If educated people were to be common among the artisan classes, I am sure that industry will be respected—and it is want of such respect that is degenerating it.

(4) Native workmen whenever they do any new work prepare no regular working design of the work they are to do. They are accustomed entirely to do from memory—it does not mean that the native workmen are unable to prepare designs in paper, but they have so crammed up the business that they think it unnecessary and waste of time. There are some workmen who generally make sketches on walls either in charcoal or white chalk if they are to begin any elaborate work. All workmen cannot be able to design—but there are some who cannot express in drawings their ability in work and yet do very good work; there are some who are able to design and not able to produce originality, and those who are able to produce original designs suitable to the purpose for which they are meant and execute them accordingly, carrying out the meaning of the design, are said to be best craftsmen. I think there will be no other means of identifying the best crafts except by their work.

The different divisions of caste are not according to the ability of workmen—as knowledge is common to all castes—but the majority of best craftsmen belong to artisan class.

(5) Native system of apprenticeship is superior at present to a very little extent—apprentices under a native maistry though they work under many great disadvantages are capable of becoming good workmen suitable to the public taste while earlier than the apprentices in a school of method. They understand what sort of works their masters are ordered to do by the public and they also watch carefully how they are executed. But after a long training in a school of method it is very difficult for the very clever boys to fetch a place outside on a daily wage of As. 8 at least. Their services have no demand in the market here and their works, however superior it may be to that of native apprentices, when it has no market in India are valued to be useless—and considered much inferior. In all other respects, I think, the training in industrial school of method is far superior. Manufactures of other places have changed the taste of Indian public and they don't value trained artisans who can produce good Indian art works.

Say, for instance, Stapathy's work which was spoken so highly in other places is not in the least valued here. Such are the tastes of the native public, and further a very few apprentices who come out of such a school of method have proved to be useful to the public. This may be due to such schools not being sufficiently advanced in working. I don't think that will work satisfactorily, however good the method or arrangements of teaching be, unless a very large amount is spent freely on materials, teaching and stipend—of course there will be a great loss in the beginning—which will gradually get less. Such schools of method, I think, must have two sections—one to revive the industry of the country, and the other to produce all kinds of works suitable to the public taste in India. The former will create a market outside India and the latter within India.

For the revival of Indian art, encouragements are wanted in the way of orders from different places. Its system of working is not imperfect and it can be encouraged and developed in its own way—no interference is necessary except the management of an expert who can distinguish the beauty of Indian art apart from other arts that are gradually being mixed up.

(6) No fee is paid by native apprentices—they are taken free in the beginning for about six months or one year, then they are paid a small stipend rising from Re. 1 to Rs. 10 according to their ability in work. They are admitted when they are about 10 or 12 years old and they remain as apprentices until their eighteenth or nineteenth year. Artizan boys very rarely go to school; their first education after their attaining a suitable age is to seek a place in some workshop and become an apprentice.

(7) Each caste has its own industry; very rarely one casteman takes up the industry of the other; workmen always prefer their own caste apprentices as they find them useful as servants for their private affairs also.

(8) I never have heard famine sufferers having been taught any industry, but I know that they are made to do some cooly business. I do not know whether it is any industry or simply digging the earth.

(9) There should be some sort of grant-in-aid system. Some of the shops or bazaars described in my answer to question No. 1 should be recognized as fit to train up boys as apprentices and the maistries should be paid grant according to the number of apprentices and in proportion to the work they turn out. There should be a supervising officer under an Inspector, who should inspect at least once in three months all the recognized shops, collect works of boys and submit a report to his immediate superior. The work of apprentices should be in the possession of the Inspector and they should become the property of Government after the grant and the cost of raw materials, out of which they have prepared the work, are paid. Such collection of works may be put in any public place for sale and the amount realized may be credited to the Government. All shops need not be recognized, but only such shops or bazaars managed by a clever maistry with at least three apprentices working under him in his own style leaving his own work need be recognized.

This system will, I think, very well stimulate all best craftsmen to develop their own knowledge and to bring the system of teaching apprentices to some refinement. If the number applying for recognition were to increase in number, it is only then the rules for recognition, rules for training maistries and rules for improved system

of teaching apprentices, etc., that can be well introduced, which will bring all men of industry to a common centre. This will surely bring success so far as the development of the industry of this country is concerned.

(10) There are no trade guilds among any class of workmen except copper and brass smiths who have a sort of union so far as their work is concerned. They have their caste headman as the head of the union. Each town will have a separate headman. The duty of these headmen is to levy a small tax and to collect it for the management of their own Kali temple. They somehow or other compel all workmen in copper and brass to pay tax to the temple. I think this arrangement is for their temple management and not for the progress of their trade.

ORDER—No. 41, Educational, dated 29th January 1902.

Recorded.

(True Extract.)

C. J. WEIR,
Ag. Secretary to Government.

To the Director of Public Instruction.

Educational (1902) Department.

CURRENT No. 104

From

[Name] *The Honble Mr. G. H. Stuart, M.A.,*

[Designation] *Director of Public Instruction,*

[Station] *Madras*



Dated *18th January* 1902

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Sir,

Your most obedient servant,

J. H. Stuart

Director of Public Instruction.

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