

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following papers :—

From H. B. GRIGG, Esq., M.A., Director of Public Instruction, to the Chief Secretary to Government (through the Accountant-General), dated Madras, 9th November 1885, No. 7321.

With reference to paragraph 1 of G.O., Educational, dated 4th October 1883, No. 670, and G.O., dated 16th July 1885, No. 443, I have the honor to submit the following proposals for the reorganization of the staff of the Civil Engineering College in view of the introduction of the new scheme of studies from the beginning of the ensuing year. The object of the reorganization is to enable the college to educate Mechanical Engineers; to improve the course of study in the several branches now taught, to extend the benefit of the instruction given in the college to those who seek employment under railway and other employers of labor, to afford special means of instruction for the maistry class, and, lastly, generally to adapt the college to taking a more important position than heretofore in promoting technical education in such other ways as may hereafter be found practicable.

2. The scale of establishment considered necessary by the committee appointed by Government in their Proceedings, dated 23rd September 1880, No. 361, Educational, to consider the question of reorganizing the college appears in the estimate given in their report printed in G.O., 26th April 1882, No. 61, Educational, page 8.

The establishment now proposed by the present Principal, Captain Love, R.E., will be found in paragraph 8 of his letter enclosed.

3. The present establishment is shown in the proposition statement herewith submitted. Including the Instructors in Photography and Bricklaying, but excluding the Instructor in Telugu and Tamil at Bangalore, who must be regarded as in temporary employ, the cost is Rs. 2,714 per mensem, or Rs. 32,568 per annum, excluding servants and contingencies.

The college is now instructing 164 students, and so soon as it has been provided with sufficient accommodation, this number will, no doubt, be greatly increased, as at present the number of applicants for admission largely exceeds the number which can be accommodated, or taught with the existing staff.

4. Before proceeding to remark on the scheme of establishment detailed below, for which sanction is requested, I beg, in view of showing that the scheme is moderate and economical, to draw the attention of Government to the scale of establishment provided for the corresponding institutions in Bengal and Bombay.

The establishment provided for the Engineering College at Howrah, in which about 150 students are being educated, is :—

	RS.	RS.
Principal	1,000	1,250
Professor	750	1,000
Professor	500	750
Professor	500	750
Teacher of Drawing	400	500
Assistant Lecturer	100	150
Assistant Teacher of Surveying	75	100
Lecturer in Physical Science	250	250
Teacher and Steward	250	400
Medical Officer	100	100
Total ..	3,925	5,250

The establishment provided for the College of Science at Poona, which contains about 150 students, is:—

	RS.	RS.
Principal	1,500	1,500
Professor of Chemistry and Geology	1,000	1,000
Professor of Mechanism and Applied Science	1,000	1,000
Lecturer in Botany and Agriculture	400	400
Head Master	250	350
First Master	200	250
Second Master	150	200
Third Master	100	150
First Assistant Master	75	100
Second Assistant Master	40	40
Mathematical Master	200	200
Lecturer on Veterinary Subjects	120	120
Superintendent of College Workshops	300	300
Total	5,335	5,610

The branches of instruction, however, at Poona are more numerous than they will be in the college here, whilst at Howrah there are workshops, but the staff noted above is apparently mainly employed in theoretical teaching.

5. The scheme of establishment, which I now submit for favorable consideration, is as follow:—

	Minimum pay.	Maximum pay.	Average pay.		
	RS.	RS.	RS.	A.	P.
Principal, graded officer, 2nd class	1,000	1,250	1,166	10	8
Professor of Engineering, graded officer, 3rd class. 750	1,000		916	10	8
Do. of Mathematics, do. 4th class. 500	750		666	10	8
Instructor in Engineering	200	300	262	8	0
Instructor in Surveying and Drawing	200	300	262	8	0
Assistant Instructor in Surveying and Drawing. 150	200		181	4	0
Do. do. in Drawing	100	150	131	4	0
Do. do. in Surveying	100	150	131	4	0
Second Assistant in Drawing	75	100	90	10	0
Do. in Surveying	75	100	90	10	0
Assistant in Vernacular	60	80	72	8	0
Do. in do.	60	80	72	8	0
Head Clerk	40	60	52	8	0
Assistant Clerk	40	60	52	8	0
Do.	20	40	32	8	0
Gymnastic Instructor	20	40	32	8	0
Librarian	20	40	32	8	0
Storekeeper	20	40	32	8	0
Bricklaying Instructor	20	40	32	8	0
Superintendent of Military Students	20	40	32	8	0
Total	3,470	4,820	4,345	0	0

or Rs. 52,140 per annum.

If to the above sum Rs. 3,344 be added on account of the average annual cost of scholarships provided in the notification, the total gross annual cost will be Rs. 55,484; as explained in paragraph 7, the net cost will probably not exceed Rs. 44,000 per annum (*i.e.*,) about Rs. 12,000 in excess of the present net cost, Rs. 32,000.

6. As regards the work to be performed by each member of the staff, I beg to refer to Captain Love's letter enclosed. I entirely concur with him as to the necessity for having two Professors—one for Engineering and one for Mathematics, and also as regards the staff of Assistants and clerical establishment to be provided; but I do not agree with him as to the financial position of the superior appointments, nor as to the scale of pay fixed for the other members of the establishment.

7. As regards the Professorial establishment, I would point out that, whilst at Howrah and at Poona the Principal and the Professors are members of the graded service of the Educational department, in Madras the Principal has hitherto always

been a Royal Engineer of the Department of Public Works. So far as the present Principal is concerned, I do not propose to disturb the existing arrangement, but I think that, when a vacancy occurs, temporary or permanent, if the two Professorships now proposed are created, it will be expedient in the ordinary course of things that one of these Professors be promoted to take his place, as unless the prospect of such promotion is held out to these officers over and above the ordinary promotion by way of pay, it will probably not be easy to tempt really good men at Home to accept the appointments. There are also other important administrative reasons why it is desirable that the entire superior staff should belong to the graded service of this department, now that the institution is no longer to be almost wholly a training institution for the Department of Public Works; and among these may be mentioned that it is the most economical, for so long only as the Principalship is held by an officer

	RS.
* Captain, R.E., pay and allowance	1,033
Average pay, second grade	1,166

	RS.
† Lieutenant, R.E., pay and allowance. 865	
Average pay, third grade	916

below the rank of Captain will the cost * of the appointment not exceed that of a second-grade officer, which for purposes of calculation in the highest grade that need be considered, whilst a Lieutenant in the Royal Engineers costs † very nearly as much as a third-grade officer, whilst his salary nearly equals the average cost (Rs. 866-10-8) of a graded officer in this department from the beginning to the end of his service according to the present strength of the classes. The only important reason for filling the post of Principal by an Engineer officer is that there are a few military students, but considering that these are selected and fairly well educated men, it is unreasonable to suppose that an experienced civilian would not be able to maintain proper discipline among them.

In view therefore of the contingency of the post of Principal being filled by a graded officer, I have provided for one second-grade appointment in the proposition statement, but it does not follow that the office should, for years to come, be filled by a second-grade officer, as the fact of one of the Professors being appointed Principal would not involve exceptional promotion, nor even the contingency of house allowance, as the Principal is at present provided with a good house, free of rent. And, similarly, although I have provided for one third-grade appointment, the appointment would not in the ordinary course be filled until the Senior Professor has served five years. However, for financial purposes, the three appointments must be regarded as filled at the same time, and on this assumption the average cost of each would be Rs. 916-10-8.

8. As regards the rest of scale of establishment, I have simply to remark that the scale generally corresponds with that fixed for similar appointments in other Government colleges, and it is mainly in order to bring the establishment into symmetry with those establishments in view of the possible grading of the subordinate educational service that I have adopted these figures instead of those recommended, as this position will be more favorable to the employes concerned and yet not more costly. In all cases the increments extend to ten years. Of these subordinate appointments, only two—the Instructorship in Engineering and the Instructorship in Surveying and Drawing—require the sanction of the Government of India. The present cost of each of these appointments is little below that proposed.

For the remaining portion of the establishment (*i.e.*,) for the salaries below Rs. 250, I request the sanction of Government, with effect from the 1st January next, when the college takes the first step towards bringing the new organization into working.

9. As explained in paragraph 7 of the Principal's letter, no special orders are at present needed in regard to the four members of the staff, whose services will not be required under the new organization. Mr. Kenny's services, however, will be required in the college until the new Professors, if sanctioned, enter on their duties, when he will revert to a post in one of the Arts colleges.

10. In conclusion, I would especially beg to draw the attention of Government to paragraph 11 of the Principal's letter and suggest that the Secretary of State be asked to make special inquiries regarding Mr. Harrison, Assistant Professor of Applied

Mechanics at the Normal School of Science, South Kensington, should that gentleman be willing to accept the Professorship of Mathematics. I would further suggest that Mr. W. C. Unwin, Professor of Hydraulic Engineering and Mechanics, Cooper's Hill, should be invited to aid in the selection of a gentleman for the Professorship of Engineering. The gentlemen selected should have an elementary knowledge of Physics, Chemistry, and Geology, as it is proposed to divide the teaching on these subjects between the two Professors, and thus avoid the expense of a separate teacher of Science.

ENCLOSURE.

From Captain H. D. LOVE, R.E., Principal, Civil Engineering College, to the Director of Public Instruction, dated Madras, 27th August 1885, No. 485-C.

With reference to your official memorandum, No. O-55, dated 12th August 1885, I have the honor to report as follows.

2. The permanent instructional staff consists at present of the undermentioned members:—

Designation.	Subject of instruction.	Salary.
		Rs.
1. Principal	Engineering	Military pay + Rs. 600, say 1,200
2. First Assistant Master ..	Mathematics	Rs. 400 rising to Rs. 500, say 466
3. Second do.	Engineering and Mathematics	215
4. Third do.	Surveying and Drawing	215
5. Fourth do.	Do. do.	160
6. Fifth do.	Drawing	100
7. Sixth do.	Surveying	100
8. Tamil Munshi	Tamil	50
9. Telugu do.	Telugu	50
Total		2,556

No. 1 is an officer of Royal Engineers.

- „ 2 an Ungraded officer of the Educational department (European).
- „ 3 a Warrant officer of the Public Works department (European).
- „ 4 a Warrant officer (retired) of the Public Works department (European).
- „ 5 a Sergeant-overseer (retired) of the Public Works department (European).
- „ 6 a Draftsman of the Public Works department (Eurasian).
- „ 7 an Overseer of the Public Works department (European).
- „ 8 a Munshi (Native).
- „ 9 a Graduate of the Madras University (Native).

In addition, there is a third vernacular munshi at Bangalore, teaching Tamil and Telugu to the military probationers. His salary, Rs. 60, is debited to the college, but he is not under the control of the Principal. There is also an Instructor in Photography, Rs. 20; and a Bricklaying Instructor, Rs. 30. These members do not form part of the daily teaching staff, and need not for the present be considered.

3. The strength of the staff depends on—

- (a) the number of classes,
- (b) the number of different subjects or courses,
- (c) the working hours in each subject.

Under present arrangements there are 2 Engineer classes, 2 Upper subordinate, 2 Draftsmen's, and 2 Surveyors' classes—in all 8 classes. Under the new scheme there will be 3 Engineer classes, 3 Upper subordinate, 2 Draftsmen's, 2 Surveyors', 1 Military probationer's, and 1 Artizan classes—or 12 classes in all. Many new subjects are to be introduced as Mechanical Engineering, Machine Drawing, Freehand Drawing, Steam, Chemistry, Physics, Geology, &c., while the working hours per class will be but little altered.

4. Consideration of these circumstances and perusal of the schedules, which accompanied my No. 453-C, dated 14th August 1885, will show that a substantial increase in the number and qualifications of the staff is indispensable. I consider that the following teaching establishment is the smallest which can deal efficiently with the work of the college:—

- | | |
|----------------------------------|-------------------------------------|
| I.—Principal. | VII.—Assistant in Drawing. |
| II.—Professor of Engineering. | VIII.—Do. in Surveying. |
| III.—Do. of Mathematics. | IX.—Second Assistant in Drawing. |
| IV.—Instructor in Engineering. | X.—Do. do. in Surveying. |
| V.—Do. in Surveying and Drawing. | XI.—Assistant in Vernacular-Telugu. |
| VI.—Assistant in do. do. | XII.—Do. in Vernacular-Tamil. |

In addition, a Science lecturer will be required once or twice a week, and an additional assistant may possibly be needed for the artizan class. The Photographic Master and Bricklaying Maistry may continue as at present.

5. As regards the *personnel* of the above staff, I remark that, if the college is to be successful under the new organization, the chief instructorships must be held by two or three men of high position and qualifications, the remaining appointments being filled by Europeans, Eurasians, and Natives taken principally from the upper subordinate ranks of the Public Works department. As regards cost, such salaries should be offered (to Public Works upper subordinates especially) as will secure the services of picked men. The subjects of instruction in a Civil Engineering College are too much specialised with reference to one another to permit of a master entering at the bottom of the staff and gradually working his way up towards the top. To provide for promotion, the system of progressive salaries must therefore be adopted; and the following details are proposed:—

I. Principal.—The Principal should be as hitherto an officer of Royal Engineers. His duties will consist in the administration of the college, the general supervision of all classes, the direct instruction of the engineer classes from 1½ to 2 hours per day, and the military discipline of the soldier-students. His instructional work now occupies 3 hours a day, leaving insufficient time for the chief duties of his position. These duties will be much increased by the reorganization scheme, and it is considered that the first period indicated above is the maximum that he can devote to class instruction.

Although the importance and responsibility of the Principal's duties will be considerably enhanced by the new scheme, it is considered that no alteration need be made for the present in his salary Rs. 600 + Military pay and allowances. It may be remarked, however, that this salary does not permit the Principal to attain at any time to a higher rate of pay than that drawn by an Executive Engineer, first grade, in the Public Works department. In order that he may not find himself at a disadvantage with his contemporaries in that department, it is suggested that the staff salary of his appointment might be raised to Rs. 700 after 20 years' service, and Rs. 800 after 25 years' service. The Principal, Thomason College, Rurki, draws a salary of Rs. 850, staff + Military pay and allowances + Rs. 100 table money.

II. Professor of Engineering.—The increased number of classes to be taught engineering, and the curtailment of the time devoted to direct teaching by the Principal, combine to render necessary the appointment of an English gentleman with the following qualifications. He should possess decided mathematical ability, must have undergone with credit a sound theoretical and practical training as a Civil and Mechanical Engineer, and should have spent some years engaged on engineering work. The salary recommended by the College Committee for this appointment was Rs. 750 to Rs. 1,000; but Rs. 600 rising to Rs. 900 or Rs. 1,000, by annual increments of Rs. 30, might be first tried. The duties of the Professor of Engineering will be the instruction of the Engineer classes and of the senior of the upper subordinate classes, in Civil and Mechanical Engineering.

As an alternative arrangement, the appointment of an officer of Royal Engineers of not less than five years' standing is suggested. He must have decided mathematical ability, and should be one of those officers who have undergone a course of mechanical training in Sir W. Armstrong's works at Elswick.

III. Professor of Mathematics.—This appointment requires for a Civil Engineering College special qualifications. Instruction in this subject must be given mainly with reference to its practical applications. Mixed mathematics should be taught experimentally with large sized "built up" apparatus, as well as analytically; graphic methods of solution, drawn to scale, should frequently be employed; in fact the Professor should have a practical mind and a neat hand as well as high mathematical ability. A knowledge of Practical Chemistry and Physics also would be advantageous. An English gentleman possessing these requisites might perhaps be attracted by a salary of Rs. 500 rising to Rs. 750, by annual increments of Rs. 15. The duties of the appointment would consist in the instruction of the Engineer classes and of one subordinate class in Mathematics.

IV. Instructor in Engineering.—This appointment should be held, as at present, by a warrant officer of the Public Works department. The salary, which even for present requirements is inadequate, must be such as to secure a picked man from the Sub-Engineer grade, and retain him for a term of years. For this purpose I consider that the pay of the Instructor in Engineering should be Rs. 250 rising to Rs. 350, by annual increments of Rs. 10.

His duties lie in the instruction of two (or three) of the upper subordinate classes in Engineering, and of two of them in Mathematics.

The present incumbent, Sub-Conductor W. Cames, is in every way fitted for the post. He passed out first of his term from the college in 1868, and has served as an instructor for the last fourteen years. He is one of my most experienced and trusted subordinates.

V. Instructor in Surveying and Drawing.—This instructor should also be a warrant officer of the Public Works department on a salary of Rs. 250 rising to Rs. 350, by annual increments of Rs. 10. His duties will consist in the control of the instruction of all classes in Surveying and

Drawing, and in the actual teaching of several of them. The present incumbent, Mr. (late Sub-Conductor) H. W. Hyde, can be thoroughly recommended for this appointment. He holds an Arts student's certificate, 2nd grade, from South Kensington, and will teach Descriptive Geometry, Freehand, Perspective, and Model Drawing, and the higher branches of Surveying. I can speak of Mr. Hyde's ability, experience, and trustworthiness in terms as high as those used respecting Sub-Conductor Cames.

The Assistants in Surveying and Drawing, Nos. VI, VII, VIII, IX, and X, will be under his general control. The number of these may be thought considerable; but it must be borne in mind that no less than ten different classes in the college will receive instruction in Drawing and eight in Surveying, and that the latter perform a great deal of out-door work. The classes will be lumped together as much as possible, but I am of opinion that six teachers in the various branches of these subjects will be essential.

VI. Assistant in Surveying and Drawing.—This post should be held by a Sergeant-supervisor of the Public Works department on a salary of Rs. 160 rising to Rs. 235, by increments of Rs. 7½ per annum. He should qualify himself to fill the post of Instructor in Surveying and Drawing when the latter falls vacant. This appointment may be filled by the present incumbent, Mr. (late Sergeant-overseer) J. Hamilton.

VII. Assistant in Drawing should be a superior Draftsman, preferably a European or Eurasian, who is well-versed in Architectural and Machine Drawing. Salary Rs. 100 rising to Rs. 130, by annual increments of Rs. 5. The present incumbent, Mr. F. Pope, may be appointed to this post.

VIII. Assistant in Surveying.—For this appointment a Sergeant-overseer of the Public Works department should be selected, or a civilian practised in Railway or Revenue Survey work. Salary Rs. 120 rising to Rs. 150, by annual increments of Rs. 5.

IX. Second Assistant in Drawing should be a Native Draftsman, holding School of Arts certificates in Freehand, Model, and Perspective Drawing. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3.

X. Second Assistant in Surveying should be a Native Surveyor, holding a 1st-class certificate, who has gained practical experience in the Revenue Survey or Public Works department. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3.

XI. Assistant in Vernacular-Telugu should be a Native Graduate distinguished for proficiency in that language. He will instruct the Engineer, Subordinate, and Probationer's classes, and may also be made available for teaching the last-mentioned class Mathematics. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3; or if Mathematics are taught, Rs. 60 rising to Rs. 90. The present incumbent, Mr. H. Narasinga Rao, B.A., is qualified for this post.

XII. Assistant in Vernacular-Tamil should possess similar qualifications, and should draw a corresponding salary. The present incumbent will shortly apply for pension; and if other provision can be made for the Bangalore Munshi, referred to in paragraph 2, the services of a graduate can be secured.

6. Incidental Establishment.—The Artizan class, which is to be an evening one, will be dealt with, if possible, by the Native Assistants above recommended.

A Science lecturer will be required about twice a week for the Engineer class. His duties can probably be undertaken by the two Senior Professors; an arrangement which would involve but slight redistribution of their ordinary work. If, however, this plan cannot be followed, a separate Lecturer in Science will be necessary. Both the time and space at the disposal of the Presidency College Science Professor are, I understand, fully occupied; but it might be practicable to engage a member of the medical service for the purpose. He should be acquainted with Chemistry, Physics, and Geology, which should be taught in a practical and experimental manner. The teaching in Chemistry should have special reference to Building materials and Metallurgy. The salary of the lectureship might perhaps be fixed at Rs. 100.

The Photographic mastership, Rs. 20, may be retained as long as it can be filled by one of the members of the regular staff. The remuneration is inadequate, and should be raised to Rs. 30.

The Bricklaying maistry will continue to be found useful. He teaches practical details of bricklaying, &c., accompanies students on inspection of works, executes small repairs, &c. Salary Rs. 30.

When a college workshop can be provided, a carpenter maistry will be required.

An Instructor in Gymnastics will be needed. His salary may be Rs. 30.

7. Members of the existing staff can advantageously be appointed to the posts numbered I, IV, V, VI, VII, and XI (paragraphs 5 and 8). The services of the following members cannot be utilized for the new requirements—Messrs. Kenny and Campbell, and the Munshis Rajagopal Mudaliar and Krishnamachari. Mr. M. Kenny, B.A., is a sound theoretical mathematician who has done justice to his classes during his stay in the college. As already explained, however, the institution will now require a practical man, versed in drawing and in habits of experiment, and possessing a knowledge of Practical Science. It would be unreasonable to expect such qualifications in Mr. Kenny, who has spent eighteen years in general education in non-technical

establishments. Mr. Kenny is not a member of the permanent staff, his substantive appointment being Head Master of Kurnool High school. Mr. Campbell continues on the strength of the Public Works department, and can revert, under G.O., Educational department, Mis. No. 350, dated 4th June 1883, to that department. Munshi Rajagopal Mudaliar is about to take his pension; but I am not in a position, without further inquiry, to make any recommendation regarding Munshi Krishnamachari, for the reason stated in paragraph 2.

8. The average cost of the permanent members of the new teaching staff, when the scheme has been for some years in operation, will be as follows:—

Number.	Designation.	Salary.	Mean salary.
			Rs.
I	Principal	Rs. 600 + Military pay and allowances, say ..	1,200
II	Professor of Engineering	Rs. 600 to 900 or 1,000 ..	800
III	Do. of Mathematics	" 500 to 750 ..	666
IV	Instructor in Engineering	" 250 to 350 ..	316
V	Do. in Surveying and Drawing	" 250 to 350 ..	316
VI	Assistant in do. do.	" 160 to 235 ..	210
VII	Do. in Drawing	" 100 to 130 ..	120
VIII	Do. in Surveying	" 120 to 150 ..	140
IX	Second Assistant in Drawing	" 50 to 75 ..	66
X	Do. in Surveying	" 50 to 75 ..	66
XI	Assistant in Vernacular, &c.	" 60 to 90 ..	80
XII	Do. do. &c.	" 60 to 90 ..	80

The total cost, when all these members have been appointed, will be, in the first instance, Rs. 3,230 in round numbers; and the average cost, after the lapse of some years, will be Rs. 4,100. To these figures must be added the small cost of the incidental establishment referred to in paragraph 6. The total amount will approximate to that of the estimate of the College Committee given on page 10 of their first report.

9. The revised salaries of Sub-Conductor Cames, Messrs. Hyde, Hamilton, Pope, and Narasinga Rao, who will occupy the appointments numbered IV, V, VI, VII, and XI, respectively, should take effect from 1st January 1886. Of the new members of the staff, Nos. III and VIII, should be appointed by January 1886, Nos. II, IX, and X by August 1886, and No. XII when the present incumbent vacates.

10. The following office establishment is proposed:—

Designation.	Salary.	
	Proposed.	Present.
	Rs.	Rs.
Superintendent of Military Students	20	..
Librarian	20	..
Storekeeper	20	30
Head Clerk and Accountant	50 to 75	40
Second Clerk	25	15
Third Clerk	15	..

The Superintendent of Military Students will have about 20 soldier-students to supervise in place of 10, and the correspondence with the Commissariat department, with Officers Commanding regiments, and with Army Head-quarters will consequently be much increased. His duties, moreover, frequently keep him in Madras during the college vacations. On these grounds, I consider that the remuneration proposed is called for.

The work of the Librarian has been trebled during the last few years owing to the increasing use made of the library. That of the Storekeeper has also increased, and will do so still further owing to the greater number of models, instruments, and apparatus to be issued and kept in order. An addition to their remuneration is therefore called for.

The clerical work of the college has much increased of late years, and it will be still further augmented by the introduction of the new scheme. I consider that an additional clerk is required, and that the salary of the Head Clerk and Accountant should rise from Rs. 50 to Rs. 75, by annual increments of Rs. 3.

The menial establishment should be increased by one peon on Rs. 8, and five punkah-pullers at Rs. 3-8-0 each. It is possible that two additional lascars for field work may eventually be applied for. The present cost of the menial establishment is Rs. 118 per mensem.

It is noted that the office and menial establishments at Rurki together cost Rs. 725 per mensem.

11. In conclusion, I strongly urge my conviction that the appointment of Professors of Engineering and Mathematics is indispensable for the proper training of the Engineers who are to be educated by this college. I have consulted with two experienced Civil Engineers who are interested in engineering education—Messrs. Hanna and Thorowgood—regarding this portion of my proposals, and find that they entirely agree in my views. I have also applied to the Imperial College of Engineering, Tokio, Japan, for information regarding the salaries paid to the Professors of Engineering and Mathematics, as it is well known that this institution has secured from time to time the services of exceptionally able men in these appointments. Further, I have discussed the subject with Mr. Bosworth Smith, the Government Mineralogist, who recently distinguished himself at the Royal School of Mines. He suggests that the Normal School of Science, South Kensington, might be able to meet the requirements described; and specially mentions the name of Mr. Harrison, Assistant Professor of Applied Mechanics at that school, whom he describes as an admirable instructor, a sound mathematician, an able experimentalist, a skilled machine draftsman, and a thoroughly practical man.

I consider that the salaries proposed for the two senior members of the subordinate staff (IV and V) are not susceptible of reduction. Together with the three senior members on the list, these instructors will form the backbone of the establishment; and if taken from what is undoubtedly the cheapest agency, the Public Works department, they must be offered salaries and promotion equivalent to those they might reasonably expect if they remained in that department.

12. An appendix is added showing the teaching staff now or lately employed at Rurki.

Rurki Establishment.

Principal, Rs. 850 + Military pay and allowances + Rs. 100 table money; as a Lieutenant-Colonel, say	Rs.	1,950
First Assistant Principal, Rs. 650 + Military allowance *	Rs.	790
Second do. do. Rs. 550 + Military allowance *	Rs.	620
Professor of Experimental Science, Rs. 750 + free house	Rs.	750
Head Master Rs. 250 to 400 mean	Rs.	350
First Assistant Master " 150 to 200 "	Rs.	183
Second do. do. " 120 to 150 "	Rs.	140
Third do. do. " 120 to 150 "	Rs.	140
Drawing Master " 250 to 400 "	Rs.	350
First Assistant Drawing Master " 150 to 200 "	Rs.	183
Second do. do. " 120 to 150 "	Rs.	140
Instructor of Photography " 85 to 135 "	Rs.	118
Staff Sergeant " 120 to 150 "	Rs.	140
Head Native Master " 100 to 200 "	Rs.	166
First Assistant Native Master " 80 to 120 "	Rs.	106
Second do. do. do. " 80 to 100 "	Rs.	93
Third do. do. do. " 60 to 90 "	Rs.	80
Fourth do. do. do. " 40 to 60 "	Rs.	53
Fifth do. do. do. " 40 to 60 "	Rs.	53
Sixth do. do. do. " 40 to 60 "	Rs.	53
Total ..	Rs.	6,468

* NOTE.—It is assumed that "Military allowance" means Military pay proper, which would be Rs. 140 for a Captain and Rs. 70 for a Lieutenant.

STATEMENT of Proposition for Revision of Establishment.

Order sanctioning present establishment. Govt. of	Department.	Office to which the proposition refers.		Nature of Change.				Proposed Scale.				Proposition.				Local Government's recommendation.	Orders of the Govt. of India.		
		No.	Designation.	Pay.		No.	Designation.	Pay.		Permanent.	Temporary.	Grounds of proposition.		Remarks.	De- part- ment.		Remarks.		
				Minimum.	Maximum.			Minimum.	Maximum.			Increase per month.	Decrease per month.					Period.	Amount.
				Rs. A. P.	Rs. A. P.			Rs. A. P.	Rs. A. P.										
		1	Principal staff pay ..	* 600 0 0	* 600 0 0	1	Principal ..	1,000 0 0	1,250 0 0										
		1	First Assistant Master ..	400 0 0	500 0 0	1	Professor of Engineering ..	750 0 0	1,000 0 0										
		1	Second do. ..	215 0 0	215 0 0	1	Do. of Mathematics ..	500 0 0	750 0 0										
		1	Third do. ..	215 0 0	215 0 0	1	Instructor in Engineering ..	200 0 0	300 0 0										
		1	Fourth do. ..	160 0 0	160 0 0	1	Do. in Surveying and Drawing ..	200 0 0	300 0 0										
		1	Fifth do. ..	100 0 0	100 0 0	1	Assistant Instructor in Surveying and Drawing ..	150 0 0	200 0 0										
		1	Sixth do. ..	100 0 0	100 0 0	1	Assistant Instructor in Drawing ..	100 0 0	150 0 0										
		1	Tamil Munshi ..	50 0 0	50 0 0	1	Assistant Instructor in Drawing ..	100 0 0	150 0 0										
		1	Telegu do. ..	50 0 0	50 0 0	1	ing.	100 0 0	150 0 0										
		1	Instructor in Brick-laying ..	44 0 0	44 0 0	1	Assistant Instructor in Surveying ..	100 0 0	150 0 0										
		1	Librarian ..	30 0 0	30 0 0	1	veying.	75 0 0	100 0 0										
		1	Head Clerk ..	40 0 0	40 0 0	1	Second Assistant in Drawing ..	75 0 0	100 0 0										
		1	Assistant Clerk ..	15 0 0	15 0 0	1	Do. do. in Surveying ..	75 0 0	100 0 0										
		1	Instructor in Photography ..	20 0 0	20 0 0	1	ing.	60 0 0	80 0 0										
		16	Servants ..	117 11 10	117 11 10	1	Assistant in Vernacular ..	60 0 0	80 0 0										
						1	Do.	60 0 0	80 0 0										
						1	Head Clerk ..	40 0 0	60 0 0										
						1	First Assistant Clerk ..	40 0 0	60 0 0										
						1	Second do.	20 0 0	40 0 0										
						1	Gymnastic Instructor ..	20 0 0	40 0 0										
						1	Librarian ..	20 0 0	40 0 0										
						1	Storekeeper ..	20 0 0	40 0 0										
						1	Instructor in Bricklaying ..	20 0 0	40 0 0										
						1	Superintendent of Military Students.	20 0 0	40 0 0										
						16	Servants ..	117 11 10	117 11 10										
			Total ..	2,156 11 10	2,256 11 10		Total ..	3,587 11 10	4,937 11 10										
														It is proposed to reorganize the staff of the College of Engineering in view of the introduction of the new scheme of studies sanctioned by Government.					

* In addition to military pay and allowances.

From H. F. CLOGSTOUN, Esq., Accountant-General, to the Chief Secretary to Government, dated Fort St. George, 24th November 1885, No. 2909. Gazetted Audit department.

In forwarding herewith letter from the Director of Public Instruction, No 7321, dated the 9th November 1885, submitting proposals for the reorganization of the staff of the Civil Engineering College, Madras, with the proposition statement received there-with, I have the honor to state that the entries in the column of "present scale" have been compared with the registers of this office and are correct with the exception of the item altered in red ink, as the pay Rs. 600, sanctioned for the appointment of the Principal, is a staff pay exclusive of military pay and allowances—*vide* Madras G.O., No. 181, dated 14th June 1875. The appointment has been held by an officer of the Royal Engineers, and the present Principal, Captain Love, draws, in addition to the staff pay of the appointment, the pay of his rank Rs. 433-10-0 per month.

2. I beg also to add that, under section 15, Pay and Acting Allowance Code, and clauses 3 and 4, of rule 5 (1), chapter 33, of the Civil Account Code, the previous sanction of the Secretary of State is necessary to the addition of three appointments to the graded service of the Educational Department of this presidency, as also to the creation of two Instructorships in Engineering and Surveying and Drawing and to the abolition of the appointments of Principal and First Assistant Master proposed by the Director of Public Instruction.

ORDER—dated 27th May 1886, No. 328, Educational.

In the foregoing letter, the Director of Public Instruction submits proposals for the reorganization of the staff of the Madras College of Engineering, with a view to such an extension of the scope of the college as will enable it to undertake the education of Mechanical Engineers, to provide instruction suitable for those who seek employment on railways and for persons of the maistry class, and generally to promote technical education.

2. The scheme of establishment contained in paragraph 5 of Mr. Grigg's letter involves a gross annual expenditure, including scholarships, of Rs. 55,484 per annum, as compared with the present cost, which is stated to be Rs. 32,568. The Director goes on to state that the net cost is not likely for the present to exceed Rs. 44,000. This figure is not explained, but it would appear to be obtained by taking all the rates of pay at their minima. The salaries proposed by the Director differ in several cases from those which the Principal of the College recommends in his letter forming an enclosure to the paper above read, but Mr. Grigg's proposals are almost identical with those of the committee appointed to consider the scheme for remodelling the college, contained in their report recorded in Proceedings of Government, 20th April 1882, No. 61, Educational, and, for reasons to be noticed below, the Government adopt the scale proposed by the Director.

3. Captain Love considers that the Principal should always be an officer of the Royal Engineers, on the ground, among others, that he will have to maintain the military discipline of the soldier-students. Mr. Grigg on the other hand proposes that the Principal and both Professors should be members of the graded educational service, as they are in the case of the colleges at Howrah and Poona. His Excellency the Governor in Council is unable to accept either view in its entirety. While agreeing with the Director that there is no reason to suppose an experienced civilian incapable of maintaining the necessary discipline among all classes of students, and that it is not expedient to declare that the Principal shall be invariably a Royal Engineer, it is, in His Excellency's opinion, desirable that the post shall always be filled by an engineer, civil or military. This being so, the proposal of the Director, that the Principal and Professors should be members of the graded service, is impracticable. The gentlemen will of necessity be specialists, not interchangeable, as pointed out by the committee in paragraph 43 of their report above referred to, with the

members of the staff of other educational institutions. In a similar case, viz., that of the Agricultural College, the Secretary of State decided that the Principal should not be admitted to the graded service, and there are equally strong reasons against the admission of the officers of the Engineering College.

4. His Excellency in Council considers the rates of salary suggested by Mr. Grigg preferable to those proposed by Captain Love. He is further pleased to declare that the Principal shall always be an engineer, civil or military, and that the pay of the Professors shall be regulated by seniority and not by the chairs they fill.

5. With the foregoing modifications the Government approve the proposed scheme of reorganization. The necessity of a measure of this kind has long been admitted, and the Secretary of State will now be addressed. Pending the receipt of his orders, however, no changes will be made in the salaries of any of the officers composing the present establishment, and the carrying out of the scheme, if sanctioned, will depend on the position of the Provincial finances and on the completion of the proposed increase of accommodation.

(True Extract.)

E. F. WEBSTER.
Chief Secretary.

To the Director of Public Instruction.
" Public Works Department.
" Accountant-General.

Exd. T. O'Connor.

Gobt. of {1886} Madras.
EDUCATIONAL.

B. No. 1597 W.d/23 June 1886

Recorded

Plg^d/Jd^d

Issued

Recd.

Encl.

G.O., 27th May 1886, No. 328.

B. No. 1597 W.d/23 June 1886

MAY.

Madras College of Engineering.

Approving, with remarks, of certain proposals
for the reorganization of the staff of the —

With orders

C. A. W.

In this draft G.O. on the
reorganisation of the College
of Engineering I do not see
anything to which I am disposed
to take exception, — but
I shall be glad if you will
compare the approved
proposals with the recom-
mendations of the Committee,
& note any points which seem
to require notice.

D.W. should see the papers
before they come back to me.

Ill
3-2-86

note

The scale of estab.
proposed by Mr. Gress
for the C. of Engineering,
in para 5 of his letter
No 7321 of 9-11-85 is
compared below with
the scale recommended
by the Committee in
1881 (G.O. of 26-4-82 No 6188)

Mr. Gress's present proposals

	Salary —	average
Principal —	1000-1250 —	1166-10-8
Professor Engineering —	750-1000 —	916-10-8
Professor Mathematics —	500-750 —	666-10-8
Instructor in Engineering —	200-300 —	262-8--
do — in S. & B. —	200-300 —	262-8--
Asst in do —	150-200 —	181-4--
Asst in Drawing —	100-150 —	131-4--
Ant. in Surveying —	100-150 —	131-4--
2 nd Ant. in Drawing —	75-100 —	90-10-
2 nd Ant. in Surveying —	75-100 —	90-10-
Ant. in Vernacular —	60-90 —	72-8-
— do — do —	60-80 —	72-8-
Head clerk —	40-60 —	52-8-
Ant — do —	40-60 —	52-8-
— do —	20-40 —	32-8-
Asst. in Gymnastics —	20-40 —	32-8-
Librarian —	20-40 —	32-8-
Store Keeper —	20-40 —	32-8-
Principal's Instructor —	20-40 —	32-8-
Supt. of the Students —	20-40 —	32-8-

Except with respect to small differences in the pay of the lower salaries, the Director's proposals are the same as those of the Committee so far as regard salaries.

The Committee pointed out that the instruction being chiefly of a technical nature, the members of the staff would not as a rule be interchangeable with those of other educational institutions -

The Director of P. I. now proposes that the Principal & two Professors should be graded officers of the Edu. Dept., but the draft order of Govt is in accordance

with the views of the Committee -

There appears to be nothing in the draft order to which objection can be taken, after reading the Committee's recommendations.

Cu
4.2.86

Li
4/2/86

I have initialled the draft

lll
5.2.86

Committee's proposals

	Salary - annual
Principal - 600 + 1250	1250 -
Prof. Mathematics	500 - 750 - 666.
Prof. Engineering	750 - 1000 - 910.
Instructor in Eng. - 200 - 300	275.
" in Surveying - 200 - 300	275.
Asst. in do - 150 - 200	183.
Instructor in Drawing - 250 - 350	310.
Asst. in do - 150 - 200	183.
Native Asst. in S. & D. - 60 - 80	75.
Tamil Munshi - 50 - 60	57.
Udhar - do - 50 - 60	57.
Native Instructor for primary class - 80 - 100	95.
Instr. in Drill & Gymnastics - 30 - 40	30.
Supt. Mil. Students - 20 - 20	20.
Literary - 20 - 20	20.
Class & Quater - 50 - 70	65.
do - 120 - 120	120.

GOVERNMENT OF MADRAS.
EDUCATIONAL DEPARTMENT.

READ—the following papers :—

From H. B. GRIGG, Esq., M.A., Director of Public Instruction, to the Chief Secretary to Government (through the Accountant-General), dated Madras, 9th November 1885, No. 7321.

With reference to paragraph 1 of G.O., Educational, dated 4th October 1883, No. 670, and G.O., dated 16th July 1885, No. 443, I have the honor to submit the following proposals for the reorganization of the staff of the Civil Engineering College in view of the introduction of the new scheme of studies from the beginning of the ensuing year. The object of the reorganization is to enable the college to educate Mechanical Engineers, to improve the course of study in the several branches now taught, to extend the benefit of the instruction given in the college to those who seek employment under railway and other employers of labor, to afford special means of instruction for the maistry class, and, lastly, generally to adapt the college to taking a more important position than heretofore in promoting technical education in such other ways as may hereafter be found practicable.

2. The scale of establishment considered necessary by the committee appointed by Government in their Proceedings, dated 23rd September 1880, No. 361, Educational, to consider the question of reorganizing the college appears in the estimate given in their report printed in G.O., 26th April 1882, No. 61, Educational, page 8.

The establishment now proposed by the present Principal, Captain Love, R.E., will be found in paragraph 8 of his letter enclosed.

3. The present establishment is shown in the proposition statement herewith submitted. Including the Instructors in Photography and Bricklaying, but excluding the Instructor in Telugu and Tamil at Bangalore, who must be regarded as in temporary employ, the cost is Rs. 2,714 per mensem, or Rs. 32,568 per annum, excluding servants and contingencies.

The college is now instructing 164 students, and so soon as it has been provided with sufficient accommodation, this number will, no doubt, be greatly increased, as at present the number of applicants for admission largely exceeds the number which can be accommodated, or taught with the existing staff.

4. Before proceeding to remark on the scheme of establishment detailed below, for which sanction is requested, I beg, in view of showing that the scheme is moderate and economical, to draw the attention of Government to the scale of establishment provided for the corresponding institutions in Bengal and Bombay.

The establishment provided for the Engineering College at Howrah, in which about 150 students are being educated, is :—

	RS.	RS.
Principal	1,000	1,250
Professor	750	1,000
Professor	500	750
Teacher of Drawing	500	750
Assistant Lecturer	400	500
Assistant Teacher of Surveying	100	150
Lecturer in Physical Science	75	100
Teacher and Steward	250	250
Medical Officer	250	400
	100	100
Total ..	3,925	5,250

*7000 students
b.c.w. 4552/80*

*Wm
u*

The establishment provided for the College of Science at Poona, which contains about 150 students, is:—

	RS.	RS.
Principal	1,500	1,500
Professor of Chemistry and Geology	1,000	1,000
Professor of Mechanism and Applied Science	1,000	1,000
Lecturer in Botany and Agriculture	400	400
Head Master	250	350
First Master	200	250
Second Master	150	200
Third Master	100	150
First Assistant Master	75	100
Second Assistant Master	40	40
Mathematical Master	200	200
Lecturer on Veterinary Subjects	120	120
Superintendent of College Workshops	300	300
Total	5,335	5,610

The branches of instruction, however, at Poona are more numerous than they will be in the college here, whilst at Howrah there are workshops, but the staff noted above is apparently mainly employed in theoretical teaching.

5. The scheme of establishment, which I now submit for favorable consideration, is as follow:—

	Minimum pay.	Maximum pay.	Average pay.	RS.	A.	P.
Principal, graded officer, 2nd class	1,000	1,250	1,166	10	8	
Professor of Engineering, graded officer, 3rd class	750	1,000	916	10	8	
Do. of Mathematics, do. 4th class	500	750	666	10	8	
Instructor in Engineering	200	300	262	8	0	
Instructor in Surveying and Drawing	200	300	262	8	0	
Assistant Instructor in Surveying and Drawing	150	200	181	4	0	
Do. do. in Drawing	100	150	131	4	0	
Do. do. in Surveying	100	150	131	4	0	
Second Assistant in Drawing	75	100	90	10	0	
Do. in Surveying	75	100	90	10	0	
Assistant in Vernacular	60	80	72	8	0	
Do. in do.	60	80	72	8	0	
Head Clerk	40	60	52	8	0	
Assistant Clerk	40	60	52	8	0	
Do.	20	40	32	8	0	
Gymnastic Instructor	20	40	32	8	0	
Librarian	20	40	32	8	0	
Storekeeper	20	40	32	8	0	
Bricklaying Instructor	20	40	32	8	0	
Superintendent of Military Students	20	40	32	8	0	
Total	3,470	4,820	4,345	0	0	

or Rs. 52,140 per annum.

If to the above sum Rs. 3,344 be added on account of the average annual cost of scholarships provided in the notification, the total gross annual cost will be Rs. 55,484; as explained in paragraph 7, the net cost will probably not exceed Rs. 44,000 per annum (*i.e.*) about Rs. 12,000 in excess of the present net cost, Rs. 32,000.

6. As regards the work to be performed by each member of the staff, I beg to refer to Captain Love's letter enclosed. I entirely concur with him as to the necessity for having two Professors—one for Engineering and one for Mathematics, and also as regards the staff of Assistants and clerical establishment to be provided; but I do not agree with him as to the financial position of the superior appointments, nor as to the scale of pay fixed for the other members of the establishment.

7. As regards the Professorial establishment, I would point out that, whilst at Howrah and at Poona the Principal and the Professors are members of the graded service of the Educational department, in Madras the Principal has hitherto always

been a Royal Engineer of the Department of Public Works. So far as the present Principal is concerned, I do not propose to disturb the existing arrangement, but I think that, when a vacancy occurs, temporary or permanent, if the two Professorships now proposed are created, it will be expedient in the ordinary course of things that one of these Professors be promoted to take his place, as unless the prospect of such promotion is held out to these officers over and above the ordinary promotion by way of pay, it will probably not be easy to tempt really good men at Home to accept the appointments. There are also other important administrative reasons why it is desirable that the entire superior staff should belong to the graded service of this department, now that the institution is no longer to be almost wholly a training institution for the Department of Public Works; and among these may be mentioned that it is the most economical, for so long only as the Principalship is held by an officer below the rank of Captain will the cost * of the appointment not exceed that of a second-grade officer, which for purposes of calculation in the highest grade that need be considered, whilst a Lieutenant in the Royal Engineers costs † very nearly as much as a third-grade officer, whilst his salary nearly equals the average cost

* Captain, R.E., pay and allowance ..	1,033
Average pay, second grade	1,166

† Lieutenant, R.E., pay and allowance ..	865
Average pay, third grade	916

(Rs. 866-10-8) of a graded officer in this department from the beginning to the end of his service according to the present strength of the classes. The only important reason for filling the post of Principal by an Engineer officer is that there are a few military students, but considering that these are selected and fairly well educated men, it is unreasonable to suppose that an experienced civilian would not be able to maintain proper discipline among them.

In view therefore of the contingency of the post of Principal being filled by a graded officer, I have provided for one second-grade appointment in the proposition statement, but it does not follow that the office should, for years to come, be filled by a second-grade officer, as the fact of one of the Professors being appointed Principal would not involve exceptional promotion, nor even the contingency of house allowance, as the Principal is at present provided with a good house, free of rent. And, similarly, although I have provided for one third-grade appointment, the appointment would not in the ordinary course be filled until the Senior Professor has served five years. However, for financial purposes, the three appointments must be regarded as filled at the same time, and on this assumption the average cost of each would be Rs. 916-10-8.

8. As regards the rest of scale of establishment, I have simply to remark that the scale generally corresponds with that fixed for similar appointments in other Government colleges, and it is mainly in order to bring the establishment into symmetry with those establishments in view of the possible grading of the subordinate educational service that I have adopted these figures instead of those recommended, as this position will be more favorable to the employes concerned and yet not more costly. In all cases the increments extend to ten years. Of these subordinate appointments, only two—the Instructorship in Engineering and the Instructorship in Surveying and Drawing—require the sanction of the Government of India. The present cost of each of these appointments is little below that proposed.

For the remaining portion of the establishment (*i.e.*) for the salaries below Rs. 250, I request the sanction of Government, with effect from the 1st January next, when the college takes the first step towards bringing the new organization into working.

9. As explained in paragraph 7 of the Principal's letter, no special orders are at present needed in regard to the four members of the staff, whose services will not be required under the new organization. Mr. Kenny's services, however, will be required in the college until the new Professors, if sanctioned, enter on their duties, when he will revert to a post in one of the Arts colleges.

10. In conclusion, I would especially beg to draw the attention of Government to paragraph 11 of the Principal's letter and suggest that the Secretary of State be asked to make special inquiries regarding Mr. Harrison, Assistant Professor of Applied

Mechanics at the Normal School of Science, South Kensington, should that gentleman be willing to accept the Professorship of Mathematics. I would further suggest that Mr. W. C. Unwin, Professor of Hydraulic Engineering and Mechanics, Cooper's Hill, should be invited to aid in the selection of a gentleman for the Professorship of Engineering. The gentlemen selected should have an elementary knowledge of Physics, Chemistry, and Geology, as it is proposed to divide the teaching on these subjects between the two Professors, and thus avoid the expense of a separate teacher of Science.

ENCLOSURE.

From Captain H. D. LOVE, R.E., Principal, Civil Engineering College, to the Director of Public Instruction, dated Madras, 27th August 1885, No. 485-C.

With reference to your official memorandum, No. O.-55, dated 12th August 1885, I have the honor to report as follows.

2. The permanent instructional staff consists at present of the undermentioned members:—

Designation.	Subject of instruction.	Salary.
		RS.
1. Principal	Engineering	Military pay + Rs. 600, say 1,200
2. First Assistant Master ..	Mathematics	Rs. 400 rising to Rs. 500, say 466
3. Second do.	Engineering and Mathematics	215
4. Third do.	Surveying and Drawing	215
5. Fourth do.	Do. do.	160
6. Fifth do.	Drawing	100
7. Sixth do.	Surveying	100
8. Tamil Munshi	Tamil	50
9. Telugu do.	Telugu	50
Total		2,556

No. 1 is an officer of Royal Engineers.

- " 2 an Ungraded officer of the Educational department (European).
- " 3 a Warrant officer of the Public Works department (European).
- " 4 a Warrant officer (retired) of the Public Works department (European).
- " 5 a Sergeant-overseer (retired) of the Public Works department (European).
- " 6 a Draftsman of the Public Works department (Eurasian).
- " 7 an Overseer of the Public Works department (European).
- " 8 a Munshi (Native).
- " 9 a Graduate of the Madras University (Native).

In addition, there is a third vernacular munshi at Bangalore, teaching Tamil and Telugu to the military probationers. His salary, Rs. 60, is debited to the college, but he is not under the control of the Principal. There is also an Instructor in Photography, Rs. 20; and a Bricklaying Instructor, Rs. 30. These members do not form part of the daily teaching staff, and need not for the present be considered.

3. The strength of the staff depends on—

- (a) the number of classes,
- (b) the number of different subjects or courses,
- (c) the working hours in each subject.

Under present arrangements there are 2 Engineer classes, 2 Upper subordinate, 2 Draftsmen's, and 2 Surveyors' classes—in all 8 classes. Under the new scheme there will be 3 Engineer classes, 3 Upper subordinate, 2 Draftsmen's, 2 Surveyors', 1 Military probationer's, and 1 Artizan classes—or 12 classes in all. Many new subjects are to be introduced as Mechanical Engineering, Machine Drawing, Freehand Drawing, Steam, Chemistry, Physics, Geology, &c., while the working hours *per class* will be but little altered.

4. Consideration of these circumstances and perusal of the schedules, which accompanied my No. 453-C, dated 14th August 1885, will show that a substantial increase in the number and qualifications of the staff is indispensable. I consider that the following teaching establishment is the smallest which can deal efficiently with the work of the college:—

I.—Principal.

II.—Professor of Engineering.

III.—Do. of Mathematics.

IV.—Instructor in Engineering.

V.—Do. in Surveying and Drawing.

VI.—Assistant in do. do.

VII.—Assistant in Drawing.

VIII.—Do. in Surveying.

IX.—Second Assistant in Drawing.

X.—Do. do. in Surveying.

XI.—Assistant in Vernacular-Telugu.

XII.—Do. in Vernacular-Tamil.

In addition, a Science lecturer will be required once or twice a week, and an additional assistant may possibly be needed for the artizan class. The Photographic Master and Bricklaying Maistry may continue as at present.

5. As regards the *personnel* of the above staff, I remark that, if the college is to be successful under the new organization, the chief instructorships must be held by two or three men of high position and qualifications, the remaining appointments being filled by Europeans, Eurasians, and Natives taken principally from the upper subordinate ranks of the Public Works department. As regards cost, such salaries should be offered (to Public Works upper subordinates especially) as will secure the services of picked men. The subjects of instruction in a Civil Engineering College are too much specialised with reference to one another to permit of a master entering at the bottom of the staff and gradually working his way up towards the top. To provide for promotion, the system of progressive salaries must therefore be adopted; and the following details are proposed:—

I. *Principal*.—The Principal should be as hitherto an officer of Royal Engineers. His duties will consist in the administration of the college, the general supervision of all classes, the direct instruction of the engineer classes from 1½ to 2 hours per day, and the military discipline of the soldier-students. His instructional work now occupies 3 hours a day, leaving insufficient time for the chief duties of his position. These duties will be much increased by the reorganization scheme, and it is considered that the first period indicated above is the maximum that he can devote to class instruction.

Although the importance and responsibility of the Principal's duties will be considerably enhanced by the new scheme, it is considered that no alteration need be made for the present in his salary Rs. 600 + Military pay and allowances. It may be remarked, however, that this salary does not permit the Principal to attain at any time to a higher rate of pay than that drawn by an Executive Engineer, first grade, in the Public Works department. In order that he may not find himself at a disadvantage with his contemporaries in that department, it is suggested that the staff salary of his appointment might be raised to Rs. 700 after 20 years' service, and Rs. 800 after 25 years' service. The Principal, Thomason College, Rurki, draws a salary of Rs. 850, staff + Military pay and allowances + Rs. 100 table money.

II. *Professor of Engineering*.—The increased number of classes to be taught engineering, and the curtailment of the time devoted to direct teaching by the Principal, combine to render necessary the appointment of an English gentleman with the following qualifications. He should possess decided mathematical ability, must have undergone with credit a sound theoretical and practical training as a Civil and Mechanical Engineer, and should have spent some years engaged on engineering work. The salary recommended by the College Committee for this appointment was Rs. 750 to Rs. 1,000; but Rs. 600 rising to Rs. 900 or Rs. 1,000, by annual increments of Rs. 30, might be first tried. The duties of the Professor of Engineering will be the instruction of the Engineer classes and of the senior of the upper subordinate classes, in Civil and Mechanical Engineering.

As an alternative arrangement, the appointment of an officer of Royal Engineers of not less than five years' standing is suggested. He must have decided mathematical ability, and should be one of those officers who have undergone a course of mechanical training in Sir W. Armstrong's works at Elswick.

III. *Professor of Mathematics*.—This appointment requires for a Civil Engineering College special qualifications. Instruction in this subject must be given mainly with reference to its practical applications. Mixed mathematics should be taught experimentally with large sized "built up" apparatus, as well as analytically; graphic methods of solution, drawn to scale, should frequently be employed; in fact the Professor should have a practical mind and a neat hand as well as high mathematical ability. A knowledge of Practical Chemistry and Physics also would be advantageous. An English gentleman possessing these requisites might perhaps be attracted by a salary of Rs. 500 rising to Rs. 750, by annual increments of Rs. 15. The duties of the appointment would consist in the instruction of the Engineer classes and of one subordinate class in Mathematics.

IV. *Instructor in Engineering*.—This appointment should be held, as at present, by a warrant officer of the Public Works department. The salary, which even for present requirements is inadequate, must be such as to secure a picked man from the Sub-Engineer grade, and retain him for a term of years. For this purpose I consider that the pay of the Instructor in Engineering should be Rs. 250 rising to Rs. 350, by annual increments of Rs. 10.

His duties lie in the instruction of two (or three) of the upper subordinate classes in Engineering, and of two of them in Mathematics.

The present incumbent, Sub-Conductor W. Cames, is in every way fitted for the post. He passed out first of his term from the college in 1868, and has served as an instructor for the last fourteen years. He is one of my most experienced and trusted subordinates.

V. *Instructor in Surveying and Drawing*.—This instructor should also be a warrant officer of the Public Works department on a salary of Rs. 250 rising to Rs. 350, by annual increments of Rs. 10. His duties will consist in the control of the instruction of all classes in Surveying and

Drawing, and in the actual teaching of several of them. The present incumbent, Mr. (late Sub-Conductor) H. W. Hyde, can be thoroughly recommended for this appointment. He holds an Arts student's certificate, 2nd grade, from South Kensington, and will teach Descriptive Geometry, Freehand, Perspective, and Model Drawing, and the higher branches of Surveying. I can speak of Mr. Hyde's ability, experience, and trustworthiness in terms as high as those used respecting Sub-Conductor Cames.

The Assistants in Surveying and Drawing, Nos. VI, VII, VIII, IX, and X, will be under his general control. The number of these may be thought considerable; but it must be borne in mind that no less than ten different classes in the college will receive instruction in Drawing and eight in Surveying, and that the latter perform a great deal of out-door work. The classes will be lumped together as much as possible, but I am of opinion that six teachers in the various branches of these subjects will be essential.

VI. Assistant in Surveying and Drawing.—This post should be held by a Sergeant-supervisor of the Public Works department on a salary of Rs. 160 rising to Rs. 235, by increments of Rs. 7½ per annum. He should qualify himself to fill the post of Instructor in Surveying and Drawing when the latter falls vacant. This appointment may be filled by the present incumbent, Mr. (late Sergeant-overseer) J. Hamilton.

VII. Assistant in Drawing should be a superior Draftsman, preferably a European or Eurasian, who is well-versed in Architectural and Machine Drawing. Salary Rs. 100 rising to Rs. 130, by annual increments of Rs. 5. The present incumbent, Mr. F. Pope, may be appointed to this post.

VIII. Assistant in Surveying.—For this appointment a Sergeant-overseer of the Public Works department should be selected, or a civilian practised in Railway or Revenue Survey work. Salary Rs. 120 rising to Rs. 150, by annual increments of Rs. 5.

IX. Second Assistant in Drawing should be a Native Draftsman, holding School of Arts certificates in Freehand, Model, and Perspective Drawing. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3.

X. Second Assistant in Surveying should be a Native Surveyor, holding a 1st-class certificate, who has gained practical experience in the Revenue Survey or Public Works department. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3.

XI. Assistant in Vernacular-Telugu should be a Native Graduate distinguished for proficiency in that language. He will instruct the Engineer, Subordinate, and Probationer's classes, and may also be made available for teaching the last-mentioned class Mathematics. Salary Rs. 50 rising to Rs. 75, by annual increments of Rs. 3; or if Mathematics are taught, Rs. 60 rising to Rs. 90. The present incumbent, Mr. H. Narasinga Rao, B.A., is qualified for this post.

XII. Assistant in Vernacular-Tamil should possess similar qualifications, and should draw a corresponding salary. The present incumbent will shortly apply for pension; and if other provision can be made for the Bangalore Munshi, referred to in paragraph 2, the services of a graduate can be secured.

6. Incidental Establishment.—The Artizan class, which is to be an evening one, will be dealt with, if possible, by the Native Assistants above recommended.

A Science lecturer will be required about twice a week for the Engineer class. His duties can probably be undertaken by the two Senior Professors; an arrangement which would involve but slight redistribution of their ordinary work. If, however, this plan cannot be followed, a separate Lecturer in Science will be necessary. Both the time and space at the disposal of the Presidency College Science Professor are, I understand, fully occupied; but it might be practicable to engage a member of the medical service for the purpose. He should be acquainted with Chemistry, Physics, and Geology, which should be taught in a practical and experimental manner. The teaching in Chemistry should have special reference to Building materials and Metallurgy. The salary of the lectureship might perhaps be fixed at Rs. 100.

The Photographic mastership, Rs. 20, may be retained as long as it can be filled by one of the members of the regular staff. The remuneration is inadequate, and should be raised to Rs. 30.

The Bricklaying maistry will continue to be found useful. He teaches practical details of bricklaying, &c., accompanies students on inspection of works, executes small repairs, &c. Salary Rs. 30.

When a college workshop can be provided, a carpenter maistry will be required.

An Instructor in Gymnastics will be needed. His salary may be Rs. 30.

7. Members of the existing staff can advantageously be appointed to the posts numbered I, IV, V, VI, VII, and XI (paragraphs 5 and 8). The services of the following members cannot be utilized for the new requirements—Messrs. Kenny and Campbell, and the Munshis Rajagopal Mudaliar and Krishnamachari. Mr. M. Kenny, B.A., is a sound theoretical mathematician who has done justice to his classes during his stay in the college. As already explained, however, the institution will now require a practical man, versed in drawing and in habits of experiment, and possessing a knowledge of Practical Science. It would be unreasonable to expect such qualifications in Mr. Kenny, who has spent eighteen years in general education in non-technical

establishments. Mr. Kenny is not a member of the permanent staff, his substantive appointment being Head Master of Kurnool High school. Mr. Campbell continues on the strength of the Public Works department, and can revert, under G.O., Educational department, Mis. No. 350, dated 4th June 1883, to that department. Munshi Rajagopal Mudaliar is about to take his pension; but I am not in a position, without further inquiry, to make any recommendation regarding Munshi Krishnamachari, for the reason stated in paragraph 2.

8. The average cost of the permanent members of the new teaching staff, when the scheme has been for some years in operation, will be as follows:—

Number.	Designation.	Salary.	Mean salary.
I	Principal	Rs. 600 + Military pay and allowances, say ..	Rs. 1,200
II	Professor of Engineering	Rs. 600 to 900 or 1,000 ..	800
III	Do. of Mathematics	„ 500 to 750 ..	666
IV	Instructor in Engineering	„ 250 to 350 ..	316
V	Do. in Surveying and Drawing	„ 250 to 350 ..	316
VI	Assistant in do. do.	„ 160 to 235 ..	210
VII	Do. in Drawing	„ 100 to 130 ..	120
VIII	Do. in Surveying	„ 120 to 150 ..	140
IX	Second Assistant in Drawing	„ 50 to 75 ..	66
X	Do. in Surveying	„ 50 to 75 ..	66
XI	Assistant in Vernacular, &c.	„ 60 to 90 ..	80
XII	Do. do. &c.	„ 60 to 90 ..	80

The total cost, when all these members have been appointed, will be, in the first instance, Rs. 3,230 in round numbers; and the average cost, after the lapse of some years, will be Rs. 4,100. To these figures must be added the small cost of the incidental establishment referred to in paragraph 6. The total amount will approximate to that of the estimate of the College Committee given on page 10 of their first report.

9. The revised salaries of Sub-Conductor Cames, Messrs. Hyde, Hamilton, Pope, and Narasinga Rao, who will occupy the appointments numbered IV, V, VI, VII, and XI, respectively, should take effect from 1st January 1886. Of the new members of the staff, Nos. III and VIII, should be appointed by January 1886, Nos. II, IX, and X by August 1886, and No. XII when the present incumbent vacates.

10. The following office establishment is proposed:—

Designation.	Salary.	
	Proposed.	Present.
Superintendent of Military Students	Rs. 20	Rs. ..
Librarian	20	..
Storekeeper	20	30
Head Clerk and Accountant	50 to 75	40
Second Clerk	25	15
Third Clerk	15	..

The Superintendent of Military Students will have about 20 soldier-students to supervise in place of 10, and the correspondence with the Commissariat department, with Officers Commanding regiments, and with Army Head-quarters will consequently be much increased. His duties, moreover, frequently keep him in Madras during the college vacations. On these grounds, I consider that the remuneration proposed is called for.

The work of the Librarian has been trebled during the last few years owing to the increasing use made of the library. That of the Storekeeper has also increased, and will do so still further owing to the greater number of models, instruments, and apparatus to be issued and kept in order. An addition to their remuneration is therefore called for.

The clerical work of the college has much increased of late years, and it will be still further augmented by the introduction of the new scheme. I consider that an additional clerk is required, and that the salary of the Head Clerk and Accountant should rise from Rs. 50 to Rs. 75, by annual increments of Rs. 3.

The menial establishment should be increased by one peon on Rs. 8, and five punkah-pullers at Rs. 3-8-0 each. It is possible that two additional lascars for field work may eventually be applied for. The present cost of the menial establishment is Rs. 118 per mensem.

It is noted that the office and menial establishments at Rurki together cost Rs. 725 per mensem.

11. In conclusion, I strongly urge my conviction that the appointment of Professors of Engineering and Mathematics is indispensable for the proper training of the Engineers who are to be educated by this college. I have consulted with two experienced Civil Engineers who are interested in engineering education—Messrs. Hanna and Thorowgood—regarding this portion of my proposals, and find that they entirely agree in my views. I have also applied to the Imperial College of Engineering, Tokio, Japan, for information regarding the salaries paid to the Professors of Engineering and Mathematics, as it is well known that this institution has secured from time to time the services of exceptionally able men in these appointments. Further, I have discussed the subject with Mr. Bosworth Smith, the Government Mineralogist, who recently distinguished himself at the Royal School of Mines. He suggests that the Normal School of Science, South Kensington, might be able to meet the requirements described; and specially mentions the name of Mr. Harrison, Assistant Professor of Applied Mechanics at that school, whom he describes as an admirable instructor, a sound mathematician, an able experimentalist, a skilled machine draftsman, and a thoroughly practical man.

I consider that the salaries proposed for the two senior members of the subordinate staff (IV and V) are not susceptible of reduction. Together with the three senior members on the list, these instructors will form the backbone of the establishment; and if taken from what is undoubtedly the cheapest agency, the Public Works department, they must be offered salaries and promotion equivalent to those they might reasonably expect if they remained in that department.

12. An appendix is added showing the teaching staff now or lately employed at Rurki.

Rurki Establishment.

Principal, Rs. 850 + Military pay and allowances + Rs. 100 table money; as a Lieutenant-Colonel, say	Rs. 1,950
First Assistant Principal, Rs. 650 + Military allowance *	790
Second do. do. Rs. 550 + Military allowance *	620
Professor of Experimental Science, Rs. 750 + free house	750
Head Master Rs. 250 to 400 mean	350
First Assistant Master " 150 to 200 "	183
Second do. do. " 120 to 150 "	140
Third do. do. " 120 to 150 "	140
Drawing Master " 250 to 400 "	350
First Assistant Drawing Master " 150 to 200 "	183
Second do. do. " 120 to 150 "	140
Instructor of Photography " 85 to 135 "	118
Staff Sergeant " 120 to 150 "	140
Head Native Master " 100 to 200 "	166
First Assistant Native Master " 80 to 120 "	106
Second do. do. do. " 80 to 100 "	93
Third do. do. do. " 60 to 90 "	80
Fourth do. do. do. " 40 to 60 "	53
Fifth do. do. do. " 40 to 60 "	53
Sixth do. do. do. " 40 to 60 "	53
Total	6,468

* NOTE.—It is assumed that "Military allowance" means Military pay proper, which would be Rs. 140 for a Captain and Rs. 70 for a Lieutenant.

STATEMENT of Proposition for Revision of Establishment.

Order sanctioning present establishment.	Govt. of	Nature of Charge.				Proposition.												Local Government's recommendation.	Orders.	Remarks.																																																																																																																																																																																																																													
		Department.	Present Scale.		No.	Proposed Scale.		Designation.	No.	Pay.		Designation.	Pay.		Permanent.	Temporary.																																																																																																																																																																																																																																	
			No.	Date.		Office to which the proposition refers.	Office of Engineering.			College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.		G.Os., Educational, Nos. 216 and 209, and Financial, Mts. No. 780.	Office of Engineering.		College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.				G.Os., Educational, Nos. 216 and 209, and Financial, Mts. No. 780.	Office of Engineering.	College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.	G.Os., Educational, Nos. 216 and 209, and Financial, Mts. No. 780.	Office of Engineering.	College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.	G.Os., Educational, Nos. 216 and 209, and Financial, Mts. No. 780.	Office of Engineering.	College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.	G.Os., Educational, Nos. 216 and 209, and Financial, Mts. No. 780.	Office of Engineering.	College of Engineering.	14th June 1880, 14th April 1883, and 7th April 1884.	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From H. F. CLOGSTOUN, Esq., Accountant-General, to the Chief Secretary to Government, dated Fort St. George, 24th November 1885, No. 2909.

Gazetted Audit department.

In forwarding herewith letter from the Director of Public Instruction, No 7321, dated the 9th November 1885, submitting proposals for the reorganization of the staff of the Civil Engineering College, Madras, with the proposition statement received therewith, I have the honor to state that the entries in the column of "present scale" have been compared with the registers of this office and are correct with the exception of the item altered in red ink, as the pay Rs. 600, sanctioned for the appointment of the Principal, is a staff pay exclusive of military pay and allowances—*vide* Madras G.O., No. 181, dated 14th June 1875. The appointment has been held by an officer of the Royal Engineers, and the present Principal, Captain Love, draws, in addition to the staff pay of the appointment, the pay of his rank Rs. 433-10-0 per month.

2. I beg also to add that, under section 15, Pay and Acting Allowance Code, and clauses 3 and 4, of rule 5 (1), chapter 33, of the Civil Account Code, the previous sanction of the Secretary of State is necessary to the addition of three appointments to the graded service of the Educational Department of this presidency, as also to the creation of two Instructorships in Engineering and Surveying and Drawing and to the abolition of the appointments of Principal and First Assistant Master proposed by the Director of Public Instruction.

ORDER—dated 27th May 1886, No. 328, Educational.

In the foregoing letter, the Director of Public Instruction submits proposals for the reorganization of the staff of the Madras College of Engineering, with a view to such an extension of the scope of the college as will enable it to undertake the education of Mechanical Engineers, to provide instruction suitable for those who seek employment on railways and for persons of the maistry class, and generally to promote technical education.

2. The scheme of establishment contained in paragraph 5 of Mr. Grigg's letter involves a gross annual expenditure, including scholarships, of Rs. 55,484 per annum, as compared with the present cost, which is stated to be Rs. 32,568. The Director goes on to state that the net cost is not likely for the present to exceed Rs. 44,000. This figure is not explained, but it would appear to be obtained by taking all the rates of pay at their minima. The salaries proposed by the Director differ in several cases from those which the Principal of the College recommends in his letter forming an enclosure to the paper above read, but Mr. Grigg's proposals are almost identical with those of the committee appointed to consider the scheme for remodelling the college, contained in their report recorded in Proceedings of Government, 20th April 1882, No. 61, Educational, and, for reasons to be noticed below, the Government adopt the scale proposed by the Director.

3. Captain Love considers that the Principal should always be an officer of the Royal Engineers, on the ground, among others, that he will have to maintain the military discipline of the soldier-students. Mr. Grigg on the other hand proposes that the Principal and both Professors should be members of the graded educational service, as they are in the case of the colleges at Howrah and Poona. His Excellency the Governor in Council is unable to accept either view in its entirety. While agreeing with the Director that there is no reason to suppose an experienced civilian incapable of maintaining the necessary discipline among all classes of students, and that it is not expedient to declare that the Principal shall be invariably a Royal Engineer, it is, in His Excellency's opinion, desirable that the post shall always be filled by an engineer, civil or military. This being so, the proposal of the Director, that the Principal and Professors should be members of the graded service, is impracticable. The gentlemen will of necessity be specialists, not interchangeable, as pointed out by the committee in paragraph 43 of their report above referred to, with the

members of the staff of other educational institutions. In a similar case, viz., that of the Agricultural College, the Secretary of State decided that the Principal should not be admitted to the graded service, and there are equally strong reasons against the admission of the officers of the Engineering College.

4. His Excellency in Council considers the rates of salary suggested by Mr. Grigg preferable to those proposed by Captain Love. He is further pleased to declare that the Principal shall always be an engineer, civil or military, and that the pay of the Professors shall be regulated by seniority and not by the chairs they fill.

5. With the foregoing modifications the Government approve the proposed scheme of reorganization. The necessity of a measure of this kind has long been admitted, and the Secretary of State will now be addressed. Pending the receipt of his orders, however, no changes will be made in the salaries of any of the officers composing the present establishment, and the carrying out of the scheme, if sanctioned, will depend on the position of the Provincial finances and on the completion of the proposed increase of accommodation.

(True Extract.)

John H. C. C. C.

Chief Secretary.

To the Director of Public Instruction.
 „ Public Works Department.
 „ Accountant-General.

Exd. T. O'Connor.

Is document 42 to No 329. 27.5.86.
 B. No 1275 W. 20.5.86.
 " 1071 W. 20.4.86
 " 138 W. 18.1.86
 Q. 2280 W. 1-10.87
 B. No 1887 W. 11.8.87
 Is document 42 to 670. 4.10.83
 B. 61-26.6.82.

(4) Miller 4552
 Govt. of {1886} Madras.
 EDUCATIONAL.

No. 1597 W. d/ 23 June 1886
 Recorded
 Recorded.

17/6/86

18.6.86

Issued
 Recd. 14/6/86 Encl.

G.O., 27th May 1886, No. 328.

B. No. 1597 W. d/ 23 June 1886

MAY.

W. 24.6

S. Es for information
 S. Es for information
 C. A.

S. of Works J. M. S.
 Dand
 24/6/86

Madras College of Engineering.
 Approving, with remarks, of certain proposals
 for the reorganization of the staff of the —.

Ans. 98/6. 25/6/86

W. 30/6