

Public Works

Marine (1898) Department.

G.O., No. 2515 ^W Marine

DATED 29 Sept 1898.

[Despatch Abstract.]

College of Engineering

Pass: Edw. Dept. receiving the report
on the working of the — during 1897, Communicated
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Five independent candidates also presented themselves and two passed. The second-year and first-year divisions of 28 and 32 students, respectively, appeared for the term examinations and obtained 56 and 48 per cent. of the total marks.

(c) *Sub-overseer and Surveyor Class.*—This class has been developed from the old Surveyor class, and students are now passing out as Sub-overseers for the first time. The old course comprised Surveying and Levelling and Topographical Drawing. The new one adds Building Construction and Drawing and Estimating. The class is rapidly becoming popular, and there is keen competition for admission. The second-year division, comprising 25 students, appeared for the final examination and 18 satisfied the examiners. One of these, however, has not yet passed the practical examination in the manipulation of surveying instruments which is held by the college. Considering that the division worked for only three sessions on the new syllabuses, the result of the examination is encouraging.

The first-year division of 26 students appeared for a term examination, and obtained 60 per cent. of the total marks.

Owing to the recent development of the class, it was not possible for any independent candidate to come forward. In order, however, to leave no room for complaint on the part of ex-students of the old Surveyor class, an examination for certificates as Surveyor, which will be the last of its kind, was held by the Board in December. Eighteen candidates presented themselves, of whom six passed in the third class. All six had, however, passed the examination in previous years, five in the third and one in the second class.

(d) *Draftsman Class.*—This class also has worked on an enlarged syllabus, which includes Building Construction as well as Drawing and Estimating. The senior division, containing 30 students, is the first to complete the extended course. Of the total number, nineteen presented themselves as college students, and ten, who were special pupils, were classed as independent candidates. The remaining student was absent. Eight of the former and four of the latter satisfied the examiners. The whole of the marks were awarded by the Board. The new subject, Building Construction, in which only 25 per cent. of the marks were scored, is mainly accountable for the large proportion of failures.

The examination for certificates was thrown open this year not only to students and ex-students of the class, but also to persons employed in the Public Works Department and recommended by Executive Engineers as possessing the requisite practical knowledge. Twenty-three independent candidates, in addition to those mentioned above, presented themselves, all of whom were ex-students, and thirteen passed.

The first-year division of the Draftsman class, containing 34 students, appeared for the term examination and scored 53 per cent. of the marks.

(e) *Artisan Class.*—This class contained 44 students at the close of the year. Evening instruction was imparted as usual, supplemented by morning practice in Surveying two days a week.

5. *Comparison of Results.*—The percentages of marks under the various subject heads secured by the senior divisions only of classes compare as follow with the average results of the preceding four years. It should be remembered that the percentages shown under 1897 do not relate solely to that year; but represent the results of three years' work in the Engineer class, of two and a half years in the Engineer Subordinate class, and of two years in the Sub-overseer and Surveyor and Draftsman classes:—

<i>Engineer Class, Senior Division.</i>								1897.	Average of preceding four years.
Mathematics	...	...	...	...	...	...	...	62	66
Science	...	...	...	...	...	...	...	50	52
Engineering	...	...	...	...	...	...	...	49	60
Drawing	...	...	...	...	...	...	...	43	64
Surveying	...	...	...	...	...	...	...	62	67
Language	...	...	...	...	...	...	...	55	55
Drills and Exercises	...	...	...	...	...	...	...	67	73
Total								53	61

Engineer Subordinate Class, Senior Division.

	1897.	Average of preceding four years.
Mathematics	55	53
Engineering	45	51
Drawing	56	54
Surveying	60	56
Language	50	45
Drills and Exercises	67	73
Total	53	54

Sub-overseer and Surveyor Class, Senior Division.

Surveying	57	55
Engineering	47	...
Drawing	42	...
Drills and Exercises	54	72
Total	50	...

Draftsman Class, Senior Division.

Geometrical and Perspective, Freehand and Model Drawing	54	59
Building Construction and Drawing	40	...
Machine Drawing	56	56
Estimating	49	42
Total	48	...

6. *Practical Courses.*—Five Engineer and sixteen Engineer Subordinate students were under practical instruction throughout the year. One Engineer student was attached to the Madras Railway Locomotive shops. His obligatory course terminated at the end of the year; but he has been permitted to remain for a further period of six months, half of which will be spent with running engines and half in the Drawing office.

All the other students were posted to Public Works divisions. The special circumstances of the year demanded that the services of those attached to the first and third circles should be utilised on famine-relief works. These students were granted a special famine allowance of Rs. 30 per mensem in addition to their subsistence allowance, and they were exempted from the riding course. The remaining students, including the Mechanical Engineer pupil, went through the Body Guard Riding School.

The progress reports received from Executive Engineers are generally favourable, those regarding the students on famine-relief work particularly so. Some of the progress reports were received much in arrears.

7. *Military Students.*—The total number of military students at the close of the year was ten, viz., one on works and nine in the Engineer Subordinate class. The student on works was employed on famine relief, and with the special sanction of the Government of India was appointed Overseer before the completion of his twelve months' practical course. As his seniority will be reckoned as from the termination of that period, he has been classed as a student.

Five probationers were admitted in January, and were transferred to the Engineer Subordinate class in July. One of them, Gunner T. Gannon, a promising man, was, I regret to say, accidentally drowned in the Cooum during the Christmas holidays. A competitive examination for a fresh batch of probationers was held in November at various centres, and four non-commissioned officers were ordered to join in January. Two of the candidates, who belong to the Dorsetshire Regiment, were on active service in Tirah, and it was found possible to examine only one of them.

The Government of India approved the proposal that military upper subordinates required for the Burma Public Works Department should be drawn from the Madras College. The number required is not likely to exceed one per annum. The college will not, however, be able to meet any such requirement before January 1900.

Attention was drawn during the year to the block in the promotion of military subordinates of the Public Works Department resulting from an order of 1884. Under

17. *Employment of passed students of 1896.*—Of the six Engineer students who completed their practical course on the 31st December 1896, the senior P. V. Manicka Nayakar was appointed Assistant Engineer in the Provincial establishment of the Public Works Department. Four of the others accepted temporary employment in the Upper Subordinate establishment, and the remaining man is believed to be employed in the Travancore Public Works Department.

Of the 15 Engineer Subordinates who completed their practical course in December 1896, five were appointed to the permanent, and five to the temporary establishment of the Public Works Department. The remaining five have furnished no information regarding their employment.

Of the eleven Draftsmen who qualified in December 1896, four obtained employment as Draftsmen in the Public Works Department, one of them in the Railway Branch; one man was appointed to the Survey; one to the Forest Department, and one is employed as a minor irrigation Overseer in the Revenue Department. The remaining four have sent in no reports.

Of the 17 Surveyors who qualified in December 1896, three were appointed temporary Overseers, two as Sub-Overseers, one as Surveyor and one as Irrigation Superintendent, in the Public Works Department. Two obtained employment as Surveyors in Native States, and one as Sanitary Inspector under a Local Board. The remaining seven have supplied no information. The appointment of Surveyors as temporary Overseers in the Public Works Department is deprecated so long as qualified Engineer Subordinates are available.

18. *Prospects of employment.*—Consequent on the reduction of the practical course from two years to one, double batches of Engineers and Engineer Subordinates qualified in 1896. The permanent appointments to the Public Works Department which the batches of Engineer Subordinates had been led to expect were not immediately available, but were conferred as vacancies took place. The result has been that there were no vacancies for the batch of December 1897. Seven temporary appointments have been offered, and it is expected that the three senior civilian Engineer Subordinates will eventually become permanent. To secure a constant flow of candidates to the college, it is most desirable to maintain the number of permanent appointments as uniform as possible from year to year. A sudden break in appointments affects the number of entering candidates at once; but it is not until these candidates pass out, some four years later, that the effect of the break is felt by the Public Works Department.

The prospects of service under Local Boards have been improved, and a register has been opened in the office of the Chief Engineer, Public Works Department, of persons eligible for the appointment of Local Board Engineer.

Lists of qualified Engineers, Engineer Subordinates, Sub-Overseers, and Surveyors and Draftsmen, containing names and addresses, are widely circulated by the college.

The vacancies notified during the year in the Gazette, the public press, and by letter to the Principal were 144 in number, of which 48 were under Government, 43 under Local Boards and Municipalities, 15 on Railways, 33 under Native States, and five under private employers. Eleven of the vacancies were for Engineers or Assistants, 47 for Upper Subordinates, 20 for Lower Subordinates, 26 for Draftsmen, 19 for Surveyors, and 21 for Maistries. Five of the appointments carried salaries of Rs. 200 and upwards, 12 between Rs. 100 and Rs. 200, 48 between Rs. 50 and Rs. 100, and 79 under Rs. 50. Particulars are given in Appendix F.

19. *Revision of Rules.*—The revised syllabuses, which were sanctioned and brought into force in 1896, regulated the instruction of all the classes during 1897. These syllabuses involve some reduction in the scope of the examination work of the Engineer and Engineer Subordinate classes, and considerable increase in the work of the Sub-Overseer and Surveyor and Draftsman classes, especially the former. The increase has been successfully met by the Sub-Overseer and Surveyor class; but it is responsible for several failures in the Draftsman class. In the latter class the award of college marks has been temporarily suspended, and the Certificate Examination has been thrown open not only to students and ex-students of the class, but also to persons employed in the Public Works Department who are recommended by Executive Engineers. The experience gained of the effect of the change of plan alluded to leads me to advise the resumption of college marks for the Draftsman class in

regard to divisions which will leave the institution subsequently to December 1898; i.e., that the reversion to the old plan should take effect on the first-year division of 1898. The arguments in favour of the principle of this system have been urged elsewhere, and have been admitted by Government in relation to the other classes of the college. The suspension of the system for two years in regard to the Draftsman class was, however, authorized as an experiment; and the divisions of 1897 consequently received no credit for practical work done during the course. There has been a lack of incentive to the students to work steadily throughout the session, their interest in drills and gymnastic exercises has naturally not been maintained, and I have deemed it undesirable to attempt to give the class any manual training in the workshops.

The abolition of college marks may, however, be confirmed in regard to independent candidates for certificates as Draftsman, and may be extended to other independent candidates. Under the old system, indifferent college marks militated against a candidate's success in future years. Independent Draftsmen who have never been through the college course should, it is considered, receive modified certificates of qualification.

Reference was made in the report for 1896 to the draft revision of the college Code of Rules, and to the inconvenience which arose from the sanction of modified syllabuses and schemes of marks in advance of their incorporation in the rules. The draft revised rules submitted in 1896 have now been eighteen months under consideration, and the inconvenience alluded to still hampers the administration. The assimilation of the classes of certificate awardable in the junior classes of the college to those given in the higher, arising as it does out of the sanctioned schemes of marks, has been introduced; and all students now pass out with either first-class or second-class certificates. No connection will in future subsist between the 'classes' of Draftsmen graded in the Public Works Department, and the classes of Draftsman certificate issued by the college.

20. *Financial Details.*—The approximate total expenditure for the calendar year 1897 amounted to Rs. 74,179, and the total income to Rs. 16,366, of which a sum of Rs. 15,662 represents fees. The net cost of the college to Government was Rupees 57,813. The average daily attendance throughout the year was 239, so that the average cost to Government per student was Rs. 242. The rate for 1896 was Rs. 252. In the orders passed on the Annual Report for 1896, it is stated that this figure is high. It is not known what comparison prompted the criticism, whether the rate of previous years, or the rates obtaining at other professional colleges in Madras. The most trustworthy comparison would appear to be with other Engineering colleges in India. A full report has been made on this subject, which brings out the facts that less money is spent on the Madras college than on any of the other three; and that the average cost per head is also least in the local institution. The cost per head in the other colleges ranges from Rs. 300 to Rs. 700; and the net cost to Government from three-quarters of a lakh to a lakh and-a-quarter. Details of the receipts and charges for 1897 are given in Appendix G.

21. *Administration.*—In the Government Order passed on the Annual Report for 1896, instructions were given for improved training in Estimating, Building Construction, and the Engineering subjects generally. The proceedings did not reach me until November 1897, when the session was almost at an end, although the Annual Report had been submitted in January. The wishes of Government had fortunately been anticipated, however, as far as they could be given effect to by the limited staff; and the working hours had been extended throughout the college. Each class, excluding the Artisan class, attended daily from 6-30 A.M. to 4-30 P.M., with a recess of two hours in the morning and one hour in the afternoon, and put in, on the average, 40 hours per week. The strain on the staff was very severe, and it cannot be continued for an indefinite period. Each instructor had on the average 23 hours per week of direct class teaching, exclusive of the large amount of time required to examine and correct plans and estimates and to prepare lectures.

To improve the instruction, more attention must be given to individual students, i.e., additional staff must be entertained. A full report has been submitted on this matter, and the services of one additional professor, one chief instructor, and one assistant have been applied for. Increase in the workshop staff and in the clerical

APPENDIX C.

DISTRIBUTION of students by wealth and occupation of parents on the 31st December 1897.

Classes in college.	Wealth.				Occupation.								
	Richer classes.	Middle classes.	Poorer classes.	Total.	Officials.	Petty officials.	Traders.	Landholders.	Artisans.	Coolies including agricultural labourers.	Mendicants.	Others.	Total.
Engineer class—													
Third year	6	..	6	3	..	..	..	3	..	..	..	..	6
Second year	6	..	6	2	..	..	..	4	..	..	..	..	6
First year	1	6	..	7	3	..	..	4	..	..	..	..	7
Engineer Subordinate class—													
Third year	19	3	22	6	1	..	..	15	..	..	..	..	22
Second year	24	4	28	9	2	..	..	17	..	..	..	..	28
First year	1	29	2	32	12	..	1	19	..	..	..	..	32
Sub-Overseer and Surveyor class—													
Second year	23	2	25	9	1	1	13	..	..	..	1	..	25
First year	21	5	26	9	3	1	12	..	..	..	1	..	26
Draftsman class—													
Second year	1	26	3	30	13	5	2	10	..	..	..	..	30
First year	27	7	34	14	3	1	15	..	..	..	1	..	34
Artisan class	26	18	44	13	6	..	12	9	1	..	3	..	44
Total	3	213	44	260	93	21	6	124	9	1	1	5	260

* Of these 44 students—

4 are sons of Artisans following the occupation of their fathers.

5 do. do. other occupations.

18 are Public Works Department maistries by occupation.

1 Fitter.

2 Tracers.

1 Ferro-Printer, Drawing Office, B.M. Railway.

1 Field Surveyor.

1 Municipal Overseer.

1 Temporary Gumastah, River Conservancy.

1 Maramat Gumastah.

9 Various.

APPENDIX D.

AVERAGE attendance throughout 1897.

	Average number on rolls.	Average daily attendance.
<i>College Department—</i>		
Engineer class, third year	6.0	5.7
Do. second year	6.1	5.8
Do. first year	6.7	6.5
Engineer Subordinate class, third year	22.0	21.1
Do. do. second year	28.4	26.9
† Do. do. first year	18.6	17.8
† Military probationers	2.0	2.0
	89.8	85.8
<i>School Department—</i>		
Sub-Overseer and Surveyor class, second year	25.0	23.9
Do. do. first year	27.0	25.8
Draftsman class, second year	30.4	27.8
Do. first year	34.1	32.3
Maistry and Artisan class	44.7	42.9
	161.2	152.7
Total, college and school departments	251.0	238.5
Percentage of numbers present to numbers on the rolls—		
College department	..	95.5
School department	..	94.7

† This division joined in July.

‡ The probationers were absorbed in July.

APPENDIX E.

GOVERNMENT Technical Examinations of 1897.

Subject.	Grade.	Number examined from						Number passed.	
		Engineer class.	Engineer Subordinate class.	Sub-Overseer and Surveyor class.	Draftsman class.	Artisan class.	Total.	First class.	Second class.
Building Materials and Construction	E.	..	..	..	..	3	3	..	..
Earthwork and Roadmaking	E.	..	..	..	..	2	2	..	..
Mensuration	E.	..	..	..	..	4	4	..	..
Practical, Plane and Solid Geometry	E.	..	..	..	..	1	1	..	..
Surveying and Levelling	I.	..	..	..	..	2	2	..	3
Free hand Outline Drawing	E.	..	2	6	5	15	5	..	8
Geometrical Drawing	E.	..	..	..	..	1	1	..	..
Hygiene	E.	..	..	..	..	..	..	..	..
Total	..	..	2	7	19	17	36	5	11

Note.—E.=Elementary, I.=Intermediate.

APPENDIX F.

CLASSIFICATION of vacancies notified during the year 1897.

CLASSIFICATION OF PERSONNEL

	Government.			Local Boards and Municipalities.				Railways.	
	Rs. 100 to 200.	Rs. 50 to 100.	Under Rs. 50.	Above Rs. 200.	Rs. 100 to 200.	Rs. 50 to 100.	Under Rs. 50.	Above Rs. 200.	Rs. 150 to 200.
Engineer or Assistants	..	1	..	1	4	..	..	4	..
Supervisor	..	1	2	..	4	19	9	..	..
Overseer	..	..	13	..	..	..	3	..	..
Sub-Overseer	..	1	9	..	..	1	..	..	..
Draftsman	2	9	2	..	..	1	1	..	2
Surveyor	..	..	8	..	..	..	..	..	..
Maistry	..	..	..	..	..	..	..	..	..
Tracer	..	..	..	..	..	..	..	..	..
Estimate Maker	..	..	..	..	..	..	..	..	..
Total	2	12	34	1	8	21	13	4	2

	Railways—cont.		Native States.			Private employers.		Total.
	Rs. 50 to 150.	Under Rs. 50	Rs. 100 to 200.	Rs. 50 to 100.	Under Rs. 50.	Rs. 50 to 100.	Under Rs. 50.	
Engineer or Assistants	2	..	..	..	..	..	..	11
Supervisor	2	..	..	1	7	1	..	1
Overseer	..	..	..	..	3	..	1	46
Sub-Overseer	4	1	..	..	4	2	..	20
Draftsman	..	..	..	2	..	..	..	22
Surveyor	..	..	..	..	13	..	..	19
Maistry	..	..	..	..	..	1	..	21
Tracer	..	..	..	..	3	..	..	1
Estimate Maker	..	..	..	..	..	..	..	3
Total	8	1	..	3	30	4	1	144

APPENDIX G.

FINANCIAL DETAILS FOR 1897.

	RS.	A.	P.
<i>Receipts—</i>			
Tuition fees	11,313	8	0
Entrance and final examination fees	4,319	0	0
Fines and other receipts	703	14	10
Total ...	16,366	6	10
<i>Charges—</i>			
Principal	15,852	3	10
Professors, masters and teachers	32,761	10	1
Clerks, librarian and servants	3,748	11	3
House-rent, personal and Presidency allowances	1,456	5	4
Board of Examiners	1,509	8	0
Library and prize allowances	523	14	10
Books and instruments	1,163	2	5
Other Europe stores	4,008	9	11
Other heads of contingent, &c., charges	6,088	11	4
Travelling allowance	496	0	0
Scholarships	3,116	13	0
Exchange compensation allowance	3,452	15	7
Total ...	74,178	9	7
<i>Net cost to Government</i>	Rs. 57,813		
<i>Average attendance throughout the year</i>	No. 239		
<i>Net cost per student</i>	Rs. 242		

From the Board of Examiners, Civil Engineering College, Madras, to the Director of Public Instruction, dated 12th February 1898.

We have the honour to submit, herewith, a report on the College of Engineering examinations held in December.

2. *Engineer class, First Division.*—Of the six college students and one independent candidate who appeared for examination, only three college students secured the required number of marks. This result was to have been expected as the class had not done well in previous years. The following is the percentage of marks and the figures would appear to show that the class is below the average if the usual method of comparing results with the average of the preceding years is adhered to:—

	1897.	1896.	Average of four years previous to 1896.
Mathematics	62	60	67
Science	50	46	52
Engineering	49	48	63
Drawing	43	53	67
Surveying	62	64	62
Language	55	53	55
Drills and Exercises	67	77	71
Total ..	53	54	62

Too much importance, however, must not be attached to these percentages as the practice of comparing the results of one examination with those of the four previous years is most misleading, the period being much too short to establish a fair average. The number of students examined in some years is small and the average may be based on the results of the examination of two students of exceptional ability. This is exemplified below:—

	1897.	1896.	1895.	1894.	1893.	Four years previous to 1893.
Mathematics	62	60	57	70	75	55
Science	50	46	45	64	54	40
Engineering	49	48	51	68	71	55
Drawing	43	53	55	69	77	67
Surveying	62	64	61	75	68	67
Language	55	53	58	61	49	56
Drills and Exercises	67	77	62	69	84	80
Total ..	53	54	53	67	68	55

From the above percentages it appears that the class is as a whole up to the average in spite of the failures of three students and that drawing is the only subject which is materially below the average. This was to be expected as the majority of the marks in drawing were awarded in previous years and it was not possible to make up for the poor results obtained in former examinations. It should be noticed that all those who passed did better than any student who appeared for examination in 1896. The standard of the examination has also, it is believed, been raised during recent years.

3. *Engineer classes, Second and Third Divisions.*—The following are the class percentages of marks obtained:—

	Second division.	Third division.
Mathematics	57	59
Science	43	...
Engineering	50	69
Drawing	45	62
Surveying	64	58
Total ...	52	61

From the above figures it appears that the third division whose work relates entirely to the last twelve months has done remarkably well, three students having obtained over 70 per cent. of the total marks obtainable and the whole class over 60 per cent.

The second division is also apparently up to the average though suffering from the results of last year's examination in drawing in which subject, as might be expected, the class is still weak.

4. *Engineer subordinate class, First Division.*—The following is the class percentage of marks:—

	1897.	1896.	Four years previous to 1896.
Mathematics	55	58	50
Science	45	50	51
Engineering	56	48	55
Drawing	60	61	56
Surveying	50	45	45
Language	67	82	70
Drills and Exercises	67	82	70
Total ..	53	54	53

This class is apparently up to the average. Five college students failed to qualify and three independent candidates.

5. *Engineer Subordinate class, Second and Third Divisions.*—The following is the class percentage of marks :—

							1897.	
							Second division.	Third division.
Mathematics	...	...	...	...	...	...	67	54
Engineering	...	...	...	...	...	...	46	65
Drawing	...	...	...	...	...	...	46	45
Surveying	...	...	...	...	...	...	58	38
Total	...	...	...	...	...	...	56	48

The second division appears to be up to the average. In the third division it seems to be a question whether a few of the students should not start their college course again as they have apparently not made a serious effort so far and will have considerable difficulty in making up for lost time.

6. *Sub-Overseer and Surveyor class.*—The following is the class percentage of marks :—

							First division.	Second division.
Surveying	...	...	...	...	...	...	57	56
Engineering	...	...	...	...	...	...	47	65
Drawing	...	...	...	...	...	...	42	64
Physical fitness	...	...	...	...	...	...	54	...
Total	...	...	...	...	...	...	50	60

This is a new class and may be considered to have done well as it takes time to organize a new course of lectures. The improvement in the second division is noticeable. Of the 25 students in the first division who appeared for examination, seven failed to qualify which is a satisfactory result as the class was converted into a sub-overseer class in the middle of the term.

7. *Draftsman class.*—The following is the class percentage of marks :—

				First division.			Second division.
				1897.	1896.	Four years previous to 1896.	1897.
Geometrical drawing	..	..	..	54	..	..	53
Building construction	..	..	..	40	..	..	..
Machine drawing	..	..	..	56	54	56	..
Estimating	..	..	..	49	35	46	..
Total	..	..	..	48	51	52	53

This is a new class and is believed to have suffered considerably owing to the complete change in the syllabus during the college course. It is satisfactory to note that only three students failed to qualify in estimating. One student passed in the first class, seven in the second class and eleven failed.

The second division was examined only in one subject.

8. *Draftsman class, Independent candidates.*—The result of suspending college marks is shown by the large number of independent candidates who presented themselves for examination. Of the 33 candidates, fifteen failed and one did not appear for the whole of the examination.

9. *Surveyor class, Independent candidates.*—Twenty candidates appeared for examination, of whom twelve failed. The chief failure was in topographical drawing.

10. So far as college students are concerned the result of the year's work may be considered to be satisfactory and judging from the work of the junior classes, if anything, slightly better than usual. The only classes in which failures are numerous

are the Engineer and Draftsman classes. In the former there are generally several who only just manage to qualify and this year they have just failed to do so. The results so far as the passed men are concerned are extremely satisfactory for, as said before, they all obtained higher marks than any student of 1896.

The failure among the draftsmen is, the Board is afraid, largely due to the alteration of the syllabus during the college course as the failures seem to be attributable to the subjects newly introduced. This was possibly unavoidable as the staff was, apparently, overworked before the new course of lectures was introduced and has not been increased.

11. The examiner in languages again brings to notice that students do not know the vernacular equivalents of engineering terms which must hamper them considerably in understanding the text-books and lectures.

12. During the past year the college marks have, as usual, been scrutinised by the President of the Board and it has been brought to the notice of the Board not only by the Principal but also by the college staff that it is impossible to cover the syllabus for want of instructors. The college now possesses a hard-working and zealous staff of instructors which, however, has not been augmented to cope with the large addition of work due to the more extensive course of instruction and to the individual attention paid to students. Government has sanctioned the adoption of a new syllabus for draftsmen and the formation of an entirely new class of sub-overseers to replace the old surveyor class. The change made will doubtless result in a great improvement in the subordinates of the Public Works, Local Fund and other Departments, but no increase has been made in the staff which has to teach the extra subjects. The poor results obtained by the draftsmen in the new subjects appear to be largely attributable to this cause, and the Board would bring to your notice that the recent improvements in the course of instruction are being practically neutralised for want of teachers, though the college apparently costs less than any other similar institution. It also seems to be a question whether it is quite right to induce parents to send their sons to a college to undergo a certain well defined course of instruction, which, with the existing staff, cannot be given; and then to examine students on a syllabus and disqualify them for not knowing what they have never been taught. This may seem a strong statement, but the time-table is available for inspection.

13. In a note attached to this report the Board make certain suggestions with regard to the mark sheets and syllabus.

14. The Board regret that the report and mark sheets have been delayed, but would point out that the examinations under the new syllabus involve considerably more work as the number of subjects has been increased and, in some of the classes, the number of independent candidates who appeared for examination is very large.

15. The Board would also bring to notice that some of the examiners and, in consequence, the Board's clerk, have not been paid for the examinations held in December 1896.

16. A copy of the mark sheets has been handed to the Principal of the college.

NOTE.

(1) *Draftsman class—Building Construction and Drawing, Machine drawing, Estimating.*—In these subjects it is perfectly easy for an examiner to set papers within the syllabus which no student can answer. It is suggested that a list of drawings which have been made in class or which are available for the inspection of students and a list of works inspected during the year should be furnished to the examiner as a guide. A list of machines with the details of which students may be expected to be familiar should also be provided. The primary object of the examination is to test the qualifications of students as draftsmen and they should not be required in examination, except as mere copying work, to draw machines or other details which they know nothing whatever about. The college text-book for building construction appears to require revision and is much too extensive for the draftsman class.

(2) *Sub-Overseer and Surveyor class—Building Construction and Drawing and Estimating.*—Same remarks as for draftsman class.

(3) *Engineer Subordinate class*.—The syllabus is still very extensive and it is believed to be almost impossible to cover it within the time allowed. It is suggested that the following alterations may be made:—

(a) *Applied Mechanics*.—The syllabus is very extensive and an examiner can easily set questions which the students cannot possibly answer. It is suggested that the syllabus should be more definite under (4), (5), (6) and under (7) framed structures, (8) roofs, (9) framed bridges. No student of this class is ever likely to be called upon to design anything except of the simplest description and the result of attempting too much is merely to confuse him. The instruction in applied mechanics of framed structures, bridges and roofs may well be limited to certain simple forms which subordinates are likely to design a list of which might be furnished to the examiner.

(b) *Mechanism and Steam Engine*.—In this also the syllabus appears to be too extensive and loosely worded and a good deal of the subject appears to be more suited to the workshop. It is suggested that students may be examined in the greater part of the subject by a practical examination in the workshops conducted by the college authorities.

(c) *Drawing and Estimating*.—Same remarks as for draftsman class.

From Major H. D. LOVE, R.E., Principal, College of Engineering, Madras, to the Director of Public Instruction, Madras, No. 1652-C, dated the 28th February 1898.

In returning the report of the College Board of Examiners, forwarded under your endorsement No. 1527, dated 15th February 1898, I have the honour to offer the following remarks.

2. In paragraph 5 (a) the Board observes that "it seems to be a question whether a few of the students should not start their college course again." The following objections to the adoption of this proposal may be mentioned:—

(a) The students referred to have not as yet disposed finally of any of the main subject heads; and they have ample time for improvement in the course of the next two years.

(b) Their retention in the junior divisions would bar the admission of a corresponding number of new students, since the number of qualified applicants is always in excess of the number that can be admitted.

3. In paragraph 8, it is stated that of the 33 candidates 15 failed. The actual numbers were: registered 36; appeared for examination 33; passed 17. It should be noted that of the 33 candidates, 10 appeared directly from the college, while the remainder were ex-students.

4. *Board's paragraph 11*.—The language text-books need revision; but the duty cannot be undertaken by the staff in its present overworked condition.

5. *Board's Notes 1 and 2*.—A list of the drawings to be prepared by each class was formerly appended to the syllabus. This was discontinued on the recommendation of Mr. West's committee for reasons which have always appeared to me insufficient.

Only such portions of the text-book on Building Construction as relate to the syllabus are read by the Sub-overseer and Surveyor and Draftsman classes.

6. *Board's note 3 (a)*.—Now that *Statics* has been removed from the syllabus in *Mathematics* for the Engineer Subordinate class, I agree with the Board that some reduction in the syllabus in *Applied Mechanics* is called for. That reduction may be limited to paragraphs (4), (5) and (6) of the syllabus which refer to *Bending*. This branch of the subject should, I consider, be dealt with by empiric rules only. I am of opinion that no reduction is called for under paragraphs (7), (8) and (9) of the syllabus.

7. *Board's note 3 (b)*.—I think the syllabus on *Mechanism and the Steam Engine* for the Engineer Subordinate class might be improved as suggested by the Board. The proposal that the examination should be a practical one, conducted by the college authorities does not commend itself to me, unless the allotment of marks to be awarded by the college is increased. Such increase would involve an alteration of the code of rules.

Proceedings, No. 4732 of 1898.

The foregoing papers relate to the working of the College of Engineering during 1897. The year was not marked by any event of special importance except that it was the first year in which the final examinations were conducted under the revised syllabuses sanctioned in G.O., No. 444, Educational, dated 22nd July 1896.

2. *Staff*.—The important changes that took place in the staff during the year were the return to duty of Mr. Alfred Chatterton in November last and the retirement from the close of the year of Mr. J. Hamilton, who had been long connected with the college as an assistant instructor. A few other changes also occurred among the subordinate staff. The sanction of Government has been accorded for the continuance of the arrangements made during Mr. Chatterton's leave for instruction in Practical Chemistry.

3. *Accommodation*.—It has not yet been found possible to execute the additions required to the college buildings. The proposal to convert the library room into a lecture room has been sanctioned by Government.

4. *Library and reading-room*.—Good use had been made of the library and the reading-room.

5. *Workshops*.—The college workshops worked fairly well under the direct supervision of Mr. Keeling, the acting Professor of Engineering. But chiefly owing to the insufficiency of the workshop staff, no arrangements could be made during the year for the training of apprentices. The Director trusts that the college will shortly be in a position to give effect to the scheme. Mr. Chatterton, the Professor of Engineering, has drawn up a set of rules in connection with testing work, and Government has recently been addressed in regard to the disposal of fees received for such work from private bodies or individuals. Proposals have been received for the introduction of an oil engine and a gas engine in the workshop. This will render the projected extension of the workshop unnecessary, and Government has been addressed on the subject.

6. *Strength and Attendance*.—Particulars appear in the margin as regards the

Class.	Strength on the 31st December.	
	1896.	1897.
Engineer	19	19
Engineer subordinate { civil students ..	63	73
{ military students. 5 }	68	82
Sub-Overseer and Surveyor	46	51
Draftsman	55	64
Artisan	37	44
Total	225	260

the college during 1896, Kurnool and Cuddapah contributed a student each during the year under report, so that Anantapur alone among the districts was left unrepresented. As in 1896, Tanjore held the lead with 84 students and it was followed by Trichinopoly, Madras and Tinnevely with 27, 21 and 18 students, respectively. Of the 19 Engineers five belonged to Mysore and Travancore and five to Tanjore. Brahmans formed the majority, contributing 64 per cent., while the Muhammadan community was, it is much to be regretted, represented by only one draftsman student, notwithstanding the concession of half-fees. Sixteen out of 19 Engineers were Brahmans. It is very disappointing that Native Christians who have evinced a steadily growing

desire for higher education were very poorly represented in this college. The artisan element was stronger than in the year previous, and the bulk of the students, who belonged to the middle classes, were drawn from landholders and officials. The military students had nearly doubled.

Year.	Degree examination.		First examination.	
	Examined.	Passed.	Examined.	Passed.
1893	4	3	..	..
1894	3	3	..	..
1895	2	2	9	7
1896	6	4	8	6
1897	7	3	8	3

7. *Examinations*—(i) *University Examinations*.—The results of the degree and First examinations in Engineering for the past five years are recorded in the margin. The percentages of success were the lowest during the period. Of the five and six candidates that appeared direct from the college for the above examinations two and three, respectively, passed. These results compare unfavourably with those of 1896.

(ii) *College Board Examinations*.—The results of the final examinations conducted by the college Board of Examiners in December 1897 are contrasted below with those of 1896:—

Class.	Number presented.		Number passed.	
	1896.	1897.	1896.	1897.
Engineer	6	6	6	3
Engineer-Subordinate	18	22	14	17
Sub-Overseer and Surveyor	20	25	17	18
Draftsman	24	19	11	8

The Engineer and Draftsman classes did not secure good results. The report of the Board of Examiners is on the whole favourable, the low percentages of success in the Engineer and Draftsman classes being attributed in the one case to the absence of good materials and in the other case to the introduction of the enlarged syllabus and the insufficiency of the staff. The failure in the Draftsman class occurred chiefly in building construction, the students having done well in estimating. It is noteworthy that independent draftsmen candidates did better than college draftsmen candidates at the final examination. Another year's experience should, however, be gained before the old arrangement of assigning college marks is revived. Building construction in the Engineer and Draftsman classes, estimating and drawing in the former and Hydraulic Engineering in the Engineer Subordinate class should receive greater attention. The junior divisions of the several classes acquitted themselves fairly well on the whole. The revision of the new syllabuses in the directions suggested by the Board of Examiners and the Principal seems to be rather premature, as they have been in operation only for a very short period. The Director is, however, convinced that the extended syllabuses demand an increase to the present staff, and the extent of such increase is now under consideration. The remarks contained in paragraph 5 of the Principal's letter, No. 1652-C, dated 28th February 1898, should form the subject of a separate communication. Major Love's remarks in paragraph 7 of the same letter are endorsed. The vernacular assistants should devote greater attention to the spelling and pronunciation of vernacular words and the suggestion of Dewan Bahadur V. Krishnamachariyar in regard to the introduction of a system of home exercises will, no doubt, be considered by the college authorities so far as it is practicable. These assistants should further be advised to prepare for their own use a small glossary of technical words and expressions with colloquial vernacular equivalents.

(iii) *Government Technical Examinations*.—From the particulars furnished in Appendix E to the report it is observed that 36 single subject candidates appeared voluntarily for the Government Technical Examinations of 1897 and that 16, or 44 per cent., were successful as against 44 examined and 22 passed in the year previous. The Artisan class failed completely in the subjects for which it applied exclusively. Geometrical drawing was the only subject in which the results were satisfactory.

8. *Independent candidates*.—The summary in the margin furnishes the results of the independent candidates at the final examinations held in December last. The Draftsman candidates have fared better than in the year previous and also better than the other classes of candidates. The Surveyor candidates fared poorly although their examination was for the last time conducted as a special case under the old syllabus.

Description.	Number examined.	Number passed.
Engineer candidates	1	..
Engineer Subordinate candidates	5	2
Surveyor candidates	18	6
Draftsman	32	17

9. *Military students*.—Including the one on works, there were ten soldier students on the rolls at the close of the year as against six in the year previous, the increase being due to fresh admissions in July 1897. The death of Gunner T. Gannon is much to be regretted.

10. *Practical courses*.—Twenty-one students were under practical instruction during the year, and the course of some of them was interrupted, as their services were required for famine work. The conduct of the students has been favourably reported on. The Chief Engineer will be requested to instruct Executive Engineers to observe greater punctuality in furnishing the Principal with progress reports on the students on works.

11. *Physical education*.—This part of the education of the students received special attention through the agency of the college Recreation Club.

12. *Employment of former students*.—From the reports, which, however, were incomplete, received from the students who successfully completed their education on the 1st January 1897, it is observed that a fairly good number have obtained appointments for which their technical qualifications fitted them. It would be well if the Railway branch offered to employ the students of the college more freely than hitherto, now that their training is more advanced and practical than before.

13. *Finance*.—The particulars furnished in paragraph 20 of the report show that though the receipts and charges of the college during the year as well as the net cost to Government exceeded the figures of 1896, the net cost per student fell from Rs. 235 to Rs. 230 in consequence of an increase in the average number on the rolls. In future the Principal is requested to calculate the net cost per student with reference to the average number on the rolls instead of the average daily attendance. The increase in the expenditure occurred under almost all the important items, notably Europe stores and contingent charges. The decrease under remuneration to the Board of Examiners was due to the non-receipt of the sanction of the Secretary of State to the payment of the honoraria due to Messrs. Ashpitel and Scovell.

14. *Revision of rules*.—The inconvenience arising from the delay in sanctioning the draft revised rules of the college has been brought to the notice of Government more than once. Early orders of Government are expected.

15. *General*.—Major Love's remarks in paragraphs 20—23 of the report are in the main repetitions of the statements made in his several separate communications which have already received attention in some cases and are in other cases receiving due attention. An accountant on Rs. 25 per mensem has been sanctioned by Government, as a temporary measure, to afford relief to the clerical establishment. In conclusion, the Director congratulates the Principal, the Professors and the staff on the ability and zeal with which the work of the college was carried on during the year under report.

(A true Extract.)

(Signed) D DUNCAN,
Director of Public Instruction.

To the Principal, College of Engineering.

„ Principals of other Government Colleges.

„ Inspectors of Schools.

„ Superintendent, School of Arts.

Copy to the President, Board of Examiners, College of Engineering.

„ Chief Engineer, Public Works Department, for information.

Copies to the Editors, *Indian Journal of Education* and the *Educational Review*.

Copy to Government, with C.L.

ORDER—No. 538, Educational, dated 25th August 1898.

Recorded, with the following remarks:—

(1) The Government trusts that it will be found possible to introduce at an early date the scheme for the training of industrial and technical teachers sanctioned in G.O., No. 182, Educational, dated 25th March 1897.

(2) The purchase of an oil-engine and a gas-engine for the workshop has been sanctioned in G.O., No. 340, Educational, dated 7th June 1898.

(3) There was a satisfactory increase in the strength of the college, and all the classes participated in it except the Engineer class, the strength of which remained stationary. In the whole college there was only one Muhammadan student, and the Native Christian community was very poorly represented.

(4) The Government concurs generally with the remarks of the Director of Public Instruction in paragraph 7 of his review.

(5) In a separate communication, the Director addressed Government on the question of employing qualified Engineer students of the college on railway surveys, and a note on the subject by the Consulting Engineer for Railways was communicated to him for his information and guidance in G.O., No. 349-A, Educational, dated 11th June 1898.

(6) The sanction of the Secretary of State to the payment of the honoraria due to Messrs. Ashpitel and Scovell was communicated in G.O., No. 349, Educational, dated 11th June 1898, and orders on the revised rules of the college were passed in G.O., No. 530, Educational, dated 22nd August 1898.

(7) The receipts and charges of the college as well as the net cost of its maintenance during the year exceeded the figures of 1896. The net cost of educating each student, however, fell from Rs. 235 to Rs. 230 owing to an increase in the average number on the rolls.

(8) On the whole, the report for 1897 is satisfactory.

[Here enter letter No. 539, Educational, dated 25th August 1898.]

(True Extract.)

[Signature]
 Secretary to Government.

To the Director of Public Instruction,
 " Public Works Department.
 Editors' Table.