Educational (189~~9~~ 1900) Department.

ORDINARY PRINTED.

G.O., No. 259-260

DATED 29-6-00

INDEXED.

Bnd. 3-29-

[Despatch Abstract.]

College of Engineering, Madras.

Recording, with remarks, the report on the working of the —— during the year 1899

BACK PAPERS.

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

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(2)

Government {1900} of Madras.

EDUCATIONAL.

Recd. } 1900. *Enclosures*

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G.O., &c., Nos. 259, 260, 29th June 1900.

JUNE.

College of Engineering, Madras.

Recording, with remarks, the report on the working of the — during the year 1899.

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 14th May 1900, No. 4955.

I have the honour to submit, for the information of Government, a copy of my Proceedings, No. 4834, dated 12th instant, reviewing the report on the working of the College of Engineering for the year 1899.

Enclosure.

Proceedings of the Director of Public Instruction, dated 12th May 1900, No. 4834.

Read the following letter from Lieutenant-Colonel H. D. LOVE, R.E., Principal, College of Engineering, Madras, to the Director of Public Instruction, dated 31st March 1900, No. 2354.

I have the honour to submit the following report on the working of the College of Engineering during the year 1899. As I resumed charge of the Principalship in November only, the matter of the report is drawn rather from records than from my personal knowledge.

2. *Changes in Establishment.*—Lieutenant-Colonel H. D. Love, R.E., returned from furlough on the 8th November and relieved the Acting Principal Mr. J. P. Davidson, who reverted to the Public Works Department.

Mr. A. Chatterton, who took charge of the Aluminium department of the School of Arts in 1893, continued throughout the year 1899 to perform the duties of that department in addition to his own as Professor of Engineering.

Mr. W. C. H. Littlewood was promoted, on 1st September, Assistant Instructor in Surveying and Drawing, sub. *pro tem.*, M.R.Ry. R. A. Bhakya Mudaliyar reverting to Assistant Instructor in Surveying. M.R.Ry. S. Subrahmanya Aiyar was appointed Assistant Instructor in Drawing, sub. *pro tem.*, *vice* Mr. Littlewood.

M.R.Ry. S. Venkatachalam Pantulu, from the Public Works Department, took charge of the duties of Second Assistant Instructor in Surveying on the 14th March, *vice* M.R.Ry. A. R. Subrahmanya Aiyar reverted to the Public Works Department.

M.R.Ry. A. S. Nageswara Sastri was appointed Vernacular Assistant, sub. *pro tem.*, *vice* M.R.Ry. M. Parthasarathi Aiyangar transferred; he joined on the 1st September. He was replaced on the 6th October by M.R.Ry. S. N. Venkatarama Aiyar, B.A.

The sanction of Government having been received to an increase in the staff, the following changes were made:—

M.R.Ry. C. V. Narayanaswami Aiyar was appointed from the Public Works Department to be additional Assistant Instructor. He joined on the 7th August.

M.R.Ry. V. Balasundara Mudaliyar, Head Clerk, was appointed Accountant, with effect from 23rd June 1899, the junior clerks receiving promotion. A clerk was appointed to the workshop and an attender to the library.

3. *Numbers.*—The numbers on the rolls at the end of the year were—

Class.	Practical course.	In college: Third year.	Second year.	First year.	Total.
Engineer	*5	6	11	12	34
Engineer Subordinate	21	28	29	30	108
Sub-Overseer and Surveyor	..	..	34	33	67
Draftsman	..	..	†21	35	56
Artisan	..	..	..	38	38
Total	26	34	95	148	303

* Includes one who passed as an independent candidate.
† Includes four independent college students and three casual students.

Excluding the students engaged in the practical course, the total number actually in the College on the 31st December 1899 was 277. The corresponding totals for the four previous years were—

Years.	Nos.
1898	286
1897	260
1896	225
1895	231

The distribution of the students by classes of the community, by districts, and by occupation of parents, is given in Appendices A, B and C. It appears that 69 per cent. of the numbers were Brahmans, 23 per cent. were other caste Hindus, 4 per cent. Europeans and Eurasians, 3 per cent. Native Christians, and 1 per cent. Muhammadans. As regards districts, 34 per cent. of the total numbers belonged to Tanjore, 9 per cent. to Madras, 8 per cent. to Trichinopoly, 7 per cent. to Tinnevelly, and 5 per cent. each to Madura, Coimbatore and Gódávari.

The numbers offering for admission were—

Class.	Registered.	Qualified.	Admitted.
Engineer	* 27	18	14
Engineer Subordinate	† 133	110	§ 30
Sub-Overseer and Surveyor	170	63	34
Draftsman	45	17	‖ 31
Artisan	132	‡ 55	50

* Of these 22 have passed or appeared for B.A. degree examination.
† Of these 14 were F.As.
‡ Of these 4 were military students.
§ This number is partly made up of candidates who qualified for the Sub-Overseer and Surveyor class.
‖ Selected candidates.

It is a curious circumstance that of the 14 First Arts under-graduates who appeared for the Engineer Subordinate class entrance examination, only four stood high enough to secure admission.

Of the 34 persons admitted to the Sub-Overseer and Surveyor class, only one was transferred from the previous year's Draftsman class.

4. *Examinations.*—The final and term examinations were conducted by the Board of Examiners under the presidentship of Mr. Ashpitel. A brief abstract of the results is given below:—

(*a*) *Engineer class.*—The third-year division contained six students, all of whom passed the final examination. The average percentage of the total marks was 59. Two independent candidates also appeared, and both were successful. The second and first year divisions, numbering 11 and 12 students, respectively, appeared for the term examinations, and obtained 57 and 54 per cent. of the total marks.

(*b*) *Engineer Subordinate class.*—The senior division of 28 students appeared for the final examination, and 17 were successful. The average percentage of marks gained by the class was 50. Fourteen independent candidates also appeared, of whom 9 passed. The intermediate and junior divisions of 29 and 30 students, respectively, appeared for the term examinations, and secured 59 and 54 per cent. of the total marks.

(*c*) *Sub-Overseer and Surveyor class.*—Out of 34 students in the senior division, 3 passed with first-class certificates and 21 with second-class. The average of marks was 55 per cent. Six independent candidates presented themselves, and 3 passed. The second division secured an average of 57 per cent. of the marks at the term examination.

A special examination was also held for certain ex-students of the old Surveyor class who had been prevented through famine duty from presenting themselves for the corresponding examination of 1897. Two candidates offered themselves, and both failed.

(*d*) *Draftsman class.*—In the senior division 18 students (4 of whom appeared as independent candidates) presented themselves, and 14 passed with second-class certificates. The average total marks were 54 per cent. Twenty-six independent

candidates were also examined and 21 passed in the second class. One of these, who has never been a student, will receive a modified certificate. In the junior division of the Draftsman class 35 students appeared for the term examination and secured an average of 47 per cent. of the total marks.

(*e*) *Artisan class.*—This class contained 38 students at the close of the year. Appendix C shows that only one of the students belonged to the branch of the community for whose principal benefit the class was originally established. The question of the development or discontinuance of this class is under consideration.

5. *Comparison of results.*—The percentages of marks secured under the various subject heads by the senior divisions of classes compare as follow with the average results of the preceding four years:—

Engineer class—Senior division.

	1899.	Average of preceding four years.
	PER CENT.	PER CENT.
Mathematics	60	59
Science	50	47
Engineering	60	50
Drawing	61	52
Surveying	63	61
Language	61	55
Drills and Exercises	62	66
Total	59	54

Engineer Subordinate class—Senior division.

Mathematics	44	57
Engineering	51	48
Drawing	48	52
Surveying	52	60
Language	52	46
Drills and Exercises	56	73
Total	50	54

Sub-Overseer and Surveyor class—Senior division.

Surveying	59	56
Engineering	47	49
Drawing	55	51
Drills and Exercise	44	65
Total	55	59

Draftsman class—Senior division.

Geometrical and Perspective, Freehand and Model Drawing	45	59
Building Construction and Drawing	59	50
Machine Drawing	38	52
Estimating	63	49
Total	54	52

6. *Practical courses.*—Five Engineer and 21 Engineer Subordinate students were under practical instruction during 1899. Of the engineer students, 3 who desired to become Civil Engineers spent the period on works, and 2 who wished to become Mechanical Engineers worked in the Public Works Workshops. The Engineer subordinate students spent the whole of the period on works. The reports received from Public Works officers were generally favourable, but in four cases an extension of the course by one month was recommended. The students went through the Body Guard Riding school, and, except in the case of a Military Apprentice, paid the fees themselves.

7. *Military students.*—The total number of Military students at the close of the year was 11, distributed as follows:—

Practical course	1
Engineer Subordinate class, senior division	3
Do. intermediate do.	3
Do. junior do.	4

The student on works was appointed, at the end of his practical course, to the Public Works Department. Of the 3 men in the senior division, one passed the final examination in December 1899 and has become an Apprentice Overseer; the other two failed and have been remanded to their batteries. One of the 3 in the intermediate division is doing remarkably well, and heads his class. The students in the junior division have not made striking progress. These constitute the last of the probationers. At the entrance examination of April 1900, the Military candidates will compete with the Civil.

8. *Surveying*—The first camp of the year was formed in April instead of February. The object of the change was to give time for the instruction of the newly-joined classes in the use of instruments before taking the students into camp. The second camp was pitched in July as usual. Both camps were located at Pallávaram. Thanks are due to the Commandant, Major Hitchins, for assistance rendered. Additional surveying instruments are needed; and some provision will be made in the indent of 1900. Mr. Goddard's arrangement of the camps was highly commended. The total cost was Rs. 2,325. The practical examination in the manipulation of instruments was held as usual. This examination is of great importance, and I consider that the subject should be an obligatory one for the final examinations.

9. *Inspections.*—In September 144 of the students inspected the Tamarapak anicut system. The third-year students of the Engineer class visited the Kolar mines with Mr. Chatterton. Thanks are due to the Gold Field Mining Board for their permission to inspect the mines and for the facilities granted for the accommodation of the students.

10. *Workshops.*—The Professor of Engineering reports as follows:—

"The following classes received instruction during the year:—

Engineer students—	
Third year	6
Second year	13
First year	12
Total	31
Engineer subordinate students—	
Third year	29
Second year	32
First year	30
Total	91

"Instruction is given from 6–30 to 8–30 every morning, but as the staff are only capable of looking after about 20 students at a time, each student attends only one morning in the week. The first and second year Engineer students attend one afternoon a week and third-year students two afternoons a week. The Engineer subordinate classes do not get any afternoon work, and, it would, I think, be of great advantage to them if they did. The workshop training is undoubtedly one of the most valuable parts of the college course, and considering the fact that the majority of our students are Brahmans, and therefore unaccustomed to any kind of manual work, I think they do remarkably well. During the year the only additions to the equipment of the workshops have been made in the shops, but an indent has been sent to England for some electrical plant which, when it arrives, will enable the students to get some practical experience of electrical machinery. The installation will consist of a dynamo, several motors, an electric light plant and an electrical furnace. The connection with the Presidency College gas works has not yet been made, and the gas engine purchased eighteen months ago has not yet been used. The Hornsby Akroyd

oil engine has proved a very satisfactory motor and the delay in connection with the gas apparatus has not caused any practical inconvenience."

"A considerable amount of work has been done with the testing machine, and Rs. 665 has been received in fees for work done for the public. An extensive series of tests was started for the Public Works Department in connection with the building materials for the proposed Bhavâni reservoir and is still in progress. A few tests have also been made for the Forest Department, but owing to the orders of Government regarding work done for its own departments, I have been unable to undertake a great deal of testing which might, under other conditions, have been carried out with advantage."

"In connection with the Aluminium department of the School of Arts which is under my charge, I have freely made use of the resources of the college workshops and with great advantage to both institutions. Such expenditure as has been incurred on account of the aluminium industry has been kept separately and charged to the School of Arts. Two stipendiary apprentices have been working throughout the year and with very satisfactory results."

"Although special stipends for graduate apprentices were sanctioned in G.O., No. 57, Educational, dated 4th February 1899, the original applicants declined to take advantage of the concession, and it seems hardly likely that any others will do so unless fairly definite prospects of remunerative employment are held out to them at the end of the course. I am strongly of opinion that all Physical Science graduates should go through a special workshop course and learn something about the construction and manufacture of the instruments and machines they employ. It is indisputable that for electrical engineers the workshop training is indispensable, and I think the interests of higher technical education in this presidency would be greatly advanced if there was some definite connection between the Engineering College Workshops and the Physical Science laboratories of the Presidency College."

"The present workshops have now been in operation for six years, their sphere of usefulness has during that time considerably extended, and the accommodation they now provide is totally inadequate to the wants of the College and of the Educational Department. Throughout it has been my endeavour to use the college workshops for every possible useful public purpose, and I now find that a new workshop at least the size of the present shop is urgently required, and will be fully utilized as soon as it can be provided. I therefore propose to shortly submit plans and estimates for such extensions as I consider very necessary in the interests of the technical and industrial education of the Presidency. In conclusion I have to report that the workshop staff have carried on their duties satisfactorily and have rendered me great assistance."

11. *Chemistry.*—In December 1898 the Director proposed that the lectures on Chemistry should be transferred from the Professor of Engineering to the special Demonstrator, whose services were engaged for the laboratory work. Government, however, decided that the then existing arrangement should continue until the end of 1899, when fresh plans were to be made.

12. *Physical training and recreation.*—Instruction in gymnastics and drill was given as usual. An examination was conducted by me at the end of the year. The degree of proficiency attained was below the average.

Mr. Goddard, the Honorary Secretary of the Recreation Club, reports that the branches for reading-room, cricket, football, hockey and tennis were all well supported. The attendance for games on the recreation ground averaged about 80. There was keen inter-class competition for the cups established for cricket, football and hockey. An extension of the recreation ground is much needed and proposals have been submitted. Teams were entered for the inter-collegiate cricket and football matches, but no trophy was won. Two tennis courts were constructed on the recreation ground. The debt incurred in 1897 has now been cleared off.

M.R.Ry. M. Parthasarathi Aiyangar's transfer was a loss to the club. M.R.Ry. S. Subrahmanya Aiyar has however exerted himself to fill his place.

13. *Library.*—During the year 111 books were added to the library, which now contains 3,653 volumes. The books issued to students numbered 2,622 and to the staff 499, against 2,910 and 463, respectively, in the previous year; while 847 references were made to the consulting library. The decrease in the issues as compared with the previous year is attributed by the librarian to the inconvenience felt through structural alterations to the library during the first three months of the year.

14. *Attendance and conduct.*—The percentage of numbers present to numbers on the rolls was 97·3 for the college department and 95·6 for the school department. The attendance by class divisions is given in appendix D. The conduct of the students was satisfactory throughout the year. Regret is felt in reporting two casualties among students, one in the Sub-Overseer and Surveyor class and one in the Draftsman class, and also in recording the death of a promising ex-student S. A. Jagadisa Aiyar, Assistant Engineer Public Works Department.

15. *University examinations.*—Four students of the senior division of the Engineer class appeared for the B.E. degree examination of 1899, and three were successful, viz., one in the Civil branch and two in the Mechanical. One candidate, who was a student in 1895, also presented himself and failed. Two other old students were registered but did not appear.

Eleven candidates offered themselves for the F.E. examination, of whom six were second-year and two third-year students. Four of the former and one of the latter were successful. The remaining three candidates were ex-students, and all failed to pass.

16. *Buildings.*—The extension of the college buildings by moving the west front 20 feet outwards, as proposed in 1896, was sanctioned during the year under review at an estimated cost of Rs. 41,260. The work of dismantling was commenced in the Christmas holidays, so as to avoid inconvenience during session. Should no unforeseen delays occur, it is expected that the extension will be completed by the middle of 1900. The additional accommodation provided will consist mainly of a Drawing office 100 feet by 24 feet, a library and reading-room of corresponding size, three lecture-rooms 25 feet by 24 feet, and a room for the librarian and storekeeper.

17. *Government technical examinations.*—Twenty candidates—of whom sixteen were students and four ex-students—presented themselves voluntarily for these examinations. Three belonged to the Sub-Overseer and Surveyor class, nine to the Draftsman class, and eight to the Artisan class. Seven different subjects were taken up, and there were 29 papers in all, of which 12 satisfied the Examiners. Particulars are given in Appendix E.

As pointed out in previous reports, these examinations do not attract students of the College of Engineering. Candidates are not specially prepared for the examinations, and the degree of success obtained is no sound criterion of the instruction imparted. The usefulness of embodying in the Annual Report details of these examinations appears therefore to be questionable.

18. *Employment of passed students of December* 1898.—Of the three Engineer students who completed their practical training, the senior K. Srinivasa Aiyangar, B.A., was appointed Assistant Engineer in the Provincial establishment of the Public Works Department on Rs. 250. The second student accepted employment in the temporary Upper Subordinate establishment on Rs. 100. The third became a Supervisor of Minor Irrigation Works under the Revenue Department.

Of the seventeen Engineer Subordinates who completed their practical course in December 1898, five were appointed to the permanent and eleven to the temporary Upper Subordinate establishment of the Public Works Department. No information has been received regarding the remaining student. Salaries ranged from Rs. 60 to Rs. 100.

Of 21 Sub-overseers and Surveyors of 1898, six were appointed temporary Overseers, one as Sub-overseer, one as Delta Superintendent, one as Channel Superintendent, and two as Surveyors, all in the Public Works Department. In addition, six accepted employment as Minor Irrigation Sub-overseers in the Revenue Department, and one as a Surveyor in the Travancore Public Works Department. Salaries ranged from Rs. 30 to Rs. 60.

Of the seventeen Draftsmen of December 1898, eight obtained employment in the Madras Public Works Department, and one in the Bombay Public Works Department. One was appointed to the Sanitary Engineer's office, one to the South Indian Railway, and one to a Municipality; while one joined the Sub-overseer and Surveyor class of the college. Salaries ranged from Rs. 20 to Rs. 50.

19. *Prospects of employment in* 1900.—The prospects of employment for the students who completed their courses at or about the end of 1899 are good. The Public Works Department will probably need a number of temporary upper subordinates to meet famine requirements, and the Revenue Department should have many

vacancies in its Minor Irrigation establishment. In these and other capacities the qualified Engineers, Engineer Subordinates, and Sub-overseers and Surveyors ought to have no difficulty in finding remunerative employment. The appointments open to Draftsmen are likely to be as usual. The minimum rate of pay assigned for these men in the Public Works Department is too low. If the minimum were raised from Rs. 20 to Rs. 35, a better class of candidates would join the college, there would be greater competition, and a more satisfactory type of men would be supplied from the college. The college draftsmen class is rapidly becoming a refuge for the qualified but unsuccessful competitors for places in the Sub-overseer and Surveyor class.

The vacancies notified during the year were 107 in number. Details will be found in Appendix F.

20. *Revision of rules.*—Revised rules were formally made operative from 1st January 1899. They embody the syllabuses and schemes of marks which were introduced in 1896, and provide for the separation of college and board marks in regard to qualifying minima. Other salient features in the revision are the withdrawal of the exemption from the entrance examinations granted to First Arts under-graduates and Upper Secondary passed candidates; the reservation of certain scholarships for Muhammadans, Native Christians or Europeans; the abolition of third-class draftsman certificates, and the consequent removal of any connection between the class of certificate held by a passed student and his grading in the Public Works Department.

In December 1899 orders were issued in the Public Works Department that, from January 1902, one appointment only to the Upper Subordinate establishment would be guaranteed to the Engineer Subordinate class. Appointments to the temporary Upper Subordinate establishment are to be open to fully qualified Engineer and Engineer Subordinate students, and transfers to the permanent establishment may be made subsequently, on the recommendation of Superintending Engineers. The effect of the change will be to advance the prospects of qualified Engineer students, and to improve the material of the permanent establishment by weeding out persons who, though successful in examination, fail subsequently to show decided aptitude for the practical duties of the Public Works Department.

Under G.O., No. 560, Educational, dated 28th August 1899, guaranteed appointments are to be reserved for students of Asiatic descent belonging to the Madras Presidency and the Native States of Travancore, Cochin, Pudukkóttai, Sandur, Banganapalle and Mysore.

By G.O., No. 716, Educational, dated 25th October 1899, it is provided that all students entering the Public Works Department shall provide fresh certificates of physical fitness.

On the suggestion of the Chief Engineer for Irrigation some elementary training in the principles of the construction of Irrigation works will in future be given to the Sub-overseer and Surveyor class.

21. *General.*—Owing to my resumption of the duties of Principal as late in the year as November, I am unable to speak of the work of the staff during the year from personal observation. I find, however, from the records that the Director has twice expressed approval of Mr. Goddard's work in connection with the survey camps. My thanks are due to the President of the Board of Examiners, Mr. Ashpitel, for his cordial co-operation, and for the promptitude with which he furnished the examination results.

22. *Financial details.*—On referring to Appendix G, it will be seen that the receipts amounted to Rs. 21,821, and the charges to Rs. 89,538. The net cost to Government was therefore Rs. 67,718. Dividing this sum by the average number of students on the rolls, it appears that the net cost of educating each student was Rs. 239. Comparing the figures with those for 1898, it will be observed that the increase in receipts was Rs. 4,268 or 24 per cent., while the increase in charges was Rs. 14,058 or 19 per cent. The rise in receipts is due partly to an increase in the tuition fee rates, partly to the larger number of students in the Engineer class, and partly to the increasing competition for admission to the Engineer Subordinate and Sub-Overseer and Surveyor classes. As regards the enhanced charges, the larger staff is responsible for about Rs. 4,000, and contingencies for about Rs. 10,000. Of the last item, about Rs. 3,500 represents higher allotment under Workshop and Workshop materials. The remaining increase is apparent rather than real, and is due to the difficulty of comparing, during successive calendar years, expenses which are regulated by the allotments of official years. Thus the contingent charges of 1899 include the cost of three survey camps, while those of

1898 show the charge for only one camp. This accounts for an apparent excess in 1899 of over Rs. 2,000. Full financial details for the official year are furnished with my annual returns, and these afford sound data for comparison. The receipts and charges for the last five calendar years are given in Appendix H.

When the additional appointments of Professor of Civil Engineering and Instructor in Mechanical Engineering, which have been approved by Government, are made, a substantial increase in the total charges must be expected. This increase, however, will be indirectly repaid by the improvement in the training given, and by the consequent economy in the works of construction placed under the charge of the men trained. The cost of the Madras College is considerably less than that of the Sibpur institution, and far below that of the Thomason College, Roorkee.

The average tuition fee paid per student per annum was Rs. 69 for the college department, and Rs. 36 for the school department. Seeing that the competitors for admission to the Engineer Subordinate class and the Sub-Overseer and Surveyor class were in each case, five times the number of students admitted, it would appear that either the tuition fees may be raised, or that higher standard of general education may be required from the candidates for these classes. The matter will form the subject of a separate communication.

Appendix A.

Distribution of Students according to classes of Community on the 31st December 1899.

Classes.	Europeans and Eurasians.	Native Christians.	Muhammadans.	Hindus.				Aborgines.	Others.	Total.
				Brahmans.	Non-brahmen Caste Hindus.	Panchamas.	Other low castes.			
Engineer classes	..	1	..	27	1	..	..	..	..	29
Engineer Subordinate classes	11	..	..	70	6	..	..	..	..	87
Sub-Overseer and Surveyor classes	..	2	3	46	16	..	..	..	..	67
Draftsman classes	..	5	..	30	21	..	..	..	..	56
Artisan class	..	1	..	18	19	..	..	..	..	38
Total	11	9	3	191	63	..	..	..	..	277

Appendix B.

Distribution of Students by Districts on the 31st December 1899.

Districts.	Engineer class.	Engineer Subordinate class.	Sub-Overseer and Surveyor class.	Draftsman class.	Artisan class.	Total.
Ganjám	..	..	..	1	..	1
Vizagapatam	..	..	..	1	..	1
Gódávari	1	3	5	5	..	14
Kistna	..	1	1	2	..	4
Kurnool	1	..	..	..	..	1
Nellore	..	1	1	..	1	3
Bellary	..	..	..	1	..	1
Madras	1	2	3	9	10	25
Chingleput	..	1	3	1	2	7
North Arcot	3	2	3	1	3	12
South Arcot	..	1	3	1	2	7
Tanjore	11	35	26	14	8	94
Trichinopoly	2	6	5	5	3	21
Madura	1	2	6	4	2	15
Tinnevelly	1	7	6	4	1	19
Coimbatore	..	9	1	3	1	14
Salem	..	..	1	2	1	4
South Canara	4	2	..	..	..	6
Malabar	1	1	..	1	..	3
Mysore	..	1	..	1	1	3
Travancore	1	1	3	..	3	9
Pudukkottai	2	2	..	..	..	3
Military students	..	10	..	..	..	..
Total	29	87	67	56	38	277

Appendix C.

Distribution of Students by Wealth and Occupation of parents on the 31st December 1899.

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	1	5	..	6	2	..	..	4	..	..	..	..	6
Second year	..	10	1	11	1	1	..	9	..	..	..	..	11
First year	..	10	2	12	3	..	..	8	..	..	..	1	12
Engineer Subordinate class—													
Third year	..	28	..	28	5	..	..	19	..	..	..	4	28
Second year	..	27	2	29	5	1	2	18	..	..	..	3	29
First year	..	27	3	30	10	4	2	10	..	..	..	4	30
Sub-Overseer and Surveyor class—													
Second year	..	25	9	34	13	7	1	13	..	..	..	..	34
First year	..	23	10	33	10	4	3	16	..	..	..	..	33
Draftsman class—													
Second year	..	20	1	21	10	1	..	10	..	..	..	..	21
First year	..	29	6	35	19	1	3	12	..	..	..	..	35
Artisan class	..	22	16	38	16	10	3	8	1	..	..	..	38
Total ..	1	226	50	277	94	29	14	127	1	..	12	277	

Appendix D.

Average numbers and attendance in 1899.

	Average numbers on rolls.	Average daily attendance.
College department—		
Engineer class, third year	6·0	5·9
,, second year	11·5	11·0
,, first year	12·5	12·2
Engineer Subordinate class, third year	28·7	27·6
,, ,, second year	29·8	29·0
,, ,, first year	30·0	29·4
	118·5	115·3
School department—		
Sub Overseer and Surveyor class, second year	34·5	33 3
,, ,, first year	34 3	33·2
Draftsman class, second year	21·3	20 2
,, first year	35·5	34·0
Maistry and Artisan class	38·4	37·7
	164·0	158·4
Total college and school departments ...	282·5	273·7
Percentage of numbers present to numbers on the rolls—		
College department		97·3
School ,, ...		96·6

Appendix E.

Government Technical Examinations of 1899.

Subject.	Grade.	Number examined.						Number passed.
		Engineer class.	Engineer Subordinate class.	Sub-Overseer and Surveyor class.	Draftsman class.	Artisan class.	Total.	
Building materials and construction.	E.	..	..	1	..	1	2	1
Building Drawing and Estimating.	E.	..	..	1	..	2	3	..
Bridge Work	E.	..	..	..	..	1	1	..
Surveying and Levelling	A.	..	..	1	..	..	1	..
	E.	..	..	..	..	1	1	..
Mensuration	E.	..	..	1	1	1	3	1
Freehand and Outline Drawing.	E.	..	..	..	5	..	5	2
Geometrical Drawing ..	E.	..	..	1	6	6	13	8
		..	..	5	12	12	29	12

Appendix F.

Classification of Vacancies notified during the year 1899.

	Government.			Local Boards and Municipalities.				Railways.				Native States.			Private employés.		Total.
	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.	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 Assistant ..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	2
Professor	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	.	1
Supervisor	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Overseer	4	6	..	..	..	5	..	..	..	..	..	..	..	1	..	..	16
Sub-overseer	..	7	24	..	..	..	2	..	..	..	..	..	..	..	..	..	33
Draftsman	..	1	14	..	..	..	..	..	1	..	1	..	..	.	..	..	17
Surveyor	2	5	21	..	..	..	..	..	..	..	..	..	..	1	..	..	29
Maistry	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Tracer	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Aniout or Conservancy Superintendent.	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Total ..	8	19	66	2	..	5	2	..	1	..	1	..	..	2	1	..	107

Appendix G.

Financial Details for 1899.

		Rs.	Rs. A. P.
Receipts—			
Tuition Fees—			
College department		8,231	
School „		5,965	
			14,196 0 0
Entrance and final examination fees			7,200 8 0
Fines and miscellaneous receipts			424 1 11
	Total		21,820 9 11
Charges—			
Principal			13,226 0 3
Professors, masters and teachers			40,244 9 5
Clerks, librarian and servants			4,333 7 1
Board of examiners			4,981 4 0
Library and prize allowances			955 11 9
Books and instruments			182 11 9
Other Europe stores			4,848 6 4
Other heads of contingent charges			14,503 8 3
Travelling allowance			591 13 6
Scholarships			4,151 5 3
Exchange compensation			1,519 11 1
	Total		89,538 8 8
Net cost to Government		67,718	
Average number of students on rolls		283	
Net cost per student		239	
Average tuition fee paid per student per annum—			
College department		69	
School „		36	

Appendix H.

Financial Details.

—	1899.	1898.	1897.	1896.	1895.
	Rs.	Rs.	Rs.	Rs.	Rs.
Receipts	21,821	17,553	16,366	14,590	14,190
Charges	89,538	75,480	74,179	66,288	72,080
Net cost to Government	67,718	57,928	57,813	51,698	57,890
Average number of students	283	285	239	205	220
Net cost per student	239	203	242	252	263

Read the following letter from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated 19th January 1900, No. 38 :—

We have the honour to submit a report on the College of Engineering Examinations held in December last.

2. The following statement shows the percentage of marks obtained by each class :—

—	First division. 1894—97.	First division. 1898.	First division. 1899.	Second division, 1899.	Third division, 1899.
Engineer Class.					
Mathematics	62	57	60	59	55
Science	51	46	50	48	..
Engineering	54	53	60	56	60
Drawing	55	55	61	58	39
Surveying	66	58	63	61	61
Language	57	52	61	..	..
Drills and exercises	69	59	62	..	..
Total	57	53	59	57	54
Engineer Subordinate Class.					
Mathematics	54	62	44	67	63
Engineering	49	49	51	55	52
Drawing	54	44	48	56	47
Surveying	59	58	52	54	53
Language	47	53	52	..	..
Drills and exercises	71	71	56	..	..
Total	54	53	50	59	54

—	First division. 1894—97.	First division. 1898.	First division. 1899.	Second division, 1899.
Sub-Overseer and Surveyor Class.				
Surveying	55	62	59	60
Engineering	47	51	47	60
Drawing	42	59	55	50
Drills and exercises	67	58	44	..
Total	59	59	55	57
Draftsman Class.				
Geometrical	57	59	45	47
Building construction	40	55	59	..
Machine drawing	53	41	38	..
Estimating	40	63	63	..
Total	50	55	54	..

3. In the Engineer class six college students and two independent candidates were examined and all obtained the required number of marks. The class is a little above the average. The second and third divisions also did fairly well.

4. In the Engineer subordinate class, first division, 28 college students and 14 independent candidates appeared for examination and 17 college students and 9 independent candidates obtain a certificate. The division has always been a poor one and has not materially improved during the past year. Of the three military students one passed.

In the second division the percentage of marks obtained is much higher and it is noteworthy that a military student has obtained the first place.

The third division is up to the average.

5. The first division of the Sub-overseer and Surveyor class has not done so well as usual, but the average is high for this class. Of the 34 college students, three passed in the first class, and 21 in the second class, and of the six independent candidates three obtain certificates.

The second division is practically up to the usual standard and there is a great improvement in Engineering. Two independent candidates were examined in surveying and both failed.

6. In the Draftsman class 14 college students, of whom 11 obtain certificates, 4 independent college students of whom 3 passed, and 26 independent candidates of whom 21 obtained the requisite number of marks, were examined. The class was a little below the average.

The second division was only examined in one subject and all except four qualified.

7. Taking the examination as a whole, the result may be said to be good. There is an improvement in Engineering except in the Sub-Overseer and Surveyor class, first division, and surveying maintains its previous high average.

8. There are several points which the Board would bring to notice—

(1) The Draftsman class appears to be in an unsatisfactory state and does not attract a good class of men. The Board understands that the best men in the second division generally join the Sub-Overseer and Surveyor class, and this is likely to continue so long as draftsman are so miserably under-paid in the Public Works Department. Good draftsman are few and far between, and unless some inducement in the shape of better pay is held out the quality is likely to still further deteriorate.

(2) It is suggested that, in all classes, certificates should be withheld until candidates have passed the practical examination in surveying. To this the Board attach much importance as students on leaving the college are, as a rule, employed on surveys, and there is no excuse for their not having a practical acquaintance with their work, having regard to the great attention which is paid to surveying during the college course.

(3) In the Draftsman class it is suggested that the qualifying minimum in geometrical, etc., drawing should be abolished or else that the number of subjects in which qualifying minima are required should be reduced as the examination is, in this respect, needlessly severe.

(4) It is suggested that E2 is too junior a class to be examined in building drawing, and that it would be more satisfactory to defer this examination until the end of the course when much better results are likely to be obtained.

Read the following letter from Lieutenant-Colonel H. D. LOVE, R.E., Principal, College of Engineering, Madras, to the Director of Public Instruction, Madras, dated 12th February 1900, No. 1949-C. :—

Referring to your endorsement, No. 800, dated 31st January 1900, on report of the Board of Examiners, I have the honour to offer the following remarks.

2. *Paragraph* 8 (1).—It is true that the Draftsman class is not as popular as the Sub-Overseer and Surveyor class. The total numbers of registered candidates for the Entrance Examination were—Sub-Overseer and Surveyor class 170, Draftsman class 45. I agree with the Board that a better type of men would be attracted to the latter class if the pay of the draftsmen of the Public Works Department were improved.

3. *Paragraph* 8 (2).—Recommendations in regard to the matter alluded to were made in my No. 1439-C., dated 5th December 1899.

4. *Paragraph* 8 (5).—The examination of the Draftsman class was conducted under the rules in force prior to 1st January 1899, by which separate minima are required in five subjects. In future, the revised rules will regulate the examination. Under these rules separate minima are obligatory under only four heads, and the minima themselves have been reduced. No further change should, it is considered, be made for the present.

5. *Paragraph* 8 (4).—The examination of the Engineer class in building drawing will, as recommended by the Board, be transferred to the third year of the course.

6. A few minor corrections in the Board's report have been made in blue pencil.

7. With regard to paragraph 2 of your endorsement under reference, I have the honour to state that the list mentioned was submitted with my No. 1892-C., dated 1st February 1900.

8. A copy of the mark sheets sent in by the Board of Examiners can be forwarded if desired. An abstract will however be given in my Annual Report for 1899.

Proceedings, No. 4834 of 1900.

The revised rules sanctioned in 1898 came into operation on the 1st January 1899 and have been noticed in detail in paragraph 20 of the report. It will be some time before the effect of the changes can be fully appreciated.

2. *Staff.*—Several changes had taken place in the staff and the establishment. The only events worthy of notice are the return of Lieutenant-Colonel Love in November last from his long leave and the strengthening of the staff of the College, including the workshop, with reference to G.O., No. 383, Educational, dated 23rd June 1899. It is hoped that a Professor of Civil Engineering and an Instructor in Mechanical Engineering will be employed as soon as the present financial strain ceases to be felt. Since the submission of the Principal's report, orders have been received for the deputation for a period of three years of Mr. Alfred Chatterton, Professor of Engineering, on special duty in connection with the development of technical trades and industries, and steps are being taken to appoint a suitable successor to him.

3. *Accommodation.*—Paragraph 16 of the report furnishes particulars of the extension to the college buildings sanctioned in G.O., No. 524, Educational, dated 10th August 1899. The college workshops seem also to require early expansion, and the necessary plans and estimates for the additional accommodation are awaited.

4. *Library and reading-room.*—The library, which received an addition of 111 books during the year, was fairly well used. It is presumed that the reading-room has, as usual, been fully utilised.

5. *Workshops.*—An extract from the report of the Professor of Engineering on the College workshops, of which he is in charge, is appended to paragraph 10 of the report. It is observed therefrom that it is proposed, on receipt from England of the electrical plant which has been indented for, to give the students of the college some instruction in the use of electrical machinery; that the two apprentices who joined the workshops in the early part of the year have worked satisfactorily; and that the graduate apprentices, whose entertainment on an enhanced rate of stipend was sanctioned in G.O., No. 57, Educational, dated 4th February 1899, have declined to take advantage of the concession offered in the absence of definite prospects of suitable employment on the completion of their course of training. The Professor of Physics, Presidency College, is requested to favour the Director with his opinion regarding Mr. Chatterton's suggestion that there should be some definite connection between the workshops of the College of Engineering and the Physical Science laboratories of the Presidency College. Both Mr. Chatterton and the Principal, College of Engineering, have proposed to utilize the college workshops as one of the centres for the practical training of Mechanical Engineer students, and the matter will be disposed of separately.

6. *Strength and attendance.*—Particulars of the strength of the different classes at the close of the last two years, excluding students in their practical course, are furnished in the margin. It is observed that there were nine students fewer at the close of 1899 than in 1898, the fall being shared by the Engineer subordinate, Draftsman and Artisan classes. The steady increase in the strength of the Engineer class is noted with satisfaction.

Class.		1898.	1899.
Engineer		25	29
Engineer Subordinate.	Civil students	80 } 89	77 } 87
	Military students	9 }	10 }
Sub-Overseer and Surveyor		62	67
Draftsman		65	56
Artisan		45	38
	Total	286	277

There was also an improvement in the proportion of the average daily attendance to the average number on the rolls. As usual, Brahmans preponderated, almost monopolizing the Engineer and Engineer Subordinate classes. It is gratifying to note that there were three Muhammadans in the college—all in the Sub-Overseer and Surveyor

class—against none in the preceding year. Three districts (Anantapur, Cuddapah and Nilgiris) as against four in 1898 were unrepresented, and Tanjore continued to contribute the largest number of students, viz., 91 out of a total of 277, Madras, Trichinopoly and Tinnevelly occupying the same position as in the previous year. It is noteworthy that the richer classes and the artisan classes were represented by only one each. This shows that the Artisan class has failed to attract the community for whose chief benefit it was originally intended. Government will shortly be addressed in regard to the discontinuance of the above class in the college. From the statement appended to paragraph 3 of the report it is observed that the competition for admission was growing keener in all the classes except the Engineer class. The fact that four only out of the 14 First Arts under-graduates who competed for admission to the Engineer Subordinate class qualified for admission goes to show that there is not much use in raising the standard of admission to the above class from the Matriculation to the F.A. Examination as suggested by Lieutenant-Colonel Love in his letter, No. 1196-C., dated 16th November 1899. It would, however, be of interest to know in which of the subjects of the entrance examination the First Arts undergraduates were found generally inferior to Matriculates, and the Principal is requested to furnish this information.

7. *Examinations*—(i) *University examinations.*—The results of the Degree Examination and the First Examination in Engineering for the years 1897–98 and 1898–99 are compared below :—

Examination.	1897–88.		1898–99.	
	Examined.	Passed.	Examined.	Passed.
Degree examination	5	5	4	3
First examination	11	6	11	5

The results for 1898–99, though fair, are not quite so good as those of the previous year.

(ii) *College Board examinations.*—The results of the final examinations conducted by the College Board of Examiners in December last are compared below with those of the previous year :—

Class.	1898.	1899.	1898.	1899.
	Number examined.		Number passed.	
Engineer	6	6	4	6
Engineer Subordinate	28	28	21	17
Sub-Overseer and Surveyor	25	34	21	24
Draftsman	23	* 18	17	† 14

It should have been explained why four of the students of the senior division of the Draftsman class were treated as "independent" candidates. The results of the Engineer and Draftsman classes were good, though all the successful students obtained only second class passes. In the Engineer Subordinate and the Sub-Overseer and Surveyor classes, the results were not good and did not compare favourably with those of the previous year. The first division of the Engineer Subordinate class is considered by the Board of Examiners to have been a poor one, and to this fact is due the low percentage of total marks obtained by the above division at the final examination as compared with that shown in 1898. The senior division of the Sub-Overseer and Surveyor class was also much below the average of the four preceding years, while the senior division of the Draftsman class was a little above the average. A deterioration is noticed in the results in mathematics and surveying in the Engineer Subordinate class, in all the subjects of the examination in the Sub-Overseer and Surveyor class, and in geometrical and perspective, &c., drawing and in machine drawing in the Draftsman class, and these subjects as well as the several defects pointed out by the individual examiners will, it is hoped, receive the careful attention of the instructors concerned.

The Principal's observations with regard to the several suggestions made by the Board of Examiners in paragraph 8 of the President's letter, No. 38, dated 19th January last, are noted. The attention of the Chief Engineer will be invited to the

* Includes four independent College students. | † Includes three independent College students.

desirability of improving the prospects of the draftsmen trained in the College with a view to attract better men to the Draftsman class.

(iii) *Government Technical examinations.*—Five entries from the Sub-Overseer and Surveyor class, 12 from the Draftsman class and 12 from the Artisan class, or in all 29 entries were made for the Government Technical examinations in various subjects and there were 12 passes, an unsatisfactory result, especially considering that all the students who presented themselves for examination in bridge-work, building-drawing and estimating and surveying and levelling failed completely. The fact that the examinations are voluntary and that the college does not specially prepare candidates for them is however noted. Particulars relating to these examinations should, however, continue to be embodied in the annual reports.

8. *Independent candidates.*—The results of the independent candidates at the final examinations held in December last are recorded in the margin. They were, on the whole, good. At the special examination held with the permission of Government for certain students of the old Surveyor class both the candidates who presented themselves failed.

Class of candidates.	Number examined.	Number passed.
Engineer candidates ...	2	2
Engineer Subordinate candidates	14	9
Sub-Overseer and Surveyor candidates	6	3
Draftsman candidates ...	* 26	† 21

* Excluding four independent College students.
† Excluding three do. do. do.

9. *Military students.*—Excluding the student engaged in his works course, there were 10 soldier students in the college, or one more than in the previous year. In the final examination held in December last one only of the three students examined was successful, and he is now undergoing his practical course as an Apprentice Overseer. It is satisfactory to note, however, that one of the students in the intermediate division has taken the first place in his class and is very promising.

10. *Practical courses.*—Five Engineer and twenty-one Engineer Subordinate students were in their practical course during the year, and of the former, two underwent their training in the Public Works Workshops as Mechanical Engineers. The practical course of four of the Engineer Subordinate students had to be extended by one month each, as their work was reported to have been not altogether satisfactory. All the students completed the prescribed riding course.

11. *Physical education.*—Physical education received proper attention through the agency of the College Recreation Club, which owes its success to Sergeant Goddard. The Principal's remark that the degree of proficiency attained by the students in gymnastics and drill was below the average is noted.

12. *Discipline and conduct.*—The conduct of the students was satisfactory, and the college continued to maintain its high average attendance.

13. *Employment of former students.*—The account given of the employment of former students is very satisfactory, the majority of them having entered the service of Government. It has been ruled that from January 1902 only one appointment on the permanent Upper Subordinate Establishment shall be guaranteed to the Engineer Subordinate class annually, the other successful students being eligible for appointments on the temporary establishment only at the outset. Lieutenant-Colonel Love considers that the ultimate result of this arrangement will be to advance the prospects of qualified Engineer students.

14. *Finance.*—Both the receipts and charges of the college advanced, having amounted in 1899 to Rs. 21,821 and Rs. 89,538 against Rs. 17,553 and Rs. 75,480 respectively in 1898, and the variations have been fully explained in the report. Owing to an increase in the net expenditure, the net cost to Government of educating each student rose from Rs. 203 to Rs. 239, which is, however, slightly below the average net cost per student for the four years ended with 1898, viz., Rs. 240. The average tuition fee paid per student per annum was Rs. 69 for the college department and Rs. 36 for the school department.

15. *General.*—Government will be addressed in a separate communication regarding the resumption or otherwise of college marks in the case of the Draftsman class and the continuance of the practice of admitting to the final examination for Draftsmen independent candidates connected with the Public Works Department who have not had the benefit of instruction in the college.

The administration of the college during the year is creditable to the Principal, the Professors and the staff of instructors.

(A true Extract.)

(Signed) G. H. STUART,
Director of Public Instruction.

To the Principal, College of Engineering,
with a spare copy for the Professor of
Engineering in charge of the workshops.
„ Principals of other Government Colleges,
with a spare copy for the Professor
of Physical Science, Presidency College,
with reference to paragraph 5.
„ Inspectors of Schools.
„ the Superintendent, School of Arts.
Copies to the President, Board of Examiners, College of Engineering.
„ „ Chief Engineer, Public Works Department, for information.
Copy to the Editors, *Indian Journal of Education* and the
Educational Review.
Copy to Government, with C.L.

Order—No. 259, Educational, dated 29th June 1900.

Recorded with the following remarks:—

(1) The working of the College during the year was satisfactory.

(2) The appointment of a Professor of Civil Engineering and of an Instructor in Mechanical Engineering awaits the sanction of the Secretary of State.

(3) The Government agrees with the Director of Public Instruction in considering it unnecessary to raise the standard of qualification for admission to the Engineer subordinate class.

(4) Proposals for improving the status of draftsmen in the Public Works Department are now under consideration by the Government.

(5) The further communications on the subject of the continuance of the artizan class and of the resumption of College marks for draftsmen, promised in paragraphs 6 and 15 of the Director's review, will be awaited.

(6) The Director should report what action has been taken on the recommendation of the Board of Examiners supported by the Principal that the practical examination in surveying should be made compulsory.

(True Extract.)

H. TREMENHEERE,
Secretary to Government.

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

Letter—No. 260, Educational, dated Ootacamund, 29th June 1900, to the Under Secretary of State for India.

With advertance to Lord Hartington's despatch No. 9, Public Works, dated the 18th May 1882, I am directed to forward a copy of the Proceedings of this Government of this date reviewing the report on the working of the College of Engineering during the year 1899.

H. TREMENHEERE,
Secretary to Government.

Rd. S. J. Press.

Educational (~~189~~ 1900) Department.

CURRENT No. 640

40 259 / 24-5-00 Print in Re-form 78 / 2500

From
The Director of Public Instruction
Madras

Order

No 4955

Dated 14th May 1900.

Received

Registered

Enclosures

Spare copies

SUBJECT.

Submitting a copy of Proceedings No 4834 dated 12th instant, reviewing the report on the working of the College of Engineering for the year 1899

DESPATCHED
15 MAY 1900

BACK PAPERS.

G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.

Government {1900} of Madras.

EDUCATIONAL.

Revised proof please 7/6/00 26/6/00

Forthwith

Draft order put in type with report. Under the instructions at flag VIII this has to be seen & the trouble of counterbotting

Recd. } 1900. *Enclosures*

Rcgd. } *Spare copies*

G.O., No. 259, 29th June 1900.

JUNE.

College of Engineering, Madras.

Recording, with remarks, the report on the working of the — during the year 1899.

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 14th May 1900, No. 4955.

I have the honour to submit, for the information of Government, a copy of my Proceedings, No. 4834, dated 12th instant, reviewing the report on the working of the College of Engineering for the year 1899.

Enclosure.

Proceedings of the Director of Public Instruction, dated 12th May 1900, No. 4834.

Read the following letter from Lieutenant-Colonel H. D. LOVE, R.E., Principal, College of Engineering, Madras, to the Director of Public Instruction, dated 31st March 1900, No. 2354.

I have the honour to submit the following report on the working of the College of Engineering during the year 1899. As I resumed charge of the Principalship in November only, the matter of the report is drawn rather from records than from my personal knowledge.

2. *Changes in Establishment.*—Lieutenant-Colonel H. D. Love, R.E., returned from furlough on the 8th November and relieved the Acting Principal Mr. J. P. Davidson, who reverted to the Public Works Department.

Mr. A. Chatterton, who took charge of the Aluminium department of the School of Arts in 1898, continued throughout the year 1899 to perform the duties of that department in addition to his own as Professor of Engineering.

Mr. W. C. H. Littlewood was promoted, on 1st September, Assistant Instructor in Surveying and Drawing, sub. *pro tem.*, M.R.Ry. R. A. Bhakya Mudaliyar reverting to Assistant Instructor in Surveying. M.R.Ry. S. Subrahmanya Aiyar was appointed Assistant Instructor in Drawing, sub. *pro tem.*, *vice* Mr. Littlewood.

M.R.Ry. S. Venkatachalam Pantulu, from the Public Works Department, took charge of the duties of Second Assistant Instructor in Surveying on the 14th March, *vice* M.R.Ry. A. R. Subrahmanya Aiyar reverted to the Public Works Department.

M.R.Ry. A. S. Nageswara Sastri was appointed Vernacular Assistant, sub. *pro tem.*, *vice* M.R.Ry. M. Parthasarathi Aiyangar transferred; he joined on the 1st September. He was replaced on the 6th October by M.R.Ry. S. N. Venkatarama Aiyar, B.A.

The sanction of Government having been received to an increase in the staff, the following changes were made :—

M.R.Ry. C. V. Narayanaswami Aiyar was appointed from the Public Works Department to be additional Assistant Instructor. He joined on the 7th August.

M.R.Ry. V. Balasundara Mudaliyar, Head Clerk, was appointed Accountant, with effect from 23rd June 1899, the junior clerks receiving promotion. A clerk was appointed to the workshop and an attender to the library.

3. *Numbers.*—The numbers on the rolls at the end of the year were—

Class.	Practical course.	In college.			Total.
		Third year.	Second year.	First year.	
Engineer	*5	6	11	12	34
Engineer Subordinate	21	28	29	30	108
Sub-Overseer and Surveyor	..	..	34	33	67
Draftsman	..	..	†21	35	56
Artisan	..	..	..	38	38
Total	26	34	95	148	303

* Includes one who passed as an independent candidate.
† Includes four independent college students and three casual students.

Excluding the students engaged in the practical course, the total number actually in the College on the 31st December 1899 was 277. The corresponding totals for the four previous years were—

Years.	Nos.
1898	286
1897	260
1896	225
1895	231

The distribution of the students by classes of the community, by districts, and by occupation of parents, is given in Appendices A, B and C. It appears that 69 per cent. of the numbers were Brahmans, 23 per cent. were other caste Hindus, 4 per cent. Europeans and Eurasians, 3 per cent. Native Christians, and 1 per cent. Muhammadans. As regards districts, 34 per cent. of the total numbers belonged to Tanjore, 9 per cent. to Madras, 8 per cent. to Trichinopoly, 7 per cent. to Tinnevelly, and 5 per cent. each to Madura, Coimbatore and Gódávari.

The numbers offering for admission were—

Class.	Registered.	Qualified.	Admitted.
Engineer	* 27	18	14
Engineer Subordinate	† 133	110	§ 30
Sub-Overseer and Surveyor	170	63	34
Draftsman	45	17	‖ 31
Artisan	132	‡ 55	50

* Of these 22 have passed or appeared for B.A. degree examination.
† Of these 14 were F.As.
‡ Of these 4 were military students.
§ This number is partly made up of candidates who qualified for the Sub-Overseer and Surveyor class.
‖ Selected candidates.

It is a curious circumstance that of the 14 First Arts under graduates who appeared for the Engineer Subordinate class entrance examination, only four stood high enough to secure admission.

Of the 34 persons admitted to the Sub-Overseer and Surveyor class, only one was transferred from the previous year's Draftsman class.

4. *Examinations.*—The final and term examinations were conducted by the Board of Examiners under the presidentship of Mr. Ashpitel. A brief abstract of the results is given below :—

(*a*) *Engineer class.*—The third-year division contained six students, all of whom passed the final examination. The average percentage of the total marks was 59. Two independent candidates also appeared, and both were successful. The second and first year divisions, numbering 11 and 12 students, respectively, appeared for the term examinations, and obtained 57 and 54 per cent. of the total marks.

(*b*) *Engineer Subordinate class.*—The senior division of 28 students appeared for the final examination, and 17 were successful. The average percentage of marks gained by the class was 50. Fourteen independent candidates also appeared, of whom 9 passed. The intermediate and junior divisions of 29 and 30 students, respectively, appeared for the term examinations, and secured 59 and 54 per cent. of the total marks.

(*c*) *Sub-Overseer and Surveyor class.*—Out of 34 students in the senior division, 3 passed with first-class certificates and 21 with second-class. The average of marks was 55 per cent. Six independent candidates presented themselves, and 3 passed. The second division secured an average of 57 per cent. of the marks at the term examination.

A special examination was also held for certain ex-students of the old Surveyor class who had been prevented through famine duty from presenting themselves for the corresponding examination of 1897. Two candidates offered themselves, and both failed.

(*d*) *Draftsman class.*—In the senior division 18 students (4 of whom appeared as independent candidates) presented themselves, and 14 passed with second-class certificates. The average total marks were 54 per cent. Twenty-six independent

candidates were also examined and 21 passed in the second class. One of these, who has never been a student, will receive a modified certificate. In the junior division of the Draftsman class 35 students appeared for the term examination and secured an average of 47 per cent. of the total marks.

(*e*) *Artisan class.*—This class contained 38 students at the close of the year. Appendix C shows that only one of the students belonged to the branch of the community for whose principal benefit the class was originally established. The question of the development or discontinuance of this class is under consideration.

5. *Comparison of results.*—The percentages of marks secured under the various subject heads by the senior divisions of classes compare as follow with the average results of the preceding four years :—

Engineer class—Senior division.

	1899.	Average of preceding four years.
	PER CENT.	PER CENT.
Mathematics	60	59
Science	50	47
Engineering	60	50
Drawing	61	52
Surveying	63	61
Language	61	55
Drills and Exercises	62	66
Total ...	59	54

Engineer Subordinate class—Senior division.

Mathematics	44	57
Engineering	51	48
Drawing	48	52
Surveying	52	60
Language	52	46
Drills nnd Exercises	56	73
Total ...	50	54

Sub-Overseer and Surveyor class—Senior division.

Surveying	59	56
Engineering	47	49
Drawing	55	51
Drills and Exercise	44	65
Total ...	55	59

Draftsman class—Senior division.

Geometrical and Perspective, Freehand and Model Drawing	45	59
Building Construction and Drawing ...	59	50
Machine Drawing	38	52
Estimating	63	49
Total ...	54	52

6. *Practical courses.*—Five Engineer and 21 Engineer Subordinate students were under practical instruction during 1899. Of the engineer students, 3 who desired to become Civil Engineers spent the period on works, and 2 who wished to become Mechanical Engineers worked in the Public Works Workshops. The Engineer subordinate students spent the whole of the period on works. The reports received from Public Works officers were generally favourable, but in four cases an extension of the course by one month was recommended. The students went through the Body Guard Riding school, and, except in the case of a Military Apprentice, paid the fees themselves.

7. *Military students.*—The total number of Military students at the close of the year was 11, distributed as follows :—

Practical course	1
Engineer Subordinate class, senior division	3
Do. intermediate do.	3
Do. junior do.	4

The student on works was appointed, at the end of his practical course, to the Public Works Department. Of the 3 men in the senior division, one passed the final examination in December 1899 and has become an Apprentice Overseer ; the other two failed and have been remanded to their batteries. One of the 3 in the intermediate division is doing remarkably well, and heads his class. The students in the junior division have not made striking progress. These constitute the last of the probationers. At the entrance examination of April 1900, the Military candidates will compete with the Civil.

8. *Surveying*—The first camp of the year was formed in April instead of February. The object of the change was to give time for the instruction of the newly-joined classes in the use of instruments before taking the students into camp. The second camp was pitched in July as usual. Both camps were located at Pallávaram. Thanks are due to the Commandant, Major Hitchins, for assistance rendered. Additional surveying instruments are needed ; and some provision will be made in the indent of 1900. Mr. Goddard's arrangement of the camps was highly commended. The total cost was Rs. 2,325. The practical examination in the manipulation of instruments was held as usual. This examination is of great importance, and I consider that the subject should be an obligatory one for the final examinations.

9. *Inspections.*—In September 144 of the students inspected the Tamarapak anicut system. The third-year students of the Engineer class visited the Kolar mines with Mr. Chatterton. Thanks are due to the Gold Field Mining Board for their permission to inspect the mines and for the facilities granted for the accommodation of the students.

10. *Workshops.*—The Professor of Engineering reports as follows :—

" The following classes received instruction during the year :—

Engineer students—	
Third year	6
Second year	13
First year	12
Total ...	31
Engineer subordinate students—	
Third year	29
Second year	32
First year	30
Total ...	91

" Instruction is given from 6–30 to 8–30 every morning, but as the staff are only capable of looking after about 20 students at a time, each student attends only one morning in the week. The first and second year Engineer students attend one afternoon a week and third-year students two afternoons a week. The Engineer subordinate classes do not get any afternoon work, and, it would, I think, be of great advantage to them if they did. The workshop training is undoubtedly one of the most valuable parts of the college course, and considering the fact that the majority of our students are Brahmans, and therefore unaccustomed to any kind of manual work, I think they do remarkably well. During the year the only additions to the equipment of the workshops have been made in the shops, but an indent has been sent to England for some electrical plant which, when it arrives, will enable the students to get some practical experience of electrical machinery. The installation will consist of a dynamo, several motors, an electric light plant and an electrical furnace. The connection with the Presidency College gas works has not yet been made, and the gas engine purchased eighteen months ago has not yet been used. The Hornsby Akroyd

oil engine has proved a very satisfactory motor and the delay in connection with the gas apparatus has not caused any practical inconvenience."

"A considerable amount of work has been done with the testing machine, and Rs. 665 has been received in fees for work done for the public. An extensive series of tests was started for the Public Works Department in connection with the building materials for the proposed Bhaváni reservoir and is still in progress. A few tests have also been made for the Forest Department, but owing to the orders of Government regarding work done for its own departments, I have been unable to undertake a great deal of testing which might, under other conditions, have been carried out with advantage."

"In connection with the Aluminium department of the School of Arts which is under my charge, I have freely made use of the resources of the college workshops and with great advantage to both institutions. Such expenditure as has been incurred on account of the aluminium industry has been kept separately and charged to the School of Arts. Two stipendiary apprentices have been working throughout the year and with very satisfactory results."

"Although special stipends for graduate apprentices were sanctioned in G.O., No. 57, Educational, dated 4th February 1899, the original applicants declined to take advantage of the concession, and it seems hardly likely that any others will do so unless fairly definite prospects of remunerative employment are held out to them at the end of the course. I am strongly of opinion that all Physical Science graduates should go through a special workshop course and learn something about the construction and manufacture of the instruments and machines they employ. It is indisputable that for electrical engineers the workshop training is indispensable, and I think the interests of higher technical education in this presidency would be greatly advanced if there was some definite connection between the Engineering College Workshops and the Physical Science laboratories of the Presidency College."

"The present workshops have now been in operation for six years, their sphere of usefulness has during that time considerably extended, and the accommodation they now provide is totally inadequate to the wants of the College and of the Educational Department. Throughout it has been my endeavour to use the college workshops for every possible useful public purpose, and I now find that a new workshop at least the size of the present shop is urgently required, and will be fully utilized as soon as it can be provided. I therefore propose to shortly submit plans and estimates for such extensions as I consider very necessary in the interests of the technical and industrial education of the Presidency. In conclusion I have to report that the workshop staff have carried on their duties satisfactorily and have rendered me great assistance."

11. *Chemistry.*—In December 1898 the Director proposed that the lectures on Chemistry should be transferred from the Professor of Engineering to the special Demonstrator, whose services were engaged for the laboratory work. Government, however, decided that the then existing arrangement should continue until the end of 1899, when fresh plans were to be made.

12. *Physical training and recreation.*—Instruction in gymnastics and drill was given as usual. An examination was conducted by me at the end of the year. The degree of proficiency attained was below the average.

Mr. Goddard, the Honorary Secretary of the Recreation Club, reports that the branches for reading-room, cricket, football, hockey and tennis were all well supported. The attendance for games on the recreation ground averaged about 80. There was keen inter-class competition for the cups established for cricket, football and hockey. An extension of the recreation ground is much needed and proposals have been submitted. Teams were entered for the inter-collegiate cricket and football matches, but no trophy was won. Two tennis courts were constructed on the recreation ground. The debt incurred in 1897 has now been cleared off.

M.R.Ry. M. Parthasarathi Aiyangar's transfer was a loss to the club. M.R.Ry. S. Subrahmanya Aiyar has however exerted himself to fill his place.

13. *Library.*—During the year 111 books were added to the library, which now contains 3,653 volumes. The books issued to students numbered 2,622 and to the staff 499, against 2,910 and 463, respectively, in the previous year; while 847 references were made to the consulting library. The decrease in the issues as compared with the previous year is attributed by the librarian to the inconvenience felt through structural alterations to the library during the first three months of the year.

14. *Attendance and conduct.*—The percentage of numbers present to numbers on the rolls was 97·3 for the college department and 96·6 for the school department. The attendance by class divisions is given in appendix D. The conduct of the students was satisfactory throughout the year. Regret is felt in reporting two casualties among students, one in the Sub-Overseer and Surveyor class and one in the Draftsman class, and also in recording the death of a promising ex-student S. A. Jagadisa Aiyar, Assistant Engineer Public Works Department.

15. *University examinations.*—Four students of the senior division of the Engineer class appeared for the B.E. degree examination of 1899, and three were successful, viz., one in the Civil branch and two in the Mechanical. One candidate, who was a student in 1895, also presented himself and failed. Two other old students were registered but did not appear.

Eleven candidates offered themselves for the F.E. examination, of whom six were second-year and two third-year students. Four of the former and one of the latter were successful. The remaining three candidates were ex-students, and all failed to pass.

16. *Buildings.*—The extension of the college buildings by moving the west front 20 feet outwards, as proposed in 1896, was sanctioned during the year under review at an estimated cost of Rs. 41,260. The work of dismantling was commenced in the Christmas holidays, so as to avoid inconvenience during session. Should no unforeseen delays occur, it is expected that the extension will be completed by the middle of 1900. The additional accommodation provided will consist mainly of a Drawing office 100 feet by 24 feet, a library and reading-room of corresponding size, three lecture-rooms 25 feet by 24 feet, and a room for the librarian and storekeeper.

17. *Government technical examinations.*—Twenty candidates—of whom sixteen were students and four ex-students—presented themselves voluntarily for these examinations. Three belonged to the Sub-Overseer and Surveyor class, nine to the Draftsman class, and eight to the Artisan class. Seven different subjects were taken up, and there were 29 papers in all, of which 12 satisfied the Examiners. Particulars are given in Appendix E.

As pointed out in previous reports, these examinations do not attract students of the College of Engineering. Candidates are not specially prepared for the examinations, and the degree of success obtained is no sound criterion of the instruction imparted. The usefulness of embodying in the Annual Report details of these examinations appears therefore to be questionable.

18. *Employment of passed students of December* 1898.—Of the three Engineer students who completed their practical training, the senior K. Srinivasa Aiyangar, B.A., was appointed Assistant Engineer in the Provincial establishment of the Public Works Department on Rs. 250. The second student accepted employment in the temporary Upper Subordinate establishment on Rs. 100. The third became a Supervisor of Minor Irrigation Works under the Revenue Department.

Of the seventeen Engineer Subordinates who completed their practical course in December 1898, five were appointed to the permanent and eleven to the temporary Upper Subordinate establishment of the Public Works Department. No information has been received regarding the remaining student. Salaries ranged from Rs. 60 to Rs. 100.

Of 21 Sub-overseers and Surveyors of 1898, six were appointed temporary Overseers, one as Sub-overseer, one as Delta Superintendent, one as Channel Superintendent, and two as Surveyors, all in the Public Works Department. In addition, six accepted employment as Minor Irrigation Sub-overseers in the Revenue Department, and one as a Surveyor in the Travancore Public Works Department. Salaries ranged from Rs. 30 to Rs. 60.

Of the seventeen Draftsmen of December 1898, eight obtained employment in the Madras Public Works Department, and one in the Bombay Public Works Department. One was appointed to the Sanitary Engineer's office, one to the South Indian Railway, and one to a Municipality; while one joined the Sub-overseer and Surveyor class of the college. Salaries ranged from Rs. 20 to Rs. 50.

19. *Prospects of employment in* 1900.—The prospects of employment for the students who completed their courses at or about the end of 1899 are good. The Public Works Department will probably need a number of temporary upper subordinates to meet famine requirements, and the Revenue Department should have many

vacancies in its Minor Irrigation establishment. In these and other capacities the qualified Engineers, Engineer Subordinates, and Sub-overseers and Surveyors ought to have no difficulty in finding remunerative employment. The appointments open to Draftsmen are likely to be as usual. The minimum rate of pay assigned for these men in the Public Works Department is too low. If the minimum were raised from Rs. 20 to Rs. 35, a better class of candidates would join the college, there would be greater competition, and a more satisfactory type of men would be supplied from the college. The college draftsmen class is rapidly becoming a refuge for the qualified, but unsuccessful competitors for places in the Sub-overseer and Surveyor class.

The vacancies notified during the year were 107 in number. Details will be found in Appendix F.

20. *Revision of rules.*—Revised rules were formally made operative from 1st January 1899. They embody the syllabuses and schemes of marks which were introduced in 1896, and provide for the separation of college and board marks in regard to qualifying minima. Other salient features in the revision are the withdrawal of the exemption from the entrance examinations granted to First Arts under-graduates and Upper Secondary passed candidates; the reservation of certain scholarships for Muhammadans, Native Christians or Europeans; the abolition of third-class draftsman certificates, and the consequent removal of any connection between the class of certificate held by a passed student and his grading in the Public Works Department.

In December 1899 orders were issued in the Public Works Department that, from January 1902, one appointment only to the Upper Subordinate establishment would be guaranteed to the Engineer Subordinate class. Appointments to the temporary Upper Subordinate establishment are to be open to fully qualified Engineer and Engineer Subordinate students, and transfers to the permanent establishment may be made subsequently, on the recommendation of Superintending Engineers. The effect of the change will be to advance the prospects of qualified Engineer students, and to improve the material of the permanent establishment by weeding out persons who, though successful in examination, fail subsequently to show decided aptitude for the practical duties of the Public Works Department.

Under G.O., No. 560, Educational, dated 28th August 1899, guaranteed appointments are to be reserved for students of Asiatic descent belonging to the Madras Presidency and the Native States of Travancore, Cochin, Pudukkóttai, Sandur, Banganapalle and Mysore.

By G.O., No. 716, Educational, dated 25th October 1899, it is provided that all students entering the Public Works Department shall provide fresh certificates of physical fitness.

On the suggestion of the Chief Engineer for Irrigation some elementary training in the principles of the construction of Irrigation works will in future be given to the Sub-overseer and Surveyor class.

21. *General.*—Owing to my resumption of the duties of Principal as late in the year as November, I am unable to speak of the work of the staff during the year from personal observation. I find, however, from the records that the Director has twice expressed approval of Mr. Goddard's work in connection with the survey camps. My thanks are due to the President of the Board of Examiners, Mr. Ashpitel, for his cordial co-operation, and for the promptitude with which he furnished the examination results.

22. *Financial details.*—On referring to Appendix G, it will be seen that the receipts amounted to Rs. 21,821, and the charges to Rs. 89,538. The net cost to Government was therefore Rs. 67,718. Dividing this sum by the average number of students on the rolls, it appears that the net cost of educating each student was Rs. 239. Comparing the figures with those for 1898, it will be observed that the increase in receipts was Rs. 4,268 or 24 per cent., while the increase in charges was Rs. 14,058 or 19 per cent. The rise in receipts is due partly to an increase in the tuition fee rates, partly to the larger number of students in the Engineer class, and partly to the increasing competition for admission to the Engineer Subordinate and Sub-Overseer and Surveyor classes. As regards the enhanced charges, larger staff is responsible for about Rs. 4,000, and contingencies for about Rs. 10,000. Of the last item, about Rs. 3,500 represents higher allotment under Workshop and Workshop materials. The remaining increase is apparent rather than real, and is due to the difficulty of comparing, during successive calendar years, expenses which are regulated by the allotments of official years. Thus the contingent charges of 1899 include the cost of three survey camps, while those of

1898 show the charge for only one camp. This accounts for an apparent excess in 1899 of over Rs. 2,000. Full financial details for the official year are furnished with my annual returns, and these afford sound data for comparison. The receipts and charges for the last five calendar years are given in Appendix H.

When the additional appointments of Professor of Civil Engineering and Instructor in Mechanical Engineering, which have been approved by Government, are made, a substantial increase in the total charges must be expected. This increase, however, will be indirectly repaid by the improvement in the training given, and by the consequent economy in the works of construction placed under the charge of the men trained. The cost of the Madras College is considerably less than that of the Sibpur institution, and far below that of the Thomason College, Roorkee.

The average tuition fee paid per student per annum was Rs. 69 for the college department, and Rs. 36 for the school department. Seeing that the competitors for admission to the Engineer Subordinate class and the Sub-Overseer and Surveyor class were in each case, five times the number of students admitted, it would appear that either the tuition fees may be raised, or that higher standard of general education may be required from the candidates for these classes. The matter will form the subject of a separate communication.

Appendix A.

Distribution of Students according to classes of Community on the 31st December 1899.

Classes.	Europeans and Eurasians.	Native Christians.	Muhammadans.	Hindus.				Aborgines.	Others.	Total.
				Brahmans.	Non-brahman Caste Hindus.	Panchamas.	Other low castes.			
Engineer classes	..	1	..	27	1	..	..	..	..	29
Engineer Subordinate classes	11	..	..	70	6	..	..	..	..	87
Sub-Overseer and Surveyor classes	..	2	3	46	16	..	..	..	..	67
Draftsman classes	..	5	..	30	21	..	..	..	..	56
Artisan class	..	1	..	18	19	..	..	..	..	38
Total	11	9	3	191	63	..	..	..	..	277

Appendix B.

Distribution of Students by Districts on the 31st December 1899.

Districts.	Engineer class.	Engineer Subordinate class.	Sub-Overseer and Surveyor class.	Draftsman class.	Artisan class.	Total.
Ganjám	..	..	..	1	..	1
Vizagapatam	..	..	..	1	..	1
Gódávari	1	3	5	5	..	14
Kistna	..	1	1	2	..	4
Kurnool	1	..	..	..	..	1
Nellore	..	1	..	..	1	3
Bellary	..	..	..	1	..	1
Madras	1	2	3	9	10	25
Chingleput	..	1	3	1	2	7
North Arcot	3	2	3	1	3	12
South Arcot	..	1	3	1	2	7
Tanjore	11	35	26	14	8	94
Tricninopoly	2	6	5	5	3	21
Madura	1	2	6	4	2	15
Tinnevelly	1	7	6	4	1	19
Coimbatore	..	9	1	3	1	14
Salem	..	..	1	2	1	4
South Canara	4	2	..	..	..	6
Malabar	1	1	..	1	..	3
Mysore	..	1	..	1	1	3
Travancore	1	1	3	..	3	9
Pudukkottai	2	2	..	..	..	3
Military students	..	10	..	..	..	..
Total	29	87	67	56	38	277

APPENDIX C.

Distribution of Students by Wealth and Occupation of parents on the 31st December 1899.

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	1	5	..	6	2	..	..	4	..	..	..	..	6
Second year	..	10	1	11	1	1	..	9	..	..	..	..	11
First year	..	10	2	12	3	..	..	8	..	..	..	1	12
Engineer Subordinate class—													
Third year	..	28	..	28	5	..	..	19	..	..	..	4	28
Second year	..	27	2	29	5	1	2	18	..	..	..	3	29
First year	..	27	3	30	10	4	2	10	..	..	..	4	30
Sub-Overseer and Surveyor class—													
Second year	..	25	9	34	13	7	1	13	..	..	..	..	34
First year	..	23	10	33	10	4	3	16	..	..	..	..	33
Draftsman class—													
Second year	..	20	1	21	10	1	..	10	..	..	..	..	21
First year	..	29	6	35	19	1	3	12	..	..	..	..	35
Artisan class	..	22	16	38	16	10	3	8	1	..	..	..	38
Total ..	1	226	50	277	94	29	14	127	1	..	..	12	277

APPENDIX D.

Average numbers and attendance in 1899.

	Average numbers on rolls.	Average daily attendance.
College department—		
Engineer class, third year	6·0	5·9
„ second year	11·5	11·0
„ first year	12·5	12·2
Engineer Subordinate class, third year	28·7	27·6
„ „ second year	29·8	29·0
„ „ first year	30·0	29·4
	118·5	115·3
School department—		
Sub Overseer and Surveyor class, second year	34·5	33·3
„ „ first year	34·3	33·2
Draftsman class, second year	21·3	20·2
„ first year	35·5	34·0
Maistry and Artisan class	38·4	37·7
	164·0	158·4
Total college and school departments ...	282·5	273·7

Percentage of numbers present to numbers on the rolls—

College department	97·3
School „	96·6

(18)

APPENDIX E.

Government Technical Examinations of 1899.

Subject.	Grade.	Number examined.						Number passed.
		Engineer class.	Engineer Subordinate class.	Sub-Overseer and Surveyor class.	Draftsman class.	Artisan class.	Total.	
Building materials and construction.	E.	..	..	1	..	1	2	1
Building Drawing and Estimating.	E.	..	..	1	..	2	3	..
Bridge Work	E.	..	..	..	..	1	1	..
Surveying and Levelling	A.	..	..	1	..	..	1	..
	E.	..	..	..	..	1	1	..
Mensuration	E.	..	..	1	1	1	3	1
Freehand and Outline Drawing.	E.	..	..	..	5	..	5	2
Geometrical Drawing ..	E.	..	..	1	6	6	13	8
		..	..	5	12	12	29	12

APPENDIX F.

Classification of Vacancies notified during the year 1899.

	Government.			Local Boards and Municipalities.				Railways.				Native States.			Private employés.		Total.
	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.	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 Assistant ..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	2
Professor	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Supervisor	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Overseer	4	6	..	..	..	5	..	..	..	..	..	..	..	1	..	..	16
Sub-overseer	..	7	24	..	..	..	2	..	..	..	..	..	..	..	..	..	33
Draftsman	..	1	14	..	..	..	..	..	1	..	1	..	..	..	..	..	17
Surveyor	2	5	21	..	..	..	..	..	..	..	..	..	..	1	..	..	29
Maistry	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Tracer	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Anicut or Conservancy Superintendent.	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Total ..	8	19	66	2	..	5	2	..	1	..	1	..	..	2	1	..	107

Appendix G.

Financial Details for 1899.

		Rs.	Rs.	A.	P.
Receipts—					
Tuition Fees—					
College department		8,231			
School „		5,965			
			14,196	0	0
Entrance and final examination fees			7,200	8	0
Fines and miscellaneous receipts			424	1	11
	Total		21,820	9	11
Charges—					
Principal			13,226	0	3
Professors, masters and teachers			40,244	9	5
Clerks, librarian and servants			4,333	7	1
Board of examiners			4,981	4	0
Library and prize allowances			955	11	9
Books and instruments			182	11	9
Other Europe stores			4,848	6	4
Other heads of contingent charges			14,503	8	3
Travelling allowance			591	13	6
Scholarships			4,151	5	3
Exchange compensation			1,519	11	1
	Total		89,538	8	8
Net cost to Government		67,718	.....		
Average number of students on rolls		283	.....		
Net cost per student		239	.....		
Average tuition fee paid per student per annum—					
College department		69	.....		
School „		36	.....		

Appendix H.

Financial Details.

—	1899	1898.	1897.	1896.	1895.
	Rs.	Rs.	Rs.	Rs.	Rs.
Receipts	21,821	17,553	16,366	14,590	14,190
Charges	89,538	75,480	74,179	66,288	72,080
Net cost to Government	67,718	57,928	57,813	51,698	57,890
Average number of students	283	285	239	205	220
Net cost per student	239	203	242	252	263

Read the following letter from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated 19th January 1900, No. 38 :—

We have the honour to submit a report on the College of Engineering Examinations held in December last.

2. The following statement shows the percentage of marks obtained by each class :—

—	First division. 1894—97.	First division. 1898.	First division. 1899.	Second division, 1899.	Third division, 1899.
Engineer Class.					
Mathematics	62	57	60	59	55
Science	51	46	50	48	..
Engineering	54	53	60	56	60
Drawing	55	55	61	58	39
Surveying	66	58	63	61	61
Language	57	52	61	..	..
Drills and exercises	69	59	62	..	..
Total ..	57	53	59	57	54
Engineer Subordinate Class.					
Mathematics	54	62	44	67	63
Engineering	49	49	51	55	52
Drawing	54	44	48	56	47
Surveying	59	58	52	54	53
Language	47	53	52	..	..
Drills and exercises	71	71	56	..	..
Total ..	54	53	50	59	54

—	First division. 1894—97.	First division. 1898.	First division. 1899.	Second division, 1899.
Sub-Overseer and Surveyor Class.				
Surveying	55	62	59	60
Engineering	47	51	47	60
Drawing	42	59	55	50
Drills and exercises	67	58	44	..
Total ..	59	59	55	57
Draftsman Class.				
Geometrical	57	59	45	47
Building construction	40	55	59	..
Machine drawing	53	41	38	..
Estimating	40	63	63	..
Total ..	50	55	54	..

3. In the Engineer class six college students and two independent candidates were examined and all obtained the required number of marks. The class is a little above the average. The second and third divisions also did fairly well.

4. In the Engineer subordinate class, first division, 28 college students and 14 independent candidates appeared for examination and 17 college students and 9 independent candidates obtain a certificate. The division has always been a poor one and has not materially improved during the past year. Of the three military students one passed.

In the second division the percentage of marks obtained is much higher and it is noteworthy that a military student has obtained the first place.

The third division is up to the average.

5. The first division of the Sub-overseer and Surveyor class has not done so well as usual, but the average is high for this class. Of the 34 college students, three passed in the first class, and 21 in the second class, and of the six independent candidates three obtain certificates.

The second division is practically up to the usual standard and there is a great improvement in Engineering. Two independent candidates were examined in surveying and both failed.

6. In the Draftsman class 14 college students, of whom 11 obtain certificates, 4 independent college students of whom 3 passed, and 26 independent candidates of whom 21 obtained the requisite number of marks, were examined. The class was a little below the average.

The second division was only examined in one subject and all except four qualified.

7. Taking the examination as a whole, the result may be said to be good. There is an improvement in Engineering except in the Sub-Overseer and Surveyor class, first division, and surveying maintains its previous high average.

8. There are several points which the Board would bring to notice—

(1) The Draftsman class appears to be in an unsatisfactory state and does not attract a good class of men. The Board understands that the best men in the second division generally join the Sub-Overseer and Surveyor class, and this is likely to continue so long as draftsman are so miserably under-paid in the Public Works Department. Good draftsman are few and far between, and unless some inducement in the shape of better pay is held out the quality is likely to still further deteriorate.

(2) It is suggested that, in all classes, certificates should be withheld until candidates have passed the practical examination in surveying. To this the Board attach much importance as students on leaving the college are, as a rule, employed on surveys, and there is no excuse for their not having a practical acquaintance with their work, having regard to the great attention which is paid to surveying during the college course.

(3) In the Draftsman class it is suggested that the qualifying minimum in geometrical, etc., drawing should be abolished or else that the number of subjects in which qualifying minima are required should be reduced as the examination is, in this respect, needlessly severe.

(4) It is suggested that E2 is too junior a class to be examined in building drawing, and that it would be more satisfactory to defer this examination until the end of the course when much better results are likely to be obtained.

Read the following letter from Lieutenant-Colonel H. D. LOVE, R.E., Principal, College of Engineering, Madras, to the Director of Public Instruction, Madras, dated 12th February 1900, No. 1949-C. :—

Referring to your endorsement, No. 800, dated 31st January 1900, on report of the Board of Examiners, I have the honour to offer the following remarks.

2. *Paragraph* 8 (1).—It is true that the Draftsman class is not as popular as the Sub-Overseer and Surveyor class. The total numbers of registered candidates for the Entrance Examination were—Sub-Overseer and Surveyor class 170, Draftsman class 45. I agree with the Board that a better type of men would be attracted to the latter class if the pay of the draftsmen of the Public Works Department were improved.

3. *Paragraph* 8 (2).—Recommendations in regard to the matter alluded to were made in my No. 1439-C., dated 5th December 1899.

4. *Paragraph* 8 (3).—The examination of the Draftsman class was conducted under the rules in force prior to 1st January 1899, by which separate minima are required in five subjects. In future, the revised rules will regulate the examination. Under these rules separate minima are obligatory under only four heads, and the minima themselves have been reduced. No further change should, it is considered, be made for the present.

5. *Paragraph* 8 (4).—The examination of the Engineer class in building drawing will, as recommended by the Board, be transferred to the third year of the course.

6. A few minor corrections in the Board's report have been made in blue pencil.

7. With regard to paragraph 2 of your endorsement under reference, I have the honour to state that the list mentioned was submitted with my No. 1892-C., dated 1st February 1900.

8. A copy of the mark sheets sent in by the Board of Examiners can be forwarded if desired. An abstract will however be given in my Annual Report for 1899.

Proceedings, No. 4834 of 1900.

The revised rules sanctioned in 1898 came into operation on the 1st January 1899 and have been noticed in detail in paragraph 20 of the report. It will be some time before the effect of the changes can be fully appreciated.

2. *Staff.*—Several changes had taken place in the staff and the establishment. The only events worthy of notice are the return of Lieutenant-Colonel Love in November last from his long leave and the strengthening of the staff of the College, including the workshop, with reference to G.O., No. 383, Educational, dated 23rd June 1899. It is hoped that a Professor of Civil Engineering and an Instructor in Mechanical Engineering will be employed as soon as the present financial strain ceases to be felt. Since the submission of the Principal's report, orders have been received for the deputation for a period of three years of Mr. Alfred Chatterton, Professor of Engineering, on special duty in connection with the development of technical trades and industries, and steps are being taken to appoint a suitable successor to him.

3. *Accommodation.*—Paragraph 16 of the report furnishes particulars of the extension to the college buildings sanctioned in G.O., No. 524, Educational, dated 10th August 1899. The college workshops seem also to require early expansion, and the necessary plans and estimates for the additional accommodation are awaited.

4. *Library and reading-room.*—The library, which received an addition of 111 books during the year, was fairly well used. It is presumed that the reading-room has, as usual, been fully utilised.

5. *Workshops.*—An extract from the report of the Professor of Engineering on the College workshops, of which he is in charge, is appended to paragraph 10 of the report. It is observed therefrom that it is proposed, on receipt from England of the electrical plant which has been indented for, to give the students of the college some instruction in the use of electrical machinery; that the two apprentices who joined the workshops in the early part of the year have worked satisfactorily; and that the graduate apprentices, whose entertainment on an enhanced rate of stipend was sanctioned in G.O., No. 57, Educational, dated 4th February 1899, have declined to take advantage of the concession offered in the absence of definite prospects of suitable employment on the completion of their course of training. The Professor of Physics, Presidency College, is requested to favour the Director with his opinion regarding Mr. Chatterton's suggestion that there should be some definite connection between the workshops of the College of Engineering and the Physical Science laboratories of the Presidency College. Both Mr. Chatterton and the Principal, College of Engineering, have proposed to utilize the college workshops as one of the centres for the practical training of Mechanical Engineer students, and the matter will be disposed of separately.

6. *Strength and attendance.*—Particulars of the strength of the different classes at the close of the last two years, excluding students in their practical course, are furnished in the margin. It is observed that there were nine students fewer at the close of 1899 than in 1898, the fall being shared by the Engineer subordinate, Draftsman and Artisan classes. The steady increase in the strength of the Engineer class is noted with satisfaction. There was also an improvement in the proportion of the average daily attendance to the average number on the rolls. As usual, Brahmans preponderated, almost monopolizing the Engineer and Engineer Subordinate classes. It is gratifying to note that there were three Muhammadans in the college—all in the Sub-Overseer and Surveyor

Class.		1898.	1899.
Engineer		25	29
Engineer Subordinate.	Civil students ..	80 } 89	77 } 87
	Military students ..	9 }	10 }
Sub-Overseer and Surveyor		62	67
Draftsman		65	56
Artisan		45	38
	Total ..	286	277

class—against none in the preceding year. Three districts (Anantapur, Cuddapah and Nilgiris) as against four in 1898 were unrepresented, and Tanjore continued to contribute the largest number of students, viz., 94 out of a total of 277, Madras, Trichinopoly and Tinnevelly occupying the same position as in the previous year. It is noteworthy that the richer classes and the artisan classes were represented by only one each. This shows that the Artisan class has failed to attract the community for whose chief benefit it was originally intended. Government will shortly be addressed in regard to the discontinuance of the above class in the college. From the statement appended to paragraph 3 of the report it is observed that the competition for admission was growing keener in all the classes except the Engineer class. The fact that four only out of the 14 First Arts under-graduates who competed for admission to the Engineer Subordinate class qualified for admission goes to show that there is not much use in raising the standard of admission to the above class from the Matriculation to the F.A. Examination as suggested by Lieutenant-Colonel Love in his letter, No. 1196-C., dated 16th November 1899. It would, however, be of interest to know in which of the subjects of the entrance examination the First Arts undergraduates were found generally inferior to Matriculates, and the Principal is requested to furnish this information.

7. *Examinations*—(i) *University examinations.*—The results of the Degree Examination and the First Examination in Engineering for the years 1897–98 and 1898–99 are compared below :—

Examination.	1897–88.		1898–99.	
	Examined.	Passed.	Examined.	Passed.
Degree examination	5	5	4	3
First examination	11	6	11	5

The results for 898–99, though fair, are not quite so good as those of the previous year.

(ii) *College Board examinations.*—The results of the final examinations conducted by the College Board of Examiners in December last are compared below with those of the previous year : —

Class.	1898.	1899.	1898.	1899.
	Number examined.		Number passed.	
Engineer	6	6	4	6
Engineer Subordinate	28	28	21	17
Sub-Overseer and Surveyor	25	34	21	24
Draftsman	23	* 18	17	† 14

It should have been explained why four of the students of the senior division of the Draftsman class were treated as "independent" candidates. The results of the Engineer and Draftsman classes were good, though all the successful students obtained only second class passes In the Engineer Subordinate and the Sub-Overseer and Surveyor classes, the results were not good and did not compare favourably with those of the previous year. The first division of the Engineer Subordinate class is considered by the Board of Examiners to have been a poor one, and to this fact is due the low percentage of total marks obtained by the above division at the final examination as compared with that shown in 1898. The senior division of the Sub-Overseer and Surveyor class was also much below the average of the four preceding years, while the senior division of the Draftsman class was a little above the average. A deterioration is noticed in the results in mathematics and surveying in the Engineer Subordinate class, in all the subjects of the examination in the Sub-Overseer and Surveyor class, and in geometrical and perspective, &c., drawing and in machine drawing in the Draftsman class, and these subjects as well as the several defects pointed out by the individual examiners will, it is hoped, receive the careful attention of the instructors concerned.

The Principal's observations with regard to the several suggestions made by the Board of Examiners in paragraph 8 of the President's letter, No. 38, dated 19th January last, are noted. The attention of the Chief Engineer will be invited to the

* Includes four independent College students. | † Includes three independent College students.

desirability of improving the prospects of the draftsmen trained in the College with a view to attract better men to the Draftsman class.

(iii) *Government Technical examinations.*—Five entries from the Sub-Overseer and Surveyor class, 12 from the Draftsman class and 12 from the Artisan class, or in all 29 entries were made for the Government Technical examinations in various subjects and there were 12 passes, an unsatisfactory result, especially considering that all the students who presented themselves for examination in bridge-work, building-drawing and estimating and surveying and levelling failed completely. The fact that the examinations are voluntary and that the college does not specially prepare candidates for them is however noted. Particulars relating to these examinations should, however, continue to be embodied in the annual reports.

8. *Independent candidates.*—The results of the independent candidates at the final examinations held in December last are recorded in the margin. They were, on the whole, good. At the special examination held with the permission of Government for certain students of the old Surveyor class both the candidates who presented themselves failed.

Class of candidates.	Number examined.	Number passed.
Engineer candidates ...	2	2
Engineer Subordinate candidates	14	9
Sub-Overseer and Surveyor candidates	6	3
Draftsman candidates	* 26	† 21

* Excluding four independent College students.
† Excluding three do. do. do.

9. *Military students.*—Excluding the student engaged in his works course, there were 10 soldier students in the college, or one more than in the previous year. In the final examination held in December last one only of the three students examined was successful, and he is now undergoing his practical course as an Apprentice Overseer. It is satisfactory to note, however, that one of the students in the intermediate division has taken the first place in his class and is very promising.

10. *Practical courses.*—Five Engineer and twenty-one Engineer Subordinate students were in their practical course during the year, and of the former, two underwent their training in the Public Works Workshops as Mechanical Engineers. The practical course of four of the Engineer Subordinate students had to be extended by one month each, as their work was reported to have been not altogether satisfactory. All the students completed the prescribed riding course.

11. *Physical education.*—Physical education received proper attention through the agency of the College Recreation Club, which owes its success to Sergeant Goddard. The Principal's remark that the degree of proficiency attained by the students in gymnastics and drill was below the average is noted.

12. *Discipline and conduct.*—The conduct of the students was satisfactory, and the college continued to maintain its high average attendance.

13. *Employment of former students.*—The account given of the employment of former students is very satisfactory, the majority of them having entered the service of Government. It has been ruled that from January 1902 only one appointment on the permanent Upper Subordinate Establishment shall be guaranteed to the Engineer Subordinate class annually, the other successful students being eligible for appointments on the temporary establishment only at the outset. Lieutenant-Colonel Love considers that the ultimate result of this arrangement will be to advance the prospects of qualified Engineer students.

14. *Finance.*—Both the receipts and charges of the college advanced, having amounted in 1899 to Rs. 21,821 and Rs. 89,538 against Rs. 17,553 and Rs. 75,480 respectively in 1898, and the variations have been fully explained in the report. Owing to an increase in the net expenditure, the net cost to Government of educating each student rose from Rs. 203 to Rs. 239, which is, however, slightly below the average net cost per student for the four years ended with 1898, viz., Rs. 240. The average tuition fee paid per student per annum was Rs. 69 for the college department and Rs. 36 for the school department.

15. *General.*—Government will be addressed in a separate communication regarding the resumption or otherwise of college marks in the case of the Draftsman class and the continuance of the practice of admitting to the final examination for Draftsmen independent candidates connected with the Public Works Department who have not had the benefit of instruction in the college.

The administration of the college during the year is creditable to the Principal, the Professors and the staff of instructors.

(A true Extract.)

(Signed) G. H. STUART,
Director of Public Instruction.

To the Principal, College of Engineering,
with a spare copy for the Professor of
Engineering in charge of the workshops.
„ Principals of other Government Colleges,
with a spare copy for the Professor
of Physical Science, Presidency College,
with reference to paragraph 5.
„ Inspectors of Schools.
„ the Superintendent, School of Arts.

Copies to the President, Board of Examiners, College of Engineering.
„ „ Chief Engineer, Public Works Department, for information.
Copy to the Editors, *Indian Journal of Education* and the
Educational Review.
Copy to Government, with C.L.

Order—No. 259, Educational, dated 29th June 1900.

Recorded with the following remarks:—

(1) The working of the College during the year was satisfactory.

(2) The appointment of a Professor of Civil Engineering and an Instructor in Mechanical Engineering awaits the sanction of the Secretary of State.

(3) The Government agrees with the Director of Public Instruction in considering it unnecessary to raise the standard of qualification for admission to the Engineer subordinate class.

(4) The further communications on the subject of the continuance of the artizan class and of the resumption of College marks for draftsmen, promised in paragraphs 6 and 15 of the Director's review, will be awaited.

6. (5) The Director should report what action has been taken on the recommendation of the Board of Examiners supported by the Principal that the practical examination in surveying should be made compulsory.

(True Extract.)

~~Secretary to Government.~~

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

Exd. S. J. Pereira.

× 4. Proposals for improving the Status of Draftsmen in the P. W. Dept are now under consideration by the Govt.

EDUCATIONAL DEPARTMENT.

Letter—to No. 260 dt 29-6-00

The Under Secretary of State for India.

Sir,

With advertance to Lord Hartington's despatch No. 9, Public Works, dated the 18th May 1882, I am directed to forward a copy of the Proceedings of this Government of this date reviewing the report on the working of the College of Engineering during the year 1899.

I have the honour to be,
Sir,
Your most obedient servant,

Ootacamund,
June 1900.

Secretary to Government.

Exd. S. J. Pereira.

Government {1900} of Madras.
EDUCATIONAL.

Recd. } 1900. *Enclosures*

Regd. *Spare copies*

Letter, No. 260, 29 th June 1900.

JUNE.

College of Engineering, Madras.

Forwarding a copy of the Proceedings of the Madras Government reviewing the report on the working of the — during the year 1899.

First copy sent to Press.

Returned for signature.

Despatched in print.

NUMBER OF COPIES REQUIRED. { Order complete. 45 / Letter only. 20 / Order complete with Letter. 15

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ENCLOSURES TO C. No.

ORDER OF GOVERNMENT

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

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