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502 W	Put up for C.A. 5-6 of -	do
522 W	Put up for C.A. 13 of -	31-8-20
577 W	Put up for C.A. 2-4 of -	2-4-41
522 W	One copy given to Section to C.A. -	5-4-83
493 W	Forests 2873 1 -	5-4-83
650 W	Forests Bds 9/10 W -	21-3/83 or 29/5/75-4-83
600 W	Forests 708 27 21-3/83 or 29/5/75	29/5/75
576 W	Forests 5170 379-4-83	4-4-83
535 W	Forests 5182 11-4-83	11-4-83
482 W	Forests 3036 10-4-83	10-4-83
603 W	Forests 5170 11-4-83	11-4-83
627 W	Forests 5170 11-4-83	11-4-83
534 W	Forests 5170 11-4-83	11-4-83
610 W	Forests 5170 12-4-83	12-4-83
605 W	Forests 5170 12-4-83	12-4-83
607 W	Forests 5170 13-4-83	13-4-83
656 W	Forests 5170 13-4-83	13-4-83
597 W	Forests 5170 13-4-83	13-4-83
43 W	Forests 5170 13-4-83	13-4-83
57 W	Forests 5170 13-4-83	13-4-83
71 W	Forests 5170 13-4-83	13-4-83

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521 W	Forests 707 5-4-83	5-4-83	
520 W	Forests 389 10-5-83	10-5-83	
570 W	Forests 389 11-5-83 or 4394 17-25-57	11-5-83 or 4394 17-25-57	
616 W	Forests 4095 14-5/83 or 1189 21-5-83	14-5/83 or 1189 21-5-83	
659 W	Forests 4095 14-5/83 or 1189 21-5-83	14-5/83 or 1189 21-5-83	
598 W	Forests 1516 4-83	4-83	
599 W	Forests 1516 4-83	4-83	
571-72 W	Forests 5175 20-5-83	20-5-83	
617 W	Forests 5175 20-5-83	20-5-83	
557 W	Forests 5175 20-5-83	20-5-83	
557 W	Forests 5188 21-6/83	21-6/83	
535 W	Forests 5188 21-6/83	21-6/83	
529 W	Forests 5231 6-7-83	6-7-83	
574 W	Forests 5290 23-6-83	23-6-83	
656 W	Forests 5306 23-6-83	23-6-83	
644 W	Forests 532 1058 16-4/83 or 5372/83	16-4/83 or 5372/83	
532 W	Forests 532 1058 16-4/83 or 5372/83	16-4/83 or 5372/83	
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573 W	Forests 5760 13-7-83	13-7-83	
596 W	Forests 5985 16-7-83	16-7-83	
591 W	Forests 6015 19-7-83	19-7-83	
483 W	Forests 6267 21-7-83	21-7-83	
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632 to ~~one copy~~ in E. Office through Mr. Lammarsch
 Dec 24/86

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~~1911 - Wade Wilson No. 18500 of 2/7/50~~

616 N. Giles St. S. E. 28/3/88

July 1883 *mi*

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559	514190-0-81		
649	4025 of 2/5/91		
5311	6412 of 1/5/91		
6184	from 1533 12-4-91		

Block No.
 Paper taken out of the Records from the charge of the Referencer,
 Dept. *P.W.D.* Press *6567* No. *28.2*, dated *28.2*, 1883
 Mis. *1883* Rack No. *1883*
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Date taken out.	FOR WHAT PURPOSE.			Initials of Referencer.	Date returned.	Initials of attender.
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24.3-10	Rk. w ur 840	10		<i>WJ</i>	14/4/10	
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" 194 W aj 23.1.80 ✓
" 355 W aj 3.2.81 ✓
" 739 W aj 17.2.81 ✓
" 1106 W aj 27.4.81 ✓
" 2529 W aj 17.10.81 ✓
" 163 W aj 20.1.82 ✓
Circ. 420 E aj 15.7.82 ✓
GO 1626 Waj 28.6.82 ✓
" 3351 W aj 19.12.82 ✓

No 655 Waj 28 Feb 1883

Ordered to be
Communicated to the
Educational Dept
and published in the
Fort St. George Gazette.

Att 27/2
27.2.83

Edl Dept ✓
The Suplt of the Gazette ✓
E. MCO ✓
Recd 28/2 RT 26/2
Sept 2/2/83-
Circ 20/2 RT 22/2

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
GENERAL.

To

Nos. 241-51 G.

Dated February 14, 1883

Received

No 655 Waj 28 Feb 1883

Appointments to the Engineer and Upper Sub-
ordinate Establishments.

No. 98; P. W. D. Press-14-2-83-212.

With order
Recd 28/2

Circ 420 E 4/15-52

PUBLIC WORKS DEPARTMENT.

CIRCULAR No. 420 E.

In forwarding the papers as per margin relating to proposed changes in the Civil Engineering College course, the undersigned would wish to be favored with your opinion *as early as possible* accompanied by such suggestions as you may wish to offer on a few of the leading points as follows:—

1. Whether the College as at present should have two classes—the first educating up to the requirements of the Engineer Establishment, the other for the Upper Subordinate Establishment, or should, as proposed by the Chief Engineer, educate only to the Sub-Engineer and Overseer standards.

2. Whether the *one* appointment to the Engineer Establishment which is, under the ruling of the Government of India, after 1885 to be offered annually to the College should be so disposed of, or made the prize open to the most deserving member of the Sub-Engineer grades.

3. Whether the Workshop course should follow that of the College, or precede it as suggested by the Chief Engineer.

4. Whether the above course, as also certain tests of physical powers and endurance, should be exacted as suggested by the Chief Engineer from all candidates prior to admission.

5. Which of the suggested theoretical courses do you prefer, or have you modifications to propose of either?

6. Have you any suggestions to offer in regard to the suggested training of Surveyors, Draughtsmen, and Maistries?

OOTACAMUND,

15 July 1882

(Signed) R. H. SANKEY, Colonel, R.E.,
Chief Engineer, Public Works Dept.

To Col. J. O. Hasted R.E.
" H. L. Prendergast R.E.
Lt Col: J. Beatty R.E.
" H. B. Mead R.E.
Major J. Pym R.E.
J. W. Randall Esqr.
G. J. Welch Esqr.
R. D. Chisholm Esqr.
N. F. Nordmann Esqr.
J. C. Larmine Esqr.

33. The College building originally formed the Palace of the Nawab of the Carnatic. The rooms are spacious and well suited for the large quantity of plan-drawing which is executed by all the classes. On the ground-floor are the quarters of the Military Students and of their Superintendent, the stores, and photographic rooms; and on the first floor the class rooms, offices, model room, and library. The models are employed in the instruction of the students, and are maintained and added to by an annual allotment in the budget. The Library consists of 1,426 volumes, the majority of which are on subjects connected with Engineering. It is open to all students of the College free of charge. The Madras Branch of the Royal Engineer Corps Library has for some years been located in the College building.

The residence of the Principal and the married quarters are conveniently situated in the immediate vicinity of the College.

TABLE A.

CIVIL ENGINEERING COLLEGE.

Abstract of Approximate Receipts and Charges from 1875-76 to 1881-82.

Items.	Actuals, 1875-76.	Actuals, 1876-77.	Actuals, 1877-78.	Actuals, 1878-79.	Actuals, 1879-80.	Estimate, 1880-81.	Estimate, 1881-82.	Remarks.
RECEIPTS—								
Fees and Fines	Rs. 6,052	Rs. 5,246	Rs. 5,616	Rs. 6,238	Rs. 4,351	Rs. 3,300	Rs. 1,900	
CHARGES—								
Principal	19,227	19,227	19,227	21,123	16,143	13,000	10,389	
Masters and Teachers ..	18,147	18,000	16,608	15,910	17,019	17,760	18,000	
Office Establishment ..	2,108	2,144	2,324	2,177	2,106	2,109	2,133	
Scholarships (Government).	1,356	1,446	1,678	2,508	2,777	3,060	1,960	
Contingencies	1,572	2,243	1,849	2,825	2,844	3,071	2,578	
Apprentice Overseers ..	..	..	..	..	..	..	4,940	
Petty Improvements and Repairs to Buildings.	..	..	..	..	..	..	1,200	
Total	42,410	43,060	41,686	44,543	40,889	39,000	41,200	
Average Annual Cost of Educating each Pupil.								
College { Total Cost ..	433	612	847	816	1,122	..	..	NOTE.—The increases are due to altered rules for dividing charges between College and School. Increases in 1879-80 due to reduced numbers. Previous decreases due to cause noted under College Department.
Department. { Cost to Government.	191	643	685	591	921	..	..	
School { Total Cost ..	311	302	248	242	309	..	..	
Department. { Cost to Government.	276	267	216	210	278	..	..	

PART II.

OBSERVATIONS AND SUGGESTIONS.

34. It will be seen from the above remarks that until last year, when the recently-established Local Fund Boards were, under G.O., No. 1028 W., dated 26th April 1880, enjoined to employ passed College Students in their Engineering establishments, the Institution was regarded only as a nursery for the Public Works Department.

35. Proceedings of Government, Educational Department, No. 361, dated 23rd September 1880, indicate that a larger sphere of action is now contemplated, and that the College, by supplying a portion of the Engineers and the whole of the subordinates, Civil and Mechanical, required throughout Southern India, may save the Government a great part of the outlay now incurred throughout importing highly-paid men from Europe.

36. The Public Works Department employs only a Civil Staff except in its Workshops at Madras and Dowlaiswaram; but it would no doubt find men who have received a thorough theoretical and practical mechanical training, useful, not only in the shops, but wherever works of importance are carried out.

37. Before considering the question of training Mechanical Engineers, it will be well to form some idea of the numbers now engaged in this profession in Southern India who might be drawn from local sources. Insufficient time is at my disposal to make the necessary inquiries, and the possible development of gold-mining introduces a very indeterminate quantity, so that the following figures are but rough approximations:—

30. *Staff.*—The sanctioned scale for the instructional staff and office establishment is as follows:—

INSTRUCTIONAL STAFF.

Title.	Held generally by	Salary.	Remarks.
Principal	An Officer of Royal Engineers:	RS. 600 + Military Pay and Allowances of Rank.	Administers the College and superintends work of all classes. Instructs First Department in subjects classed under "Engineering."
First Assistant Master ...	Ungraded Officer of the Educational Department.	400 to 500	<i>Mathematics.</i> —First Department, and 1st class, Second Department.
Second do. ...	Warrant Officer, Public Works Department.	215	" <i>Surveying</i> " and " <i>Drawing and Estimating.</i> "—First Department, and 1st class, Second Department. Superintends Military Students.
Third do. ...	Warrant Officer, Public Works Department.	215	<i>Engineering.</i> —Second Department. <i>Mathematics.</i> —Second class, Second Department.
Fourth do. ...	Warrant Officer, Public Works Department.	160	<i>Surveying and Drawing and Estimating.</i> —Second class, Second Department.
Fifth do. ...	Military or Civil Overseer, Public Works Department.	100	<i>Surveying.</i> —Special Survey Class.
Sixth do. ...	Military or Civil Overseer, Public Works Department.	100	<i>Drawing and Estimating.</i> —Special Drawing Class.
Munshi do. ...	Native	60	<i>Tamil and Telugu.</i> —Vernacular Class, Bangalore.
Do.	Do.	50	<i>Tamil.</i> —Second Department.
Do.	Do.	50	<i>Telugu.</i> —Do.
Bricklaying Instructor..	Do.	44	First and Second Departments in practical work. Present incumbent draws only Rs. 30.
Instructor in Photography.	One of the Assistant Masters.	20	Instructs selected students of the Second Department.
Total ...		2,114	

OFFICE ESTABLISHMENT.

	RS.	A.	P.
One Clerk and Accountant on	40	0	0
One Librarian on	30	0	0
One Assistant Clerk and Librarian on	15	0	0
One Moochee on	8	0	0
Three Peons on Rs. 7	21	0	0
Eight Lascars on Rs. 6	48	0	0
One Sweeper	5	0	0
One Puckally on	10	11	10

Total ... 177 11 10

31. *Accounts Examination.*—In addition to its ordinary work, the College holds half-yearly examinations in Arithmetic, Dictation, and Hand-writing for admission to the Accounts Branch of the Public Works Department.

32. *Vacations.*—The long vacation extends over June and July. The Christmas vacation is nearly synchronous with the holidays usually granted in Government Offices at that season.

Second year—

Copying and Coloring Architectural Plans.
Copying and Coloring Topographical Plans.
Drawing Bridges and Irrigation works from Specification.
Estimating for Bridges and Irrigation works.

The hours are from 10 A.M. to 3 P.M. Five Scholarships, similar to those of the Surveying Class, are tenable by proficient second-year students. The marks at the final examination are awarded by the College and are as follow:—

Drawing from Specification	...	...	...	...	...	...	100
Estimating	...	...	...	...	...	...	100
Copying and Coloring	...	...	...	...	...	...	100
Session Work	...	...	...	...	...	...	100
Session Examinations	...	...	...	...	...	...	100
Total ...							500

23. This class is a popular one, partly because the profession for which the students work is thoroughly congenial to native character, and partly because the demand for qualified draftsmen is by no means confined to the Public Works Department.

24. Outside candidates are admitted to the final examinations of both these special classes on payment of a fee of Rs. 7-8-0 each. They are examined either at the College or at the headquarters of Executive Engineers, Public Works Department. The examinations differ from those for students only in the absence of Session marks.

25. *Age at Admission.*—The limits of age for admission are:—

First Department	...	...	...	...	...	...	16 to 22
Second do.	...	...	...	...	...	...	17 to 22
Special Classes	...	...	...	...	...	...	15 to 22

26. *Attendance and Cost of School Branch.*—The average numbers attending, and the cost of individual education of the school branch of the institution for the last four years are given below:—

Years.	Average Number of Students.	Annual Cost per Student.
1876-77	...	143
1877-78	...	166
1878-79	...	175
1879-80	...	126

27. *Fees.*—The following fees are paid by students:—

	RS.
First Department	16 each per mensem.
Second do.	3 " "
Surveying Class	3 " "
Drawing do.	3 " "

Holders of scholarships and free scholars (who may be nominated to a number not exceeding 5 per cent. of paying students) pay no fees.

28. *Books and Instruments.*—Military Stipendiary Students are provided by the College with books and instruments, but all others supply their own.

29. *Scholarships.*—The stipends and scholarships appertaining to the different classes are here collected:—

No.	Amount.	Tenable by	Period, Years.	Annual Cost.	Remarks.
5	RS. 10	Military Division, Second Department.	2	RS. 1,200	Stipends.
5	15	Civil Division, Second Department.	1	900	Government Scholarships.
5	8	Surveying Class ...	1	480	
5	8	Drawing Class ...	1	480	
1	13½	Second Department	2	160	Private Scholarship.

civilians will be debited to the Educational Department. No definite orders on this subject have yet been received in the latter department.

17. The Military men who enter the College are by G.O., Public Works Department, No. 2492, dated 24th October 1859, guaranteed employment. G.O., in the Public Works Department, No. 2317.W., dated 6th October 1880, states that, while the department remains on its present footing, six appointments annually may be anticipated. If the full number of Military students succeeded in passing out, which is rarely the case, there would thus remain only one vacancy per annum for Civilians. The various Local Fund Boards have recently taken up considerable numbers, and other students frequently find employment in departments for which they have not been specially educated. On the whole I do not think that present prospects are much inferior to those which existed prior to the reduction in the Public Works Department.

18. The following table shows that the proportion of successful students who have obtained employment in the Public Works Department has, during the last four years, been 48 per cent. :—

Years.	Number of Successful Students.	Number of Appointments to P. W. Dept.
1876	28	18
1877	23	10
1878	24	15
1879	25	5
Total	100	48

The average number of appointments per annum was 12.

SPECIAL SURVEYING CLASS.

19. The duration of the course is the same as that for the Second Department, but the hours are 11 A.M. to 3 P.M., and in addition, out-door work three times a week. The following is an abstract of the course :—

First year—

Printing, Scales, Conventional Signs.
Chain Surveys.
Prismatic and Surveying Compass Surveys.
Adjustments of levels.

Second year—

Levelling.
Theodolite and Sextant.
Traverse.
Plane Table (laid down, but not practised).

20. Candidates for admission are examined in April by the papers used for the Second Department, but are not expected to reach so high a standard. Five Scholarships of 8 rupees per mensem tenable for one year are awarded to the most proficient second year students who have not been more than one year at the College. The marks at the final examination are awarded by the College and are as follow :—

Chain and Compass	100
Levelling	100
Theodolite, Sextant, and Traverse	100
Copying and Coloring	100
Session Work. {In-door	100
{Out-door	100
Session Examinations	100
Total	700

21. The certificates and prizes are distributed on the Public day. I am unable to state what proportion of the students eventually obtain appointments as Surveyors. Employment of this nature in the Public Works Department is generally of a temporary nature, but the Revenue Survey probably finds permanent work for considerable numbers.

SPECIAL DRAWING CLASS.

22. The entrance examination and the duration of the course are the same as for the Special Surveying Class. The following is an abstract of the course :—

First year—

Instruments, Printing, Conventional Signs.
Copying and Coloring Architectural Plans.
Estimating for simple buildings.

The increase during the year 1879-80 is chiefly due to revised rules for the division of the pay of the staff between the College and School Branches.

SECOND DEPARTMENT.

11. The College course commences annually in August, and extends over one year and ten months inclusive of vacations. The students consist of non-commissioned officers and soldiers of Her Majesty's British Forces, and of European, Eurasian, and Native Civilians. The number of the former studying at any one time in the College is limited to ten; but that of the latter is regulated only by the number of candidates for admission, the accommodation in the College, and the teaching capacity of the staff.

12. Non-commissioned officers and soldiers recommended by their Commanding Officers, are in April examined by the College in Arithmetic, Dictation, and English Grammar. The five at the head of the list proceed in June to Bangalore where they remain for one year, each man being attached to a corps of his own arm of the service, and they study Tamil or Telugu optionally under the supervision of a Munshi appointed by the College. At the expiration of the year, they are examined in the vernaculars, and if successful are admitted to the College in the following August, when they go through the same course as the civilians who enter at that time. Barracks are provided in the College for the ten Military students, and married quarters for such as may need them. They are commanded by the Principal, are in all respects subject to Military regulations, and draw their pay and clothing from their regiments. The College provides stipends of 10 rupees each per mensem for two years.

Civilians who have matriculated at a University are admitted without examination on producing certificates of age, health, and conduct. All other candidates are in April of each year examined by the College in Arithmetic and English Dictation and Grammar.

13. A general idea of the course will be gained by reference to paragraph 6 of my report on the College, No. 170-C, dated 6th August 1880, where the marks awarded to each subject are shown. The following is an abstract :—

Heads.	Marks.
Mathematics	500
Engineering	400
Surveying	550
Drawing and Estimating	450
Vernacular language	100
Session marks	500
Total	2,500

Half-yearly examinations are held, the second of which regulates the grant of scholarships to be referred to presently, while the third chiefly contributes towards the item Session marks in the abstract above. The courses in "Surveying" and "Drawing and Estimating," the nature and quantity of the out-door work, the hours of attendance, and the holidays are the same as for the First Department.

A few selected students go through a course of Photography under the supervision of an instructor, who is generally one of the Assistant Masters. The class has for some months been in abeyance.

14. Five scholarships of Rs. 15 each per mensem are tenable during their second year of study by the civilian students of this department. They are awarded to the most proficient who have studied not more than one year at the College. It sometimes happens that students who have failed at the final examination are permitted to study for an additional year, or that some of those who have qualified in the Special Surveying or Drawing Classes enter the Second Department. Such are not eligible for scholarships; there is also a scholarship of about Rs. 13 per mensem and tenable for two years which was established by General Walker, and which can be held only by the natives of the Malabar, Canara, or Nilgiri Districts.

15. The final examination takes place in May, and is conducted, as far as possible, by unpaid independent examiners. Outside candidates are permitted to present themselves on payment of a fee of Rs. 15 each, and they are examined either at the College, or under the supervision of an officer of the Engineering Establishment of the Public Works Department at any of the head-quarters of Executive Engineers. Their examination differs from that of College students in the omission of the subject language, and in the absence of marks for "Session Examinations" and for "work done during session."

16. At the close of the examination a public day is named, when the annual report is read by the Principal, and the certificates and prizes are distributed. The names of successful students are reported to the Chief Engineer, Public Works Department, who makes appointments at discretion to any vacancies that may exist. Under the new Public Works Code the men appointed remain apprentices for one year, when, if approved, they are posted to the permanent establishment. During their year of apprenticeship, the Public Works Code states that their names remain on the books of the College, and that the staff pay of soldiers and the total pay of

Orders have not yet been passed by Government on a remonstrance which has been made against this incidence of the charge.

FIRST DEPARTMENT.

7. The First Department is divided into a Military Division or Commissioned Officers, and a Civil Division for Civilians, European, Eurasian, and Native, of the better classes. Owing to the recruiting of the Engineer Establishment of the Public Works Department from the officers of Royal Engineers and from the Civil Engineers educated at the Royal Indian Engineering College, Cooper's Hill, no students have joined the former Division since 1870. The members of the Civil Division must be under-graduates of the Madras or other Indian University, and must have passed the First Examination in Arts. On production of a certificate to this effect and of evidence regarding conduct, age, and physical fitness, candidates are admitted to the College without examination. Admission takes place annually in January, and the course of instruction extends over two years inclusive of vacations. The hours of attendance are 10 A.M. to 1 P.M. and 2 P.M. to 5 P.M., daily, with the exceptions of Sundays, Wednesdays, and Government holidays. Early out-door instruction in Surveying and Engineering is generally afforded three times a week. That in Engineering is confined to little more than inspection of works in progress, full reports of which are subsequently submitted by the students.

The time spent in-doors is divided into four attendances of 1½ hours each, one of which is generally devoted daily to each of the subject heads, Mathematics, Engineering, Surveying, and Drawing and Estimating. A general idea of the nature of the course will be gained by reference to letter to Director of Public Instruction, No. 170-C, dated 6th August 1880, page 5, where the marks awarded to each subject are shown. The following is an abstract of the marks :—

Mathematics	...	...	...	...	...	...	...	...	600
Engineering	...	...	...	...	...	...	...	...	700
Surveying	...	...	...	...	...	...	...	...	550
Drawing and Estimating	...	...	...	...	...	...	...	...	550
Session Examinations	...	...	...	...	...	...	...	...	500
									2,900

The item "Engineering 700" contains two mathematical subjects, "Practical Mechanics" and "Hydrostatics," each worth 100 marks, so that the division really stands thus :—

Mathematics	...	...	...	...	...	...	...	...	800
Engineering	...	...	...	...	...	...	...	...	500
Surveying	...	...	...	...	...	...	...	...	550
Drawing and Estimating	...	...	...	...	...	...	...	...	550
Session marks	...	...	...	...	...	...	...	...	500
									2,900

8. Half-yearly examinations are held in the College, which, together with the plans, &c., executed during the first year of study, produce marks counting 500 towards the final examination. This explains the last item in the abstract.

The final examination in December is conducted, as far as possible, by independent examiners who are unpaid. Difficulty is sometimes experienced in obtaining a sufficient number.

9. The names of successful students are reported to the Chief Engineer, Public Works Department. A few instances have occurred in which appointments have been made to the Engineer Establishment of the Public Works Department, and these cases have nearly always been of natives; but passed students generally consider themselves fortunate if they succeed in gaining an entrance to the Upper Subordinate Branch. Of twenty-four students, who have obtained certificates as Assistant Engineer during the last seven years, two now occupy position in the Engineer and ten in the Upper Subordinate Establishment, while eight are believed to have obtained other employment under the Mysore and Travancore Governments, and in the Salt Department and Local Fund Boards of the Madras Government.

10. No scholarships, stipends or prizes exist for the First Department. The fee paid by each student is Rs. 16 per mensem. The average numbers attending, and the cost to Government of individual education during the last four years were as follow :—

Year.	Average Number of Students.	Annual Cost per Student. RS.
1876-77	7	643
1877-78	7	636
1878-79	9	591
1879-80	6.2	921

for its enlargement and improvement as my comparatively short experience in its working leads me to believe called for.

PART I.

CONSTITUTION OF THE COLLEGE.

3. With the view of training men for service in the Revenue Department, a Government Survey School was established in 1834, which was extended some twenty-five years later into a Civil Engineering School to meet the requirements of the Public Works Department. In 1861, a special class for surveying, drawing, and estimating was formed, and in the following year, the institution became a College by the addition of a Senior Department for the supply of Engineers. About the same time an Officers' Surveying Class was also added.

Thus the institution at present consists of—

- (1.) A Collegiate branch or "First Department" educating Commissioned Officers of the Army and members of the Madras or other Indian Universities who have passed the F. A. Examination, to the standard required for an Assistant Engineer, Public Works Department, the course being also adapted to meet the demands of the degree of Bachelor of Civil Engineering conferred by the Presidency University.
- (2.) A School branch, training students of all classes for the various grades of the subordinate and office establishment of the Public Works Department. It comprises—
 - (a.) Second Department, which educates European non-commissioned officers, and soldiers and civilians of all races to the standard required for the grades of Supervisor and Overseer, Public Works Department;
 - (b.) Special Surveying Class, which fits men to become practical Surveyors; and
 - (c.) Special Drawing Class, which trains to the standards required for Draftsmen and Estimators in the Public Works Department.
- (3.) An Officers' Surveying Class. This class has for some years been in abeyance owing to the establishment of garrison courses of instruction, and it is not likely that it will ever be revived.

4. One of the following certificates may be awarded to each student or other candidate who is successful at the final examinations :—

Certificate as Assistant Engineer, Public Works Department.
" as Supervisor, Public Works Department.
" as Overseer, Public Works Department.
" as Surveyor, First Class.
" " Second Class.
" " Third Class.
" as Draftsman and Estimator, First Class.
" " Second Class.
" " Third Class.

The percentages of marks which must be gained at the final examination to secure certificates are as follow :—

	Each subject.	Total.
Assistant Engineer	33	50
Supervisor	35	60
Overseer	25	40
Surveyor, First Class	66	75
" Second Class	50	66
" Third Class	33	50
Draftsman and Estimator, First Class	66	75
" and Estimator, Second Class	50	66
" and Estimator, Third Class	33	50

5. In 1873 the College was transferred from Imperial to Provincial Services, and a grant of £4,304 (equivalent to Rs. 51,648 at 1s. 8d. exchange) made as compensation. From Table A, page 12, it may be seen that, deducting fees, the average annual cost of the institution during the last five years has been Rs. 37,017, so that considerable profit accrues to the Local Government.

6. The actual and anticipated receipts and charges from 1875-76 to 1881-82 will also be found in this table. The decrease in receipts during the last two years is due to the recent reductions in the Public Works Department, which had an immediate effect on the numbers attending the College. Notwithstanding the saving in the salary of the Principal by employing a junior in place of a senior officer, the estimated charges for 1881-82 exceed those of the previous year. This is owing chiefly to the introduction of a rule in the new Public Works Department Code directing that Overseers appointed to the department shall be entertained as apprentices for one year, during which their pay will be charged to the Educational Department.

CONTINGENCIES.

	Per Annum.
	RS.
Ordinary and Special, as per sanctioned scale	3,456
Contribution to Presidency College for Physical Laboratory, Rs. 75 × 12	900
Minor repairs to buildings	500
Lithographic charges	200
	<u>5,056</u>

ABSTRACT ESTIMATE.

Receipts.

Engineer Department—	
10 at Rs. 10 for 3 years	3,600
Subordinates Department—	
30 — 5 (Military Students) at Rs. 3 for 2½ years	2,250
Surveying and Drawing Classes—	
35 at Rs. 3 for 2 years	2,520
	<u>8,370</u>

Charges.

Educational Staff (average charge)	51,792
Office Establishment	2,700
Stipends and Scholarships (Engineers)	2,400
Do. do. (Subordinates)	5,262
Do. do. (Others)	1,320
Subsistence allowance (Mechanical Engineers)	1,200
Premia and Honoraria	9,500
Contingencies	5,056

Total ... 79,230

Proposed net cost to the Educational Department	70,860
Present net cost per sanctioned scale, allowing only for four Military and two Civil Apprentice Overseers, per annum—vide Principal's Note, paragraph 96	41,810
Present Imperial Grant £4,304, at 1s. 8d. exchange	51,648

CHARGES IN THE PUBLIC WORKS DEPARTMENT, BEING
REMUNERATION FOR USEFUL WORK PERFORMED.

Subsistence Allowance in final year—

Engineers (Civil)—	
1 European or Eurasian at Rs. 50 for 1 year	600
6 Natives at Rs. 25 for 1 year	1,800
Subordinates—	
9 Europeans and Eurasians at Rs. 30 for 1 year	3,240
21 Natives at Rs. 20 for 1 year	5,040

Total ... 10,680

Note, dated 10th December 1880, by Lieutenant H. D. LOVE, R.E., Principal, Civil Engineering College, Madras, with reference to G.O., Educational Department, No. 361, dated 23rd September 1880.

In my report to the Director of Public Instruction, dated 6th August 1880, on the working of the Civil Engineering College, certain modifications of the different courses were proposed which were deemed needful, but which at the same time would not materially affect the cost of the institution. The Proceedings of Government now referred to indicate that changes of a more radical character are contemplated, and that the time has arrived when proposals involving increased expenditure may be recommended.

2. With the view of assisting the Committee appointed to consider the questions of remodelling the College and training Mechanical as well as Civil Engineers and Subordinates, it appears desirable to describe briefly the constitution of the College, and to make such suggestions

OFFICE ESTABLISHMENT.

	Salary.	Average Salary.
	RS.	RS.
Superintendent of Military Students	20	20
Librarian	20	20
Head Clerk and Accountant	50 to 70	65
Second Clerk, Peons, and Lascars	120	120

Per Annum ... Per Mensem ... 225
Rs. 225 × 12 = Rs. 2,700

STIPENDS, SCHOLARSHIPS, AND SUBSISTENCE ALLOWANCES.

To frame an estimate of the Stipends, Scholarships, and Subsistence Allowances, the Committee suppose the classes to be divided as follow:—

Engineer Class 10 ...	{ 7 Civil	{ 1 European or Eurasian. 6 Natives.
	{ 3 Mechanical	{ 1 European or Eurasian. 2 Natives.
Subordinate Class 30 ...	{ 15 in Railway Shops	{ 2 Europeans. 2 Eurasians.
	{ 15 in P. W. Shops	{ 11 Natives. 3 Europeans. 2 Eurasians. 10 Natives.

(a) Stipends and Scholarships—

(1) Engineer Classes—

2 at Rs. 30 for 2 years	RS.
1 at „ 20 for 2 years	1,440
4 at „ 10 for 1 year	480
	<u>480</u>
	2,400

(2) Subordinate Classes—

5 Military at Rs. 10 for 3½ years	2,100
6 Civil at { Rs. 11 for 2 years	1,584
{ Rs. 8 for 1 year	576
1 Lawrence Asylum at { Rs. 23 for 2½ years	690
{ Rs. 20 for 1 year	240
1 for Walker Scholar at Rs. 3 for 2 years	72
	<u>5,262</u>

(3) Surveying and Drawing Classes—

10 at Rs. 11 for 1 year	1,320
--------------------------------	-------

(b) Subsistence Allowance of Mechanical Engineers—

1 European or Eurasian at Rs. 50	600
2 Natives at Rs. 25	600
	<u>1,200</u>

PREMIA AND HONORARIA.

(a) Premia payable to Railway Shops—

3 Engineers at Rs. 1,000 (2 years)	3,000
15 Subordinates at Rs. 100 (1 year)	1,500
	<u>4,500</u>

(b) Premia payable to P. W. Shops—

7 Engineers at Rs. 250 (1 year)	1,750
15 Subordinates at Rs. 50 (1 year)	750
	<u>2,500</u>

(c) Honoraria to Examiners—

50 papers per annum at Rs. 50	2,500
--------------------------------------	-------

Instructor in Drawing.—The Instructor in Drawing for the First and Second Departments must be well acquainted with Mechanical Drawing of buildings and machinery, and with Free-hand Drawing. A suitable man may probably be obtained on a salary of Rs. 250 rising to Rs. 350.

Assistant in Drawing.—His Assistant on Rs. 150 to Rs. 200 will fit himself to take the post of Instructor when a vacancy occurs.

Native Assistant in Surveying and Drawing.—The Assistants in Surveying and Drawing will also instruct the Special Survey and Drawing Classes, and will be aided in these duties by a Native Assistant on Rs. 60 rising to Rs. 80.

Vernacular Munshis.—If, as has been recommended, the Military Probationers are transferred to Madras, the Vernacular Munshis may be reduced to two, one for Telugu and one for Tamil. Each should draw a salary of Rs. 50 rising to Rs. 60.

Native Instructor of Maistry Class.—The Maistry Class will require a Native Instructor on Rs. 80 rising to Rs. 100.

Superintendent of Military Students.—The Superintendent of Military students should be one of the Warrant Officers above mentioned. He must reside in the College, and should draw an allowance of Rs. 20 per mensem.

Bricklayer Maistry.—With the courses of instruction proposed, the services of a Bricklayer Maistry may be dispensed with.

Instructor in Drill and Gymnastics.—The services of an Instructor in Drill and Gymnastics may probably be obtained for about Rs. 30 monthly.

44. *Office Establishment.*—The only change which appears necessary in the Office Establishment is the appointment of two additional lascars for surveying duties. The salary of the Head Clerk and Accountant should be Rs. 50, rising to Rs. 70, and that of the Librarian may be reduced to Rs. 20.

45. *Contingencies.*—The present sanctioned scale for contingencies, amounting to Rs. 3,466 per annum (*vide* Table B, page 38, of the Principal's note), appears suitable. A further allowance of Rs. 900 for expenses in connection with the study of Physics will be necessary, and additional provision must be made for minor repairs to Buildings and for Lithographic charges, which have lately been debited to the College.

46. *First Outlay.*—First outlay will be necessary on the gymnasium, swimming bath, games, mechanical models, &c., but the Committee do not possess sufficient data to enable them to frame an estimate for such apparatus.

47. *Budget.*—The control of the institution by the Public Works Department having ceased, it is recommended that the College Budget should no longer be submitted separately, but that it should be included in that of the Educational Department.

48. *Designation.*—It is suggested that the designation of the institution should be changed to "College of Engineering," as Mechanical instruction forms a large part of the proposed curriculum.

ESTIMATE.

EDUCATIONAL STAFF.

	Salary. RS.	Average Salary. RS.	
Principal	600 + Military Pay (say)	1,200	in accordance
Professor of Mathematics ...	500 to 750	666	with G.O., No. 181,
Professor of Engineering ...	750 to 1,000	910	Educl., 14th June
Instructor in Engineering and			1875.
Mathematics	200 to 300	275	
Instructor in Surveying ...	200 to 300	275	
Assistant in "	150 to 200	183	
Instructor in Drawing ...	250 to 350	310	
Assistant in "	150 to 200	183	
Native Assistant in Surveying			
and Drawing	60 to 80	75	
Tamil Munchi	50 to 60	57	
Telugu "	50 to 60	57	
Native Instructor of Maistry			
Class	80 to 100	95	
Instructor in Drill and Gym-			
nastics	30	30	

Per Mensem ... 4,316

Per Annum, Rs. 4,316 × 12 = Rs. 51,792

38. *Admission.*—In view of the important appointments which it is hoped will now be opened to the students of the Engineer Classes, the Committee recommend that more trustworthy evidence of age than is now required from natives should be produced, such as family horoscopes or deposition before a Magistrate. The medical certificate for all classes should be in the following form, which is a modification of that used at Rurki: "I certify that I have carefully examined A. B., and I find that his eye-sight is perfect, that he is fairly robust, and his constitution is sound, and that he has no disease or bodily or mental infirmity unfitting him now or likely to unfit him in the future for active out-door service in the Public Works Department. He has had small-pox, been vaccinated."

39. *Sessions.*—The session for the Engineer, Surveying, and Drawing Classes should commence in January of each year, and that for the subordinate class in August, so as to admit of all the classes leaving the College at the same period of the year. The vacation should be in June and July as at present.

40. *Physical Training.*—The Committee believe that great advantage would result if the students underwent some physical training. A field gymnasium, and possibly a swimming bath, might be constructed for the joint use of the Civil Engineering and Presidency Colleges, and marks should be given for gymnastics, swimming, and drill. Field games, such as cricket, lawn tennis, quoits, &c., should receive encouragement.

41. *Boarding.*—It is considered that the establishment of a boarding-house in the vicinity of the College, which should be self-supporting, for native students not belonging to Madras, would be of advantage.

42. *Numbers.*—As the practical courses will be productive of expenditure on the part of Government, it is considered that the numbers of pupils in the Engineer and Subordinate Classes should be limited to the probable requirements of the Madras Presidency. These numbers may for the present be—Engineer Class 10, Subordinate Class 30 annually. The average number of students in the College at any one time may be taken as 180:—

Engineers	10 × 3 =	30
Subordinates	30 × 2½ =	75
Military Probationers ...	5 × 1 =	5
Surveying and Drawing Classes ...	35 × 2 =	70
		180

STAFF, &c.

43. *Staff.*—The instruction being chiefly of a technical nature, the members of the staff will not, as a rule, be interchangeable with those of other educational institutions, and it is therefore recommended that the principle of progressive increments to salaries should be generally adopted.

Principal.—No change appears necessary in the general duties or salary of the Principal.

Professor of Mathematics.—The increased number of classes in the First and Second Departments, and the higher attainments required from the former, render necessary the appointment of a Professor of Mathematics on a salary of Rs. 500 rising to Rs. 750 by annual increments of Rs. 50.

Lecturer on Physical Science.—For the study of Physics the Civil Engineering College students should be combined with the classes of the Presidency College, and should attend the lectures given at that institution, where sufficient apparatus already exists. The only expenditure involved by this arrangement would be a contribution not exceeding Rs. 75 monthly for laboratory contingencies. There are at present no facilities for the study of Geology; but in the event of that subject being introduced at the Presidency College, the services of the Professor of Geology might be utilised in the same manner as those of the Professor of Physical Science.

Professor of Engineering.—To efficiently administer the College, and to superintend the work of all classes, the Committee consider that the Principal should not employ more than two hours per day in actual instruction. They therefore think that an additional Professor of Engineering should be appointed with special reference to his abilities as a Mechanical Engineer. He must be a good Mathematician, must possess a thorough knowledge of the theory of Engineering, and must have undergone a complete workshop training. His salary should be Rs. 750 rising to Rs. 1,000 by annual increments of Rs. 50.

Assistant in Engineering and Mathematics.—He will require an Assistant, who should instruct the junior classes in both Engineering and Mathematics. The Assistant may be a warrant officer of the Public Works Department on a salary of Rs. 200 rising to Rs. 300.

Instructor in Surveying.—The Instructor in Surveying for the First and Second Departments may also be a warrant officer on similar salary.

Assistant in Surveying.—His Assistant should be a Serjeant-Overseer of the Public Works Department, who will qualify himself to take the post of Instructor on the occurrence of a vacancy. His salary should be Rs. 150 rising to Rs. 200.

College students, and the Acting Superintendent is understood to explain that the superior social position and large expectations of the pupils render it difficult to utilize their services.

The Committee think that, if this view be correct, greater inducement should be offered to men of a more suitable type to enter the Surveying Department of the College, as it appears that both time and money must be wasted by the Revenue Survey in affording an education for the acquirement of which every facility exists elsewhere.

It is therefore recommended that the possession of a College Certificate as Surveyor should be indispensable for employment in the Revenue Survey, and that the present course should be so altered as to suit the requirements of that Department as well as of the Public Works Department. The Committee have been unable to elicit the precise nature of these requirements from the Acting Superintendent.

29. *Drawing Class.*—Mechanical drawing of models and machines should form part of the course for this class, and the hours of attendance should be made synchronous with those of the subordinate class to allow for the additional work thus involved.

It is recommended that the whole of the Draftsmen employed in the Revenue Survey should be drawn from this source.

30. The rules in force respecting scholarships and certificates of qualification in the Surveying and Drawing Classes may remain unchanged.

31. *Maistry Class.*—The Committee are of opinion that the establishment of a Maistry Class for the instruction of artisans and mechanics in rough mechanical drawing, Arithmetic, English, and the mechanical powers should be advantageous. The class should be held in the evening, and no fee other than one for registration of, say, Rs. 1, should be required. A certificate of attendance would be given after a minimum period of one year's regular study.

GENERAL.

32. *Photography.*—The Committee recognise the advantage to the Public Works Department of the possession of a few practised photographers; but viewing the facts that instruction in Photography must interfere with the more legitimate work of the pupils of the Second Department, and that the study can rarely be steadily practised after leaving the College, they consider that the subject should be discontinued by the subordinate classes. Should it appear, however, that a knowledge of Photography is of value in the Revenue Survey, instruction may be imparted to selected students of the Surveying and Drawing classes.

33. *Outsiders.*—It is considered that College students only should be admitted to the examinations, as the tests which are applied to them could not, from their nature, be imposed in their entirety on outside candidates.

34. *Premia and Honoraria.*—The following premia payable by the Educational Department to the Railway Workshops to cover cost of instruction and waste of material appear suitable:—For the two years' course of a Mechanical Engineer student Rs. 1,000. For the one year's course of a subordinate pupil Rs. 100.

The following premia should be paid to the Public Works shops:—For the one year's course of a Civil Engineer Rs. 250, and of a subordinate Rs. 50.

An honorarium of Rs. 50 is recommended for each paper set by an independent examiner.

35. *Scholarships.*—All scholarships should be susceptible of reduction or withdrawal in case of unsatisfactory progress or conduct; and, with the exceptions of the Military stipends and the exhibition tenable by a Lawrence Asylum pupil, scholarships should be awarded only to the extent of half the number of paying students at any time in a class.

36. Under the present rules, the following students pay no fees:—

Four pupils per annum from the Civil Orphan Asylum.

All scholarship holders.

Other students selected by the Principal in number not exceeding 5 per cent. of the paying pupils.

Students of the Junior Departments who pay no fees are thus practically in receipt of scholarships of Rs. 3 per mensem; and the Committee are of opinion that expenditure of this nature should be shown under the head "Scholarships."

37. With the view of more conveniently comparing the proposed with the present scale, this practice has not been followed in paragraphs 14 and 24; but in the estimate which is appended to this report the fees payable have been added to the nominal value of the scholarships under the head "Charges," and the fee recovered under "Receipts."

Thus the largest scholarship in the First Department will be Rs. 30 per mensem, out of which the holder will repay Rs. 10 per mensem for his education. The Lawrence Asylum scholarship will be shown as Rs. 23, and the Walker scholar must, provided he does not also hold a Government exhibition, receive a special scholarship of Rs. 3 to enable him to pay his fee. No further scholarships of this amount are, however, considered necessary.

20. *Practical Course.*—The Committee do not approve the present practice of selecting for one year's practical training only those pupils who will be required for permanent employment in the Public Works Department, and of paying them salaries, from Educational Funds, which are disproportionate to their position as students. The pupils who are not so selected leave the College when but half educated, and fail to secure employment in small Engineering establishments which cannot afford to undertake the completion of their training. The cost to the State of their technical education is thus wasted.

The Committee believe that if all students of this class were provided with such a training as to fit them to take their places at once on works, and to carry out their duties therewith moderate efficiency, the savings, both direct and indirect, resulting from the extended employment of natives of this country would outweigh the increased cost of their education. With this view, they consider indispensable a practical course of two years, the first of which should be spent in workshops, and the second on engineering works in progress.

During the first year, the students should be distributed among the chief workshops in the Presidency. The Public Works shops at Madras and Dowlaishweram will doubtless be able to render important assistance, and it is hoped that arrangements may be made for the training of the remainder at the Locomotive shops of the Madras and South Indian Railway Companies. The pupils, unlike those of the engineer classes, should be confined to one or two descriptions of work, preferably those of the fitting and erecting shops.

During the second year, the Public Works Department alone can afford the requisite training, and the students should be entertained as Overseer Pupils on large engineering works, receiving the regular instruction recommended for the Engineer Pupils. In place of the large salaries now drawn by Overseer apprentices, the pupils should receive only a subsistence allowance of Rs. 30 per mensem for Europeans and Eurasians, and Rs. 20 for Natives. The Committee consider that the work of the pupils will be remunerative, and that these allowances should therefore be paid by the Public Works Department.

21. *Examinations.*—During the theoretical course, Term Examinations should be held by independent examiners, and the results counted towards the final total. The certificates of qualification as Engineering Subordinates should be awarded only on the satisfactory completion of the practical course, and vacancies in the permanent establishment of the Public Works Department should be filled by the latest batch of passed men in order of merit.

22. *Qualifying Marks.*—The qualifying minima marks for a pass as an Engineering Subordinate should be 30 per cent. on each of the five subject heads, and 45 per cent. on the total. The attainment of 60 per cent. on the total marks might constitute a pass with credit. The present certificate as Supervisor appears unnecessary.

23. *Inducements.*—In view of the increased length of course, and of the aim of training men for other than Government employ, the Committee consider that greater inducements than at present exist must be offered to subordinate students. They recommend that, prior to each entrance examination, notice should be given of the number of appointments in the Public Works Department which will be competed for by the then entering batch, and that the employment of any but certificated men in the engineering establishments of the Local Fund Boards be prohibited.

24. *Scholarships.*—The following stipends and scholarships should fall vacant annually:—

Military Stipends.—A number not exceeding five at Rs. 10 per mensem tenable for three and-a-half years.

Civil Scholarships.—Six at Rs. 8 extending over three years. These should be awarded in the first instance only for one year on the results of an examination held six months subsequent to entrance, and redistributed annually after each term examination. One at Rs. 20 per mensem tenable for three and-a-half years by a European or Eurasian pupil of the Lawrence Asylum, and awarded by open competition among the pupils.

25. *Soldier Students.*—Under G.O., Military Department, No. 175, dated 6th May 1859, employment is guaranteed to passed Military students. The present total annual requirements of the Public Works Department appear to be little in excess of the supply of this class of men, so that the Civilian students labor under a serious disadvantage. The committee advise that a fixed proportion should be established between the number of soldiers and civilians appointed to the Upper Subordinate Establishment, and that the Military students admitted to the College should be limited to the number thus arrived at.

26. *Fee.*—The fee throughout the theoretical course should be Rs. 3 per mensem. For the present no fee should be exacted during the workshop year.

27. *Public Works Code.*—The adoption of the proposals made by the Committee regarding the Engineer and Subordinate Classes will render necessary some modification of the Public Works Code, paragraphs 149, 150, 171—175, 178, 179, 187, and 188.

SURVEYING AND DRAWING CLASSES.

28. *Surveying Class.*—This class was originally established to meet the wants of the Public Works Department and the Revenue Survey. The latter, however, makes little or no use of the

14. *Scholarships*.—The Committee advise that, to place the College on a more nearly equal footing with those of other Presidencies, the following scholarships be established:—

Two of Rs. 20 per mensem } tenable for two years, to be awarded annually on the
One of Rs. 10 do. } results of the first year's examination.
Four of Rs. 10 per mensem tenable for one year during the workshop course, to be
awarded on the results of the final examination.

15. *Fees*.—The fee, which is now Rs. 16 per mensem for two years, should be fixed at Rs. 10 for three years. No fee should for the present be required during the year of workshop training.

16. *Subsistence Allowances*.—In the final year, the work performed by the Civil Engineer students will be to some extent remunerative, and the Committee advise that subsistence allowances of Rs. 50 per mensem for Europeans and Eurasians, and Rs. 25 per mensem for Natives, should be paid by the department receiving their services. The work of Mechanical Engineers will be less remunerative, but equal subsistence allowances should be awarded, payable by the Educational Department.

SUBORDINATE CLASS.

17. *Subordinates*.—Engineering Subordinates comprise (a) Civil Overseers of the Public Works Department and men holding analogous positions in other establishments; (b) Foremen Mechanics; and (c) Mechanical Overseers to superintend the work of a series of factory shops or the erection of large machinery. The Committee are of opinion that the first-named class only should be educated at the College, and that their training should include some knowledge of both Civil and Mechanical Engineering. They consider that a want is felt for men of the second class trained in this country, but that a College can do little to meet the requirement; and that subordinates of the third class are rarely needed, and would be best obtained by selection from Foremen Mechanics.

18. *Admission*.—Matriculated Candidates may be admitted to the class without examination as at present; but others should pass an entrance examination in English, Arithmetic, Elementary Algebra, and two books of Euclid. The maximum limit of age for Civilians should be eighteen. In the case of Military student, whose age limit is twenty-five, the examination should continue to comprise only English and Arithmetic, the other two subjects being acquired during their year of probation. This will be best effected by transferring the probationers from Bangalore to Madras, where accommodation can be made available for them at the College. By this arrangement the services of a Vernacular Munshi at Bangalore may be dispensed with.

19. *Theoretical Course*.—It is recommended that the theoretical course for the subordinate class should be as follows:—

I. Mathematics—

Arithmetic and Algebra.
Geometry and Mensuration.
Trigonometry.
Elementary Statics.

II. Drawing—

Geometrical Drawing.
Orthographic Projection.
Mechanical Drawing (Buildings, Irrigation Works, Models, and Machines).
Free-hand Drawing.

III. Language—

Tamil or* Telugu.

IV. Surveying—

Chain and Compass.
Box Sextant and Plane Table.
Theodolite.
Levelling.
Topographical Drawing.

V. Engineering—

Building Materials and Construction.
Hydraulics, Bridges, and Irrigation Works.
Earthwork and Roads.
Strength of Materials.
Elements of Mechanism and the Steam Engine.
Designing and Estimating (Civil and Mechanical).

This course will occupy two years and-a-half. The Committee would have desired to include some instruction in Physics, but consider that it would be impracticable without lengthening the course.

* NOTE.—Tamil compulsory for Natives of Telugu Districts, and *vice versa*. The language optional for other students.

V. Language.

Tamil, or
Telugu.

(NOTE.—Tamil to be obligatory for Natives of Telugu Districts and *vice versa*).

VI. Engineering.

Strength of Materials.
Building Construction and Architecture.
Theory of Strains and applications to Construction.
Earthwork, Roads, and Railways.
Hydraulics, including Bridges and Irrigation Works.
Principles of Mechanism.
Prime-movers, Steam-engines, and Hydraulic Machinery.
Designs, Specifications, and Estimates.

VII. Surveying.

Instruments.
Surveying and Levelling in the field.
Calculations and Topographical Drawing.

This course will occupy three years.

8. *Practical Course for Civil Engineer Pupils*.—After completing the theoretical course, the Civil Engineer pupils should spend one year in the Public Works Workshops, going through the carpenter's shop, the smithy, the foundry, and the fitting shop. They should then spend one year under the Public Works Department, being stationed at places where large works are in progress. They should be regularly instructed in the practical details of brickmaking, masonry, bricklaying, building of all sorts, the management of labor, and accounts.

9. *Practical Course for Mechanical Engineer Pupils*.—After completing the theoretical course, the Mechanical Engineer pupils should be stationed for two years at the largest workshops available, preferably those of the Madras and South Indian Railways, if satisfactory arrangements can be made. The number of students in this class will probably be very small for some time.

10. *University Degree*.—The examination for the University Degree should take place at the end of the theoretical course; but, inasmuch as the possession of a Degree in Engineering is held as a guarantee that its possessor is qualified to practise that profession, the Committee recommend most strongly that the degree should be withheld until the receipt of a certificate from the Principal of the College that the candidate has satisfactorily gone through the full practical course. They further suggest that the Senate of the University be moved to change the designation of the Engineering Degree to "Bachelor of Engineering," and to raise the standard of the examination to that recommended for the College course.

11. *Examinations*.—Term Examinations should be held annually by independent Examiners. At present great difficulty is experienced in securing the services of suitable persons to conduct these examinations; and the Committee recommend that a moderate fee should be allowed for every paper set. At the Term Examinations, portions of certain subjects should be finally disposed of, and the marks gained at each examination should count towards the final total. The final examination should take place at the close of the theoretical course.

12. *Qualifying Marks*.—The minima qualifying percentages of marks at examinations should be 35 per cent. on each of the seven subject heads (or on so much of each of the seven subject heads as is taken up at every examination) and 53 per cent. on the total. An aggregate exceeding 65 per cent. on the total marks might constitute a pass with honors.

13. *Inducements*.—If the Engineering profession is to be opened up to the Natives of this Presidency, the Committee consider that the courses they have proposed are absolutely essential to the education of efficient men. The period at which men of the Engineer class will begin to earn their living will thus be some three years later than at present, and the Committee are convinced that, until it has been demonstrated that Natives are as capable of good work in this as in other professions, the existence of the classes is contingent on some guarantee of employment. It is no matter for surprise that the profession of Engineering is so unpopular when the facilities which exist for the attainment of superior posts in law and Medicine are regarded. The present Engineering class of the College has been hitherto trained solely for the Public Works Department, but during the last seven years two only of its passed students have been appointed to the Engineering Establishment. It would ere this have died out, had it not been that its members have generally secured employment in the subordinate grades of the Public Works Department to the detriment of the Junior classes whose pupils specially qualify for those grades.

The Committee recommend that two appointments annually as Assistant Engineer, Third Grade, be guaranteed by Government, and awarded to the two students highest on the list of the final examination who have satisfactorily completed their practical course. This proposal is moderate when compared with the practice at Rurki, where eight appointments to the Engineering Establishment of the Public Works Department are annually guaranteed.

Practical or Descriptive Geometry.
Orthographic and Isometric Projections.
Mechanical Drawing.
Architectural Drawing.
Free-hand and Perspective Drawing.

of the Madras Government for reference.

[illegible]

NOTE BY THE CHIEF ENGINEER.

G.O., No. 61, Educational, dated 26th April 1882, refers the report of the Committee assembled under the Presidency of Colonel Shaw-Stewart, dated 18th April, on the subject of remodelling the Madras Civil Engineering College for my opinion.

2. As the subject is one of primary importance to the future well-being of this department, I hope I may be excused for looking at the proposed changes exclusively from the stand-point of its interests, rather than in reference to the general advancement of education, though this too, I believe, will eventually be found to profit by this method of dealing with the question.

3. The Committee in paragraph 5 of their report are under a misapprehension in supposing that Commissioned (*i.e.*, Staff Corps) Officers are eligible for appointment from the College. Again, no European or East Indian can, under the late ruling of the Secretary of State, be appointed to the Engineer Establishment, or indeed to any higher position than that of Supervisor, 2nd Grade, this being the highest available appointment under the limit of Rs. 200 salary.

4. All higher appointments from the College must, under existing rules, be reserved for persons of pure Asiatic parentage, and the extent to which such are limited has also been lately clearly defined by the ruling of the Government of India that, the Madras College can only be allowed to offer *one* appointment per annum, to the Engineer Establishment, commencing with the year 1885.

5. Since 1874 only two Natives have been appointed from the College to the Engineer Grade, and last year five passed students were made Apprentice Supervisors, 2nd Grade. To the Overseer grades the appointments have necessarily been much more numerous and frequent, but as a fact no defined principle has been recognised in making any of these appointments, further than, as a rule, picking out either the senior pupils (according to examination) of the year, when there happened to be vacancies.

6. It by no means follows that we thus got the best men for the Engineer grade, and there can be no question that heart-burnings and discontent have not unnaturally been the result. Such also will, it is to be feared, inevitably be the consequence of conferring the Engineer or Officer grade on the youth who, after 1885, happens to pass the best examination at College, leaving all others to find such places as they can in the Upper Subordinate grades.

7. Seeing, therefore, that Europeans and Eurasians are excluded from appointment to the Engineer Establishment, I confess I see no reason why, as proposed in the Committee's Report,—

First the social distinctions implied by the terms "*Engineer Class*" and "*Subordinate Class*" (which are inapplicable to native society) should be perpetuated in the proposed College curriculum, and

Second why, instead of appointing raw youths to the Engineer Establishment, these prizes *one*, if necessary, per annum, should not be reserved entirely for those who, after a sufficient service in the department, have fairly won their claim to the distinction, by working their way up through the Sub-Engineer grades, in the manner which I shall advert to further on.

8. I may here explain that hitherto in principle, as defined by the Public Works Code, an Upper Subordinate does not merely by long and approved service of necessity rise to the Sub-Engineer grades. Higher theoretical or other tests are exacted than for the lower grades, and the position is one of selection.

9. This separation of the Sub-Engineer grades, in which the consolidated pay proper rises from 250 to 400 rupees per mensem, is moreover daily becoming more marked. From the necessity which has forced itself on attention of diminishing the proportion which, the numbers in the Assistant Engineer grades bear to those in the Executive and higher grades in the department, with a view to afford a reasonable and steady flow of promotions, it has for some time been recognized that a change must ere long be made, in the organization of the department, by which members of the Sub-Engineer class (which will probably have to be considerably expanded both as to numbers and requirements) will in all probability be called on to perform many of the duties, now chiefly devolving on Assistant Engineers.

10. However this may be, the Sub-Engineer class, even without any change of organization, and while still continuing to be recruited from such of the Supervisors as can satisfy the Code requirements, might yearly receive additions from the College by the appointment as Apprentices, of such Native students as could succeed in passing the necessary tests.

11. Hitherto there has only been, as shown, the occasional and very rare chance of an appointment to the Engineer grade, and, in lieu of this, two yearly nominations of Apprentice Sub-Engineers, might, I think, be safely promised for, say, the next four or five years, after which a revision might be made in the number of guaranteed appointments to hold good for another specified period in advance.

12. Similarly with regard to the Overseer grades, to which the Government stands at present pledged to appoint five British Soldiers, who may succeed in obtaining certificates, a guarantee for a similar period might be given to nominate three Natives or Eurasians annually.

13. Under the foregoing remarks, therefore, there would be a *First Class* educating up to the standard required for the Sub-Engineer grade, and a *Second Class* up to that for the Overseer grades, in lieu of the so-called "Engineer" and "Subordinate" classes of the Committee's scheme. Details of the studies, &c., will be found further on.

14. Turning now to the conditions under which entry into the College should be admissible, I need hardly say that with a department like ours the very first necessity is to secure youths having the best physique, of proved active habits, and both ready and willing to turn their hands to any work, connected with their future duties.

15. It is needless to say that the present purely literary test touches none of these primary essentials, and that, if real reform is to be secured, the most stringent rules with this object must be adopted and adhered to.

16. Before entry into the College for the second class (through which all alike should pass) I would require—

- (1) Either proof of the University Matriculation Examination having been passed, or an examination in English and a stiff one in Arithmetic.
- (2) Production of a certificate from the Superintendents of the Public Works, Madras Railway, or South Indian Railway Workshops, or of the Gun Carriage Manufactory that the student had attended the shops for not less than one year, keeping workman's hours, and that he had with his own hands turned out certain works in the fitting and erecting shops.
- (3) Production of the recognized medical health certificate.
- (4) Submission to the test of walking 20 miles in 6 hours, and of riding 25 miles in $3\frac{1}{2}$ hours.

17. Unless preliminaries such as these—all in themselves simple enough of accomplishment—can be implicitly complied with, it does not appear to me that a sufficiently serious reform will have been entered on.

18. The British Soldier, who is ready as a rule to put his hand to any kind of manual labor, does not so necessarily require to pass through the preliminary workshop course, but, if suitable arrangements could be made with this object, it would be all the better for him to do so.

19. Turning now to the theoretical course as laid down by the Committee, it appears to me that too much is being attempted.

20. For Overseers we need men who can accurately set out and measure up work, understand and attend strictly to the terms of a specification, survey with a compass, and level with accuracy, and have a thorough acquaintance with the manufacture and employment of materials. They need never be called on to design any but the very simplest class of works, or ever deal with hydraulic formulæ.

21. Thorough grounding in Arithmetic, and a sufficient acquaintance with the elements of Algebra and Geometry, to allow of a man acquiring as complete a knowledge of mensuration as possible would, I venture to think, prove far more profitable than merely working over the numerous subjects of an ambitious curriculum.

22. Such at least is the conclusion which has been forced on me, after a long experience of the department in many parts of India.

23. In this view, therefore, I would modify and curtail the theoretical course prescribed by the Committee (paragraph 19) as follows:—

I.—*Mathematics*—

Arithmetic.

Elementary Algebra.

Do. Geometry.

Mensuration.

II.—*Drawing* as laid down by the Committee, omitting "Orthographic projection."

III.—*Languages* as laid down by the Committee.

IV.—*Surveying* ditto, omitting "Box sextant" and plane table; also "Theodolite."

V.—*Engineering* as laid down by the Committee with the addition of "Specifications."

24. The subjects of designing, estimating, &c., should be taught strictly on the lines laid down in the Departmental Code and Forms, the lately published "Standard Specification" of the department being used as one of the text-books.

25. If statics are to be included in the course, the subject should be treated in the most elementary way, and the application taught as much as possible graphically, as in Mr. Robert Bow's excellent little work entitled "The Economics of Construction in relation to Framed Structures."

26. No student should be allowed to pass from any subject till it has been thoroughly mastered, practical application and illustration being freely employed throughout the instruction.

27. To those only who can pass a searching examination in Head I, "*Mathematics*," with of course certain portions of the remaining heads, by the end of the first year, should it be permitted to move up to the first class.

28. Those remaining in the second class should be looked on as candidates for the Overseer grades, and might well devote $1\frac{1}{2}$ years more to completing the course in a thoroughly satisfactory manner.

29. Sufficient time would thus, it is thought, be afforded for devoting to plan-drawing, estimating, surveying and levelling, and generally to the subjects embraced under Heads IV and V. Very sound instruction in these important matters might in this way be imparted.

30. The curriculum of the First Class I would, in a somewhat similar manner, curtail from that laid down in paragraph 7 of the Committee's Report.

I.—*Pure Mathematics*—omit "Algebraic Geometry" and "Differential and Integral Calculus."

II.—*Applied Mathematics* as laid down by the Committee, adding "Graphic Statics."

V.—*Engineering* ditto, adding "Sanitary Engineering,"—a very important subject.

31. The remaining heads might stand as laid down by the Committee, it of course being accepted that where the curriculum is similar to that for the second class, more advanced ground will be taken in dealing with the several subjects, though

here again thorough grounding should be strictly enforced, rather than admit of any sacrifice to diffusion or mere show.

32. In striking out "Differential and Integral Calculus," I have, I believe, the high sanction of Mr. Guilford Molesworth.

33. As regards Chemistry and Geology, such instruction as may appear necessary had better be imparted by lectures only.

34. As regards the first, it might suffice to teach the merest elements, with practical illustrations of qualitative analysis, with direct application to limestones and cement, and the lithological character of the rocks suitable for building purposes (few and simple in classification) in South India.

35. As regards Geology, the sedimentary rocks and palæontology of the Peninsula are so little capable of illustration that, a simple elementary sketch with illustrations from the "Manual of the Geology of India" by the Geological Survey Department, and from Medlicott's "Artesian borings in India," assisted by visits to the Central Museum, would apparently suffice for all practical purposes.

36. Much in the same way the elementary general principles of architecture as an art, would best be conveyed through the medium of lectures, illustrated for such works as Owen Jones' "Grammar of Ornament," Fergusson's "History of Indian and Eastern Architecture," &c., special attention being devoted to the best methods for adapting such features in indigenous styles, as may be applicable to the present requirements of the department, and to the means of conserving the ancient national monuments.

37. Under the foregoing proposals the Native pupil, after a year at the Workshops and three years passed in theoretical training, would be able to carry off, if successful, a Sub-Engineer's certificate, or again, after a similar time at the Workshops and two-and-a-half at College, an Overseer's certificate.

38. The holders of the first and second Sub-Engineer's certificates, and of the first, second, and third Overseer's certificates would again, as previously suggested, be guaranteed Apprenticeships in these grades respectively, and their practical departmental training be entered on, which would extend over one year.

39. The department could not of course undertake to extend the advantages of this practical training to those, who are not selected for Government service, nor would it, I think, be desirable to hold out any hopes to the pupils who fail to secure the first or second of the Sub-Engineer certificates, that they may be appointed to the Overseer grade.

40. The practical course which the students, on being appointed Apprentices, undergo under selected departmental Instructors would be much as at present.

41. They would be placed at the head-quarters of all large works, and the course would consist of instruction in bricklaying, carpentry, earthwork, blasting, brick and tile making, and preparation of materials generally. During the last three months the Apprentice would, as far as possible, be given the full responsibility of a Sub-Overseer's charge, including the keeping of the accounts, payments of coolies, setting out and measurement of work, &c.

42. The Committee, in paragraph 20, object to the large salaries now drawn by Apprentices. These under the present Code rules are as follow:—

(1) If British Soldiers, a consolidated pay of Rs. 80 per mensem *plus* quarters, married men in addition receiving the usual regimental allowance for wife and children.

(2) If Civilians (European, Eurasian, or Natives) and appointed to second grade, they draw Rs. 60 *plus* quarters.

(3) If Natives appointed to third grade, Rs. 40 and no quarters provided.

43. Looking to the time passed in previous study, &c., I confess the above scale of remuneration does not seem to me to be too high, and for Apprentices of the Sub-Engineer grade (not included therein) I would suggest a salary of Rs. 100 per mensem without quarters.

44. The objection urged by the Committee to the payment of Apprentices being borne by the Educational Department is, I consider, valid. As the services of the men

are to be solely devoted to the department, I think it should bear their salary, as also the special pay given to Instructors, but the ruling based originally on the Government of India Code has quite lately been altered by that authority.

45. As regards the attainment of an University degree, it will be observed that this does not necessarily fall in with a scheme based exclusively on departmental requirements; yet I see no reason why such should not be encouraged and be made the object of reasonable ambition, on the part of those who carry off Sub-Engineers' certificates.

46. After, say, five or six years of thoroughly approved service in the department (and the requirements of the public service admit), Government might grant in very special cases six months or even a year's leave on half pay to students desirous of competing for the B.C.E. degree, the winning of which would, no doubt, be taken into consideration in regard to the ultimate prize which I have proposed to hold out as the reward of long and approved departmental service, viz., in the form of one appointment per annum (vacancies, &c., permitting) to the Engineer Establishment.

47. Frequently it is only after a man has been some years at practical work that he fully realizes the bearings of his theoretical studies, recognizes his deficiencies, and sees the necessity for acquiring increased theoretical power. Again, the incentive of possible future promotion, cannot fail to have its effect in inducing men to keep up, and even expand, their College studies, a matter that is unfortunately now neglected in the majority of cases. Even those who, notwithstanding their efforts, should fail to obtain their degree would be all the better for their advanced studies. The concession which I advocate is therefore one which I cannot but think would have a beneficial effect on the department, and thus well repay the Government.

48. It would not be right to confine the advancement of deserving Sub-Engineers to the Engineer grade, absolutely to the holders of University degrees, but such could not fail to be taken largely into account, and this I have no doubt would in itself suffice.

49. For those who fail to obtain Government service from the College, they will always have, as now, the opportunity of going up for their degree whenever they please; and, as by the plan I propose they would have put in one year at the workshops, the difficulty which has arisen in reference to the bestowal of a degree, in consideration of purely literary acquirements need not weigh too much.

50. If the University however desires, it might refuse to grant a degree to any candidate, before he could show that he had passed at least five years in the actual practice of his profession, subsequent to obtaining his Sub-Engineer's certificate at the College.

51. Before passing to other subjects I would wish to say a word, in reference to the anomaly which must be at once apparent in regard to my own, or any other scheme connected with the College, from the fact that, under the present ruling of the Secretary of State, all Europeans and Eurasians are, and must continue to be, unfairly weighted in the competition for appointments, unless some special modification be adopted in the existing rule.

52. The European or Eurasian who enters the College can have no possible inducement to qualify himself for a Sub-Engineer's certificate, as this, it will be seen, would actually constitute a bar (see paragraph 39 above) to his obtaining any appointment in the department! The anomaly, if not indeed absolute injustice, of such an arrangement, not only as regards the individual, but as affecting the well-being of the department, is too patent to call for further remark.

53. The Surveying and Drawing classes next claim attention. There is probably no portion of the departmental establishment which is in greater need of revision and improvement. From the fact of Surveyors not being till quite lately graded on the permanent establishment, and of Draughtsmen's posts being altogether inadequately paid, there has been no encouragement to really good men to seek these positions.

54. In the lately sanctioned normal scale, I was enabled to enter sixteen graded Surveyors with ranging from 80 to 200 rupees, the ultimate intention being to bring the most approved and trustworthy of these men eventually on the permanent strength

Salaries

of the establishment, in positions parallel in every sense to those occupied by other Upper Subordinates.

55. This in time will no doubt, when followed up, give the department all it requires, *i.e.*, if the Civil Engineering College is in a position to afford the proper instructions.

56. Similarly with regard to Draughtsmen, a scheme is now being digested which, if sanctioned, will create six or seven posts for men of this class on Rs. 80 per mensem, and this limit may in time be increased as more proficient men are turned out by the College.

57. But the first question here is, how are the men of both classes to receive the needful training if, as is surmised, the College staff is not in itself fully equal to the task?

58. At present our Draughtsmen are little more than mere tracers and indifferent copyists, whereas to make a really efficient man of this class there must be natural aptitude, followed up by careful instruction in free hand drawing.

59. From correspondence with Mr. Chisholm on this subject, he considers that the capabilities of the School of Arts, Madras, as at present organized, would extend to the following:—

- (1) Free-hand drawing from copies, enlarged or reduced.
- (2) Plane geometry consisting of one specimen sheet of problems worked out and a two-hours' paper.
- (3) Perspective consisting of one specimen sheet of a problem or problems and a three-hours' paper.
- (4) Drawing from measurement one specimen sheet.

60. The course might subsequently be enlarged, but in the mean while I should consider it necessary, as a preliminary to entering the College for going through their regular training, that all candidates for positions of either Surveyors or Draughtsmen, whether intended for the Public Works or the Revenue Survey Department, should present a School of Arts certificate showing that they had successfully passed the foregoing test.

61. Mr. Chisholm informs me that at South Kensington every one has in the first place to obtain an "Art Master's" certificate, after which he can elect to follow Architecture, Painting, or any of the decorative arts, and suggests that the College Drawing Masters should pass to this extent—a matter involving apparently not more than six months' application.

62. As regards the classes which the Committee (paragraph 31) suggest should be constituted for the instruction of Maistries, I may observe that arrangements have now for some time been on foot for the formation of a body of Foremen Artizans for this department. The scale, if sanctioned by Government, would be nearly as follows, the pay of each grade being, with one exception, the same as provided in the Code for Sub-Overseers, viz.:—

No.	Grading.	Monthly Pay.
8	Sub-Overseers, 1st Grade	From Rs. 50 to 70
8	Do. do.	Do. „ 35 to 45.
8	Do. do.	Do. „ 30 to 35.
24	Maistries, do.	Rs. 25.
24	Do. do.	„ 20.
24	Do. do.	„ 15.

63. It was not intended that any other than a strictly trade test should be applied, and that advancement to and in the Sub-Overseer grades should depend solely on intelligence and good service, but there is no reason why those who enter this establishment should not have the opportunity of receiving sound elementary instruction in Arithmetic, Plane Geometry, Mensuration, Plan Drawing, and in just sufficient Civil Engineering as to afford an insight to the most essential points to be observed in construction generally.

64. The Roorkee course for men of this class is apparently too diffused, but as test books in the vernaculars of Southern India do not, I believe, at present exist in such subjects as Building Materials, Earthwork, Construction of Buildings, Roads,

Carpentry, and Estimating, those adopted at that College and published in Hindustani might, I should think, be translated with advantage into Tamil and Telugu, at least to commence with.

65. In selecting students for admission to this class, I would make it *sine qua non* that they should be either sons of Maistries or Artizans, or that each should be a proficient in some of the building trades; and, again, that departmental promotion should mainly, if not indeed wholly, depend on their proficiency as tradesmen combined with good service. The object in fact should be not only to revive, but improve the old Maistries who, with all their defects, were a most deserving and useful class, and have been far too much neglected in this Presidency.

66. It is impossible in a paper of this character to enter into needful detail, and I must therefore confine myself to what I believe will be found essential in reforming the curriculum of the College.

67. The Principal of the College would be enabled to shape a scheme for the various studies on the general lines I have indicated, should such meet the approval of the Government; but before any measure of this character be undertaken, it would be much more satisfactory to me if the proposals embodied in these papers were sent for opinion, on one or two leading points, to a few selected Public Works Officers, and the whole then relegated through the Director of Public Instruction for final disposal.

OOTACAMUND,
10th June 1882.

(Signed) R. H. SANKEY, Colonel, R.E.,
Chief Engineer, P.W.D.

Nos. 241—51 G.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

GENERAL.

Fort William, February 14, 1883.

Appointments to the Engineer and Upper Subordinate Establishments.

Read again—

Home Department Circular No. $\frac{21}{746-753}$, dated 10th April 1879.

Public Works Department Resolution No. 1516—28 G, dated 11th November 1882, and Despatches from the Secretary of State quoted in the preamble, also Secretary of State's Despatch No. 52 P W, dated 28th September 1882, approving of the above Resolution before issue.

Read—

Letter from the Secretary to the Government of Madras, Public Works Department, No. 3351 W, dated 19th December 1882, asking for definite orders as to future appointments to the Engineer and Upper Subordinate Establishments.

RESOLUTION.—The Circular of the Home Department quoted in the preamble, in furtherance of the views of Her Majesty's Government enjoined the reservation of appointments in the uncovenanted service generally for natives, but made an exception in favor of certain Departments and amongst others, of the Public Works Department.

2. Prior, however, to the issue of this Circular, the Secretary of State had, in his Despatch, No. 41, dated 10th August 1876, followed by other Despatches quoted in the preamble of Resolution No. 1516—28 G, dated 11th November 1882, impressed upon the Government of India that, as the European portion of the Superior Public Works Establishment was now recruited from the Royal Indian Engineering College at Coopers Hill, the appointments from the Indian Engineering Colleges should be closely reserved for natives, and that, without the sanction of the Secretary of State, no Europeans other than Royal Engineer Officers should, in future, be appointed in India to the Engineer Establishment. At the same time his Lordship gave it to be understood that he did not intend these orders to affect the classes formed at the Thomason College for the education of Non-Commissioned Officers and Soldiers of the British Army, or of Europeans and Natives, for the Subordinate Establishment of the Department.

3. The purport of the above orders was, so far as appointments from the Thomason College are concerned, summed up in Resolution No. 1516—28 G, dated 11th November 1882, which directs that, commencing with the students entering the College in the year 1883, the number of appointments to the Engineer Establishment, guaranteed from time to time to that institution, shall be given in the first instance to persons of pure Asiatic origin who qualify under the usual conditions.

4. It is necessary however, in view of the orders by the Secretary of State already quoted, and of the uncertainty in regard to this matter which the letter from the Government of Madras shows to exist, to lay down the following rules for future guidance in making appointments to the Engineer and Upper Subordinate Establishments:—

1.—Without the sanction of the Secretary of State, no permanent appointment of Europeans, except of Royal Engineers, or as provided in Rule 2, shall be made to the Engineer Establishment.

P.W. 28-2-83 L 655-W.

2.—Subject to any guarantee that may have been already given, the appointments made to the Engineer Establishment from the Indian Engineering Colleges shall be reserved for persons of pure Asiatic origin who qualify according to the College Standard. If, however, a sufficient number of Natives do not pass the test, the appointments will be open to European or Eurasian competitors at the same examination.

3.—Appointments shall not be made under Rule 2 in excess of the numbers guaranteed from time to time. The numbers guaranteed for the years 1885 and 1886 are shown in the margin.

	1885.	1886.
Madras ...	1	1
Bombay ...	1	1
Bengal ...	1	1
Thomason College	3	4
	<u>6</u>	<u>7</u>

4.—Appointments in the Subordinate Establishment shall be open, under the same rules as heretofore, to Non-Commissioned Officers and Soldiers of the British Army, and to Europeans and persons of mixed descent as well as to Natives.

ORDER.—Ordered, that this Resolution be communicated to the Local Governments and Administrations marginally noted, and the Director General of Railways; also that it be published in the *Gazette of India* and all local official Gazettes.

The Governments of Madras, Bombay, Bengal, the North Western Provinces and Oudh, and the Punjab, in the Public Works Department.
The Chief Commissioners of the Central Provinces, British Burma, Assam and Coorg.
The Agents, Governor General for Central India and Rajputana.

G. W. Walker

Offg. Under Secy. to the Govt. of India.

No 2414

To The Secretary to the Government of Madras
P. W. Department.

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
GENERAL.

To

Nos. 241—51 G.

Dated February 14, 1883

Received

3-5-92 ✓
1-6-99 ✓
1-11-11 ✓
GO 2214 Wa/27.8.79 ✓
" 194 W a/13.1.80 ✓
" 305 W a/3.2.81 ✓
" 739 W a/17.2.81 ✓
" 1106 W a/27.4.81 ✓
" 2529 W a/17.10.81 ✓
" 163 W a/20.1.82 ✓
Circ. 420 E a/15.7.82 ✓
GO 1626 W a/25.6.82 ✓
" 3351 W a/19.12.82 ✓

No. 655 Wa/28 Feb 1883

Ordered to be
Communicated to the
Educational Dept
and published in the
Calcutta Gazette.

Att 27/2

27.2.83

No. 655 Wa/28 Feb 1883

Edl Dept ✓
The Supt of the Gazette ✓
E. M. C. O. ✓
Recd: 28/2 Rt. 26/2
Sept 2/3/83-
Recd: 20/2 Rt. 22/2

Appointments to the Engineer and Upper Sub-
ordinate Establishments.

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