

Educational (1907) Department.

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G.O., No. 586

DATED 7-9-07

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[Despatch Abstract.]

College of Engineering, Madras

Stating that the
recruitment for the —, will
from the Educational Department
and its administration be cont.
under the control of that Depart.

BOOK PAPERS.

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

FURTHER PAPERS.

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

2
Government of Madras.

EDUCATIONAL DEPARTMENT. 2

Recd.

Regd.

} 1907.
Enclosures
Spare copies

G.O., No. 586, 7th September 1907.

College of Engineering, Madras.

Stating that the recruitment for the — will in future be from the Educational Department and its administration be continued under the control of that Department.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following papers :—

I

G.O., No. 655, Educational, dated 3rd October 1905.

ABSTRACT.—Passing orders on the report of the Committee appointed to consider the extension and reorganization of the College of Engineering.

II

G.O., No. 657, Educational, dated 10th October 1906.

ABSTRACT.—Passing orders on the remarks of the Committee appointed in connection with the extension and reorganization of the College of Engineering, and requesting the Director of Public Instruction to submit proposals for the introduction of the scheme of reorganization as approved and also proposals for the revision of the rules of the College.

Order—No. 586, Educational, dated 7th September 1907.

The Committee appointed to advise on the question of the extension and reorganization of the College of Engineering, Madras, at first recommended that the entire staff of the College should be recruited from the Public Works Department and that the administration of the College should be in the hands of the Chief Engineer. Mr. deWinton, then Chief Engineer, was however strongly opposed to these proposals and considered that the College should remain under the Educational Department and that the superior staff should be recruited from Europe and from the Educational Department, the Public Works Department being indented upon only to supply temporary vacancies. The Government concurred generally with the Chief Engineer and requested the Committee to reconsider the question. The Committee therefore reported that they would not press the point as to the administration of the College which might be left in the hands of the Educational Department, but that as regards the recruitment of the staff from the Public Works Department, they considered it to be the only source from which the staff could be drawn and that, if necessary, the cadre of that Department should be increased to provide for it.

2. The Governor in Council was then disposed to accept the above recommendation of the Committee, but on further and fuller consideration he is unable to agree that it would be either expedient or desirable to draw the teaching staff of the College from the Department of Public Works. For professorial work special qualities and training are required which cannot be always secured in men selected for a department whose duties are primarily of an executive character. To supply suitable men from the Public Works Department would interfere with

its proper recruitment. If the Secretary of State were asked to take account of the requirements of the College in making Public Works appointments he would have to consider that the Engineers selected for this purpose would be liable to serve only for three or four years of their total service as professors. This course would not be in the interests of the legitimate work of the department, nor would it conduce to the best interests of the College. For these reasons the Governor in Council is unable to accept the Committee's proposal on this point. For the future the recruitment for the College will be in the Educational Department and its administration be continued under the control of that department.

(True Extract.)

H. D. TAYLOR,
Ag. Secretary to Government.

Forwarded to the

(By Order.)

Registrar.

To the Director of Public Instruction.
Public Works Department.

NOTES CONNECTED WITH G.O., No. 586, EDUCATIONAL, DATED
7TH SEPTEMBER 1907.

[SUBJECT—*The reorganisation of the Staff of the College of Engineering.*]

Previous Papers :

G.O., No.	451,	Educational, dated	11th December 1879.
" "	3	" "	27th January 1880.
" "	4	" "	10th February "
" "	328	" "	27th May 1886.
" "	629	" "	10th July "
" "	605	" "	10th November 1887.
" "	479	" "	10th August 1896.
" "	655	" "	3rd October 1905.
" "	1713 W.,	dated	11th October 1905.
" "	37,	Educational, dated	20th January 1906.
" "	657	" "	10th October "
" "	2038 W.,	dated	26th October 1906.
" "	159,	Educational, dated	20th March 1907.

Page 108 of the list of Educational Officers for 1906.

Also rule 4 of the rules of the College of Engineering—page 4 of G.O., No. 37, Educational, dated 20th January 1906.

The teaching staff of the College of Engineering now consists of—

- (1) a Principal,
- (2) a Professor of Civil Engineering,
- (3) a Professor of Mechanical Engineering,
- (4) a Professor of Mathematics,
- (5) an Instructor in Surveying and Drawing,
- (6) an Instructor in Civil Engineering,
- (7) an Instructor in Mechanical Engineering,
- (8) a Workshop Instructor,
- (9—16) eight ordinary Assistants,
- (17—19) three Foremen Assistants in the Workshop,
- (20) an Instructor in Gymnastics.

2. Of these, Nos. (2) and (3) are in the Indian Educational Service, Nos. (4), (5) and (6) are in the Provincial Educational Service, and Nos. (8) to (20) are in the Subordinate Educational Service. No. (1) is outside the Indian Service and No. (7) outside the Provincial Service, but the appointments in both cases are gazetted appointments.

Paragraph 16 of the report—page 6 of G.O., No. 655, Educational, dated 3rd October 1905.

3. The Committee appointed to consider the question of reorganising the College recommended that the staff should consist of—

- (1) a Principal,
- (2—3) a Professor of Mathematics with one Assistant,
- (4—9) a Professor of Mechanical Engineering with five Assistants, one of whom should be a Science Assistant,
- (10—17) a Professor of Civil Engineering with seven Assistants,
- (18) a Gymnastic and Drill Instructor.

4. The Committee recommended that the staff should be recruited from the Paragraph 16 of report—page 6 of G.O., Public Works Department and should be paid allowances of Rs. 200 in the case of Professors, Rs. 100 in the case of Senior Assistants and Rs. 30 in that of Junior Assistants, in addition to the pay and allowances which they would draw if employed on departmental duty in Madras.

5. In paragraph 11 of G.O., No. 657, Educational, dated 10th October 1906, the Government expressed their willingness to recommend that the recruitment of the entire staff—both professorial and subordinate—should be from the Public Works Department. This would involve an increase in the cadre of the Public Works Department and the matter, it is believed, is being considered by the Public Works Establishment Committee that is now sitting.

6. The Director is revising the rules of the College, but meanwhile the details as regards allowances may perhaps be settled. In regard to this matter His Excellency the Governor said :—

“The pay might be excluded from the regulations and made to be the pay of the rank of the officer concerned *plus* allowances as in the case of the Secretariat.”

Should not the rank of the officers to be appointed Principal and Professors and Assistants be settled in the first instance? In other words, should it not be settled that only an officer of the rank of, say, Superintending Engineer, should be appointed Principal. Similarly it may be settled that only officers of the rank of, say, Executive Engineers, should be appointed as Professors, officers of the rank of, say, Sub-Engineers, should be appointed Senior Assistants, and officers of the rank of Supervisors or Overseers should be appointed Junior Assistants. The numbers of the Senior and Junior Assistants have also to be settled. In regard to allowances, may the amounts recommended by the Committee, which considered the question of reorganising the College, be accepted? Before, however, anything further is done the remarks of the Public Works Department may perhaps be invited on these points. That department may also be asked what recommendations, if any, have been made by the Establishment Committee in regard to the increase in the cadre of the department.

Vide paragraph 16 of the Committee's report—page 6 of G.O., No. 655, Educational, dated 3rd October 1905.

That would make the pay of the Principal very high. Why bind ourselves by rules that it may not be convenient to keep?

H.D.T.

C. G. MACKAY.

I agree that it is undesirable to restrict the appointments to any special grade or rank. This might be productive of great practical inconvenience.

H. D. TAYLOR—6-1-07.

Public Works Department probably will not know until the Committee issues its report.

H. D. TAYLOR.

C. G. MACKAY.

H. D. TAYLOR.

7. A reminder has already been sent to the Director for the revised rules of the College. He may be again reminded separately.

P. T. THARYAN—2-1-07.

The remarks of the Public Works Department may be invited, I submit.

C. G. MACKAY—5-1-07.

With reference to His Excellency's remarks quoted at A in paragraph 6 of the office-note, is any information available as to the “allowances as in the case of

the Secretariat”. So far as I am aware there are no special allowances outside the Public Works Department. Officers of that department stationed in Madras receive as it is special allowances in the way of house-rent, etc. What exactly would be the difference between the recommendations of the Committee (paragraph 4 of the office-note) and His Excellency's suggestion as quoted in paragraph 6?

H. D. TAYLOR—6-1-07.

As observed by the Secretary, it does not appear that any special allowances are granted to officers of the Secretariat except in the Public Works Department. In the Public Works Secretariat, the Secretaries* are granted a special local allowance of Rs. 250† each; but the Under Secretaries seem to draw only the Presidency allowances, and the Presidency‡ house-rent allowances admissible under paragraphs 33 and 35 of the Public Works Code.

* 1. Secretary, Public Works Department (Works).
2. Do. do. (Irrigation).
3. Do. do. (Railway).
† Vide page 4 of the Quarterly Civil List for October 1906. The authority for the grant of this allowance is not traceable.
‡ Vide page 4 of the Quarterly Civil List put up.
Pages 16 and 17 of Volume I of the Code.

2. Under the above paragraphs of the Public Works Code and Appendix § 19 to that Code, the members of the Public Works Department of the classes specified below, while serving at the Presidency town, receive Presidency house-rent and Presidency allowances at the following rates :—

Class of officer.		Presidency house-rent.	Presidency allowance.
		RS.	RS.
(1) Chief Engineer, 2nd and 3rd grades	.. ..	60	..
(2) Superintending Engineer, 1st and 2nd classes	.. ..	60	..
(3) Do. 3rd class	.. ..	60	..
(4) Executive Engineer, 1st grade	.. ..	45	..
(5) Do. 2nd and 3rd grades	.. ..	45	100
(6) Assistant Engineer, 1st grade	.. ..	45	100
(7) Do. 2nd do.	.. ..	30	50
(8) Do. 3rd do.	.. ..	20	50
(9) Sub-Engineers, 1st, 2nd and 3rd grades	.. ..	20	50
(10) Supervisors, 1st and 2nd grades	.. ..	10	30
(11) Overseers, 1st, 2nd and 3rd grades	.. ..	10	15

3. The Committee's proposal appears to be to grant allowances of Rs. 200 in the case of Professors, Rs. 100 in the case of Senior Assistants, and Rs. 30 in that of Junior Assistants in addition to the pay and allowances which they, as officers of the Public Works Department, would draw if employed on departmental duty in Madras. It is not clear what is exactly meant by His Excellency's remarks at A quoted in paragraph 6 of the office-note on page 2. As pointed out in paragraph 1 above, while the Secretaries in the Public Works Department appear to get a special local allowance of Rs. 250 per mensem and no Presidency house-rent or Presidency allowances, the Under Secretaries seem to get only Presidency house-rent and Presidency allowances|| but no special allowances.

Probably an allowance in addition to grade pay only was meant.

C. G. MACKAY.

|| Local allowances.

C. G. MACKAY.

K. RANGASWAMI AYYANGAR—10-1-07.

C. G. MACKAY—12-1-07.

I take His Excellency's remark to mean merely the ordinary Presidency allowances admissible under paragraphs 33 and 35, Public Works Department Code, in addition to grade pay.

H. D. TAYLOR in the case the pay duty in

To the Public Works Department for remarks.

PUBLIC WORKS DEPARTMENT.

The following are the allowances, in addition to grade pay, drawn by Public Works Department officers of the Secretariat:—

	Local. RS.	Presidency. RS.	House-rent. RS.
Secretary, Public Works Department	250	..	..
Joint Secretary do. (Irrigation) ..	250	..	..
Under Secretary, Public Works Department ..	100	* 100	45
Do. do. (Irrigation) 100	100	* 100	45

* Forfeited when an officer attains the rank of Executive Engineer, 1st grade.

Public Works Department officers outside the Secretariat, stationed in the Presidency town, draw the allowances specified on page 3.

It is for consideration whether allowances on these scales should be applied *mutatis mutandis* to Public Works Department officers on the College staff.

R. PARSONS—18-1-07.

For orders. I take His Excellency's remark to mean that officers would draw ordinary Presidency allowance and house-rent in addition to grade pay.

A. G. ROMILLY—19-1-07.

I take His Excellency to mean that the officers should draw something more than officers of the same rank in the Presidency town outside the Secretariat as do the officers of the Public Works Department Secretariat, that is, "local allowance" in addition to the Presidency allowance and house-rent which all officers below the rank of Executive Engineer, 1st grade, draw when stationed in the Presidency town. I take it that His Excellency's intention was that the officers should then draw the pay of their rank. Presidency allowance, if below the rank of Executive Engineer, 1st grade, and house-rent, plus a local allowance, the amount of which might be fixed according to the importance of the office concerned.

F. J. WILSON—1-2-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

I submit that if local allowances, in addition to Presidency and house-rent allowances ordinarily admissible to officers of the Public Works Department stationed at the Presidency are to be allowed in the case of Public Works Department officers brought on to the staff of the Engineering College, there will be a howl for the grant of similar allowances on the part of all other Educational officers stationed at the Presidency. Public Works Department officers in the Secretariat appear to be especially well favoured in the matter of allowances; it may be that the object is to compensate for the cost of the move to the Hills, but this argument could not apply to Professors on the College staff who reside

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the 1. receive as officers outside the Secretariat who are stationed at the Presidency. graph 4 of al allowance is to be given, it should be given as a "teaching paragraph 6 t as a "local allowance", or there would be an outcry on the part ers of the Educational Service.

H. D. TAYLOR—6-2-07.

I voted against the general recruitment of the Engineering College professoriate from the Public Works Department instead of from the Educational Service, that service being strengthened by the appointment of suitably qualified men specially chosen for the work in England. But it has been decided to recommend the former scheme to the Government of India and to the Secretary of State—in my opinion I fear with little chance of success.

Two questions arise in connection with the working out of the scheme—

(1) Should the appointments of Principal and Professors be restricted to specified grades in the Public Works Department, or be open to any officer selected irrespective of grade and pay?

(2) Should special allowances be given to officers appointed to these posts?

As to (1), the restriction of appointments to stated grades I am inclined to think that if this is not done the interests of the College may suffer. We know from experience elsewhere that a departmental officer who has not proved himself very satisfactory in the discharge of departmental duties proper is apt to be foisted, under pressure brought to bear by his departmental head, into situations where he is likely to do "less harm", as the phrase goes, without full consideration of the interests of the post into which he is so transferred. Departmental thorns can thus be transplanted without being eradicated. Even in the case of the Engineering College, I rather think that the appointment of Principal has not always been made with the best educational consequences.

If there is no limitation the cost of the College may become unreasonably high by the appointment of too senior men. The College will still remain under the Educational Department and its actual cost in any year must be shown in the Educational budget. If the Engineering College is staffed from Public Works Department, what will be the consequences financially, as between Provincial and Imperial, of heavy charges for Professors, etc., resulting from the appointment of very senior officers of the Public Works Department?

G. S. F[ORBES]—6-2-07.

It does not appear that any portion of the cost of the Public Works establishment is directly chargeable to Imperial funds.

2. Article 2119 of the Public Works Code prescribes rules to regulate the mode of charging for establishment and tools and plant, when one fund or branch of the department executes works for another. According to these rules, a portion of the Public Works establishment of this Presidency is being debited to Imperial, but the amount so debited varies directly with the value of works executed and is calculated at the

What has this got to do with the question!

G. S. F[ORBES].

rate of 23 per cent. on their value—please compare Appendix E on pages 130 to 133 of the Budget Estimate of the Public Works Department for 1906-07.

3. If the College of Engineering is to be staffed by the officers of the Public Works Department, it does not appear that the amount annually debited to Imperial will in any way be affected. It will no doubt be necessary to increase the cadre of the Public Works Department, but the additional staff will not be employed on the works, and the salary and allowances paid to such of the members of the staff as do duty in the College, will be debited to the Educational Department and will, it is submitted, be a purely Provincial charge.

4. It has taken time to get the information from Public Works Department.

K. RANGASWAMI AIYANGAR—26-2-07.

Will Financial please say if the above view is correct?

C. A. SOUTER—27-2-07

To the Financial Department.

FINANCIAL DEPARTMENT.

The view set forth in the foregoing note is, it is submitted, correct.

T. HARI RAO—1-3-07.

C. M. SCHMIDT—2-3-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

Re-submitted.

H. D. TAYLOR—3-3-07.

For the moment, in writing my query of 6th February, I had it in my mind that the Public Works Department establishment was Imperial, which of course it is not. However that makes little difference to my point. What I wanted to get at was how the *Educational* budget would be affected by recruiting the staff of the Engineering College from Public Works Department? Will it be more costly than the present staff? Or practically the same?

G. S. F[ORBES]—5-3-07.

The present cost of staff of the College of Engineering is as shown below:—

	Pay.	Average pay.
	RS.	RS. A. P.
1. Principal	1,000—50—1,250	1,166 10 8
2. Professor of Civil Engineering ..	500—50—1,000	805 8 11
3. Professor of Mechanical Engineering ..	500—50—1,000	805 8 11
4. Professor of Mathematics ..	200—700	416 10 8
5. Instructor in Engineering ..	200—700	416 10 8
6. Instructor in Surveying and Drawing ..	200—700	416 10 8
7. Instructor in Mechanical Engineering ..	450	450 0 0
8. Assistant Instructor in Surveying and Drawing ..	150—10—200	183 5 4
9. Assistant Instructor in Surveying ..	100—10—150	133 5 4
10. Assistant Instructor in Drawing ..	100—10—150	133 5 4
11. Second Assistant Instructor in Surveying ..	75—2½—100	90 4 5
12. Second Assistant Instructor in Drawing ..	75—2½—100	90 4 5
13. Additional Assistant Instructor ..	75—2½—100	90 4 5
14. Assistant in Vernacular ..	60—2—80	72 3 7
15. Do. ..	60—2—80	72 3 7
16. Workshop Instructor ..	200	200 0 0
17. Foreman Fitter ..	50—5—75	66 10 8
18. Foreman Carpenter ..	45—3—60	55 0 0
19. Gymnastic Instructor ..	20—2—40	32 3 7
Total ..		5,696 15 2

2. It is not possible to arrive at an accurate forecast of the expenditure which the revised staff of the College would entail unless it is decided what classes of officers are to be appointed as Principal, Professors and Assistant Professors, but assuming that the Principal is an officer of the grade of Superintending Engineer, the Professors are Executive Engineers, the Senior Assistants are Assistant Engineers and the Junior Assistants, Supervisors or Overseers, the cost of the revised staff will work out as follows:—

	Pay.	Average pay.
	RS.	RS.
1. Principal (Superintending Engineer) ..	1,500—2,000	1,750
Staff allowance ..	..	200
House-rent ..	..	60
2. Three Professors (Executive Engineers) ..	700—1,000	2,550
Staff allowance at Rs. 200 each ..	..	600
Presidency allowance and house-rent at Rs. 145 each. ..	..	435
3. Three Senior Assistant Professors (Assistant Engineers—Provincial Service) ..	250—400	1,000
Staff allowance at Rs. 800 each ..	..	300
Presidency allowance and house-rent at Rs. 100 each. ..	..	300
4. Ten Junior Assistants (Supervisors and Overseers) ..	60—200	1,180
Allowance at Rs. 30 each ..	..	300
Presidency allowance and house-rent at Rs. 32-8-0 each. ..	..	325
5. Gymnastic Instructor ..	20—40	32
		9,032
		5,697
Increase ..		3,335

K. RANGASWAMI AIYANGAR—12-3-07.

C. A. SOUTER—13-3-07.

Will Chief Engineer (Works) please note whether the scale of establishment suggested would meet the requirements of the College, and whether the scale of salary and allowances as noted above is in accordance with the standard scale of the Public Works Department?

H. D. TAYLOR—14-3-07.

To Chief Engineer (Works).

PUBLIC WORKS DEPARTMENT.

The rates given are correct, except that under *item 2*, if an Executive Engineer of the first grade is appointed he would not be entitled to Presidency allowance. *Item 3* also requires slight correction. Provincial Engineers are not entitled to Presidency allowance. It remains to consider whether the suggested scale is suitable.

R. PARSONS—18-3-07.

As regards scale of salary, the rates are correct (with the exceptions noted above).

As regards the suitability of the scale of establishment, Educational would, I think, be in a better position to judge than the Public Works Department.

A. G. ROMILLY—18-3-07.

I think the scale for the purposes of the enquiry may assume a Superintending Engineer for the Principal.

For the three Professors one Executive Engineer of each grade thus—

	RS.
1 First grade	1,000
1 Second grade	850
1 Third grade	700
Staff allowance	600
Presidency allowance for second and third grades	200
House-rent for three at Rs. 45	135
Total	3,485

I am not sufficiently acquainted with the requirements of the other members of the staff to say whether the proposed classes are suitable.

F. J. WILSON—20-3-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

The remarks of the Director of Public Instruction will be invited u.o. as to the suitability of the scale suggested on page 3 *supra*, more especially with reference to the sufficiency or otherwise of the staff of Senior and Junior Assistant Professors suggested.

H. D. TAYLOR—23-3-07.

To the Director of Public Instruction.

I consulted Colonel Love* and subjoined is a copy of his reply. I have nothing to add :—

"Subject to the minor modifications suggested below, I think that the Public Works scale of staff given in your letter will suffice for the College of Engineering in regard to both numbers and emoluments. It is presumed that leave vacancies will be promptly filled from the Public Works Department.

"The following remarks are offered on the scheme :—

"(a) No provision has been made for Workshop Instructor, Workshop Foreman and Laboratory Assistants. In a Public Works establishment these persons would probably be 'charged to works'.

"(b) The 'staff allowances' are no doubt provided to render service in the College attractive and to ensure our securing the best men available. The staff allowance is additional to the ordinary Presidency allowance and house-rent which are drawn by the majority of Public Works officers serving at the Presidency. The 'staff allowance' is therefore a purely College allowance.

"(c) The salary of the three Professors is entered at Rs. 700 to Rs. 1,000, average Rs. 850. The pay of a Third-grade Executive Engineer is Rs. 700, of a second grade Rs. 850, and of a first grade Rs. 1,000. The scheme apparently contemplates one of each in the College as a rule. Now a First-grade Executive Engineer is not eligible for Presidency allowance. The last entry under 'Professors' might therefore read Presidency and house-rent for two Professors at Rs. 145 each, and house-rent for one Professor at Rs. 45—335.

"(d) The scheme contemplates three Provincial Service Assistant Engineers as Senior Assistant Professors. One at least of these should be an ex-soldier if he is to serve as Superintendent of Military Students. But see (e) *infra*.

"(e) Instead of a Gymnastic Instructor (native) on Rs. 20 to 40, it would be preferable to have a Sergeant Instructor of Gymnastics and Drill transferred from the Military Department. He should reside in free quarters at the College and should also hold the office of Superintendent of Military Students. This arrangement will be the more desirable if the Principal should be a civilian.

"(f) As a free house valued at Rs. 150 per month is attached to the office of Principal, no house-rent need be entered under 'Principal', and his staff allowance might be reduced to Rs. 100 or Rs. 150.

"(g) If the College is transferred to Saidapet and becomes a residential one, the members of the staff should all be resident, *i.e.*, quarters will be built for them. Allowances for house-rent will then become unnecessary if the quarters are made free.

Yes

G. S. F[ORBES].

"(h) While the staff of Principal, Professors and Senior and Junior Assistant Professors is considered sufficient for present requirements, experience alone can show whether additional lecturers and assistants may not become necessary as the institution develops under the new rules and the residential system".

T. T. LOGAN—2-4-07.

EDUCATIONAL DEPARTMENT.

Re-submitted with reference to the Honourable Member's note of 5th March 1907.

Page 6 *supra*.

* 3,500
12

42,000 a year.

G. S. F[ORBES].

Yes.

G. S. F[ORBES].

2. The increase in cost under the proposed arrangements (if staff allowances are approved) would be about Rs. 3,500 per mensem, or a corresponding * increase in cost of building should separate house-rent allowance not be given.

3. The Director of Public Instruction's suggestion in clause (a) of his note may be adopted.

4. It is not likely that sanction to the scheme, if finally adopted, is likely to be received before April 1909, or it is doubtful even then whether Public Works Department will be able to supply the requisite men. It is presumed that the present staff will have to be absorbed

But Secretary of State has not sanctioned the scheme and I much doubt if he will!

G. S. F[ORBES].

in Public Works Department, *e.g.*, Mr. James would have to be transferred to the cadre of the Public Works Department.

5. Temporary arrangements must however be made for carrying on the work on present lines and, as Colonel Love retires on 25th October 1907, it is about time to consider the question of appointing his successor.

H. D. TAYLOR—3-4-07.

Please re-submit after the Budget meeting at Ootacamund.

G. S. F[ORBES]—4-4-07.

A draft may now be prepared for Government of India in order that the Secretary of State's sanction (if India approves) may be obtained to a professorial staff drawn from the Public Works Department for the Engineering College.

As I have already noted on the reorganisation scheme, I am personally most strongly opposed to depending upon the Public Works Department for Professors and teachers for the College. The qualities required for teaching are not at all

necessarily connected with those required in a practical Executive Engineer. Moreover now that the mode of appointment to the Public Works Department has been entirely altered, I do not see how the Government can have even the assurance (whatever its value was) that was available when the department was recruited from Cooper's Hill, which at any rate secured theoretical training. Assuming that the Secretary of State sanctions the strengthening of the cadre to supply Professors and teachers, it is clear he would have in making his nominations to have in view, for a certain proportion, tutorial qualifications; and that proportion would have to be sufficiently large to supply not only the actual professorial strength, but also a margin for absentees, etc.

The Civil Engineering College, though primarily instituted to supply the State with trained subordinates, is not wholly a departmental institution. It is one of our technical colleges in the Educational Department; and year after year we have been looking forward to the larger influx of private students to engage on industrial pursuits not connected with the State.

I will however put these views into form at a later stage.

G. S. F[ORBES]—24-4-07.

These papers have been sent to me, but they are incomplete. In the short time that remains of my present office, I don't think it worth while to call for full papers. On the point of recruiting the professorial staff from the Public Works Department, I have always been of Mr. deWinton's opinion—which is apparently that of my Honourable Colleague—I do not think the College can be efficiently supplied with Professors from the Public Works Department. I consider the College should remain under the Educational Department and that the English Professors should be recruited from England.

M. H[AMMICK]—29-4-07.

I have asked Mr. Wilson for an expression of his views on this question. They are set out in the accompanying note which I should like to be attached to the file.

2. I have again gone fully into this question and, after further deliberation, am disposed to modify my original opinion.

3. I should like the notes to be printed (including Mr. Wilson's note) before Mr. Stokes' return, whereupon we may discuss the question in Council.

A. L[AWLEY]—15-5-07.

Proposals for the recruitment of the Staff of the Engineering College.

As requested by His Excellency, I have read the papers in the file on this subject, and had a conversation with Colonel Love regarding it this morning. The question on which I am to express an opinion is, I understand, whether, as recommended in G.O., No. 657, Educational, dated 10th October 1906, the recruitment of the entire staff—both professorial and subordinate—should be from the Public Works Department. The entire staff included in the proposals consists of—

- (1) a Principal and three Professors;
- (2) three Senior Assistant Professors of the standing of Provincial Assistant Engineers;
- (3) Junior Assistants of the standing of Public Works Department Subordinates.

It seems to be generally admitted that the third item or subordinate staff can only be drawn from the Public Works Department. I think then in justice to the department the fact should be recognised and the cadre increased accordingly.

With regard to the first two items, viz., the Professors, the proposal as described in G.O., No. 657, is that these appointments are to be held for periods, limited to three or four years at a time, by Engineers on the regular staff of the Public

selecting candidates for the Engineering

2. In the notes which follow the Government Order quoted above, it is further proposed that the appointments of Principal and Professors of the College should be filled by Public Works Department officers of certain specified grades, and that special allowances should be given to the officers selected so that their emoluments as Professors would exceed those they would draw for carrying on their ordinary departmental duties.

3. I think it must be recognised that an Engineer may be a very good Executive Engineer and yet fail to have the best qualifications for professorial work, and *vice versa*—what with the extra pay, head-quarters at Madras and a two months' summer recess the effect of the proposals would be to put a premium on professorial work, and I am very doubtful whether this is desirable, in the interests of the proper work of the department, viz., actual practical work.

4. It is the case that the services of our best Engineers are often required in outlandish and possibly unhealthy places, and that less competent Engineers can be more suitably employed in more comfortable places where the work to be done is possibly less important and where they are more under the eye of their superiors. It is one of the difficulties of Public Works Administration under service rules to make it clear that the Engineer of the first category who throws to the winds all ideas of personal comfort and devotes himself wholeheartedly to the work on which he is engaged, will in the end reap his reward and step over the heads of his less zealous or less competent brethren. It is to my mind the Engineer who acts as described, who faces practical difficulties of his profession and overcomes them, who is most likely to make the best Administrative officer or Chief later on, and I cannot help thinking that four years' experience of this sort of thing is incomparably superior in value, to what he might gain by acting for a like period as a Professor at the College. To institute four well-paid sedentary Public Works Department appointments, open to all the executive grades, and to a Superintending Engineer would be, I fear, to institute a further temptation to good officers to turn their attention away from what I submit is most important, viz., practical experience of and zeal for the actual execution of work.

5. Considering the interests of the College on the other hand, I doubt if Public Works service is the best training ground for a Professor, and although the Secretary of State be asked to take account of the requirements of the College in making Public Works appointments, he would have, under the scheme, to consider that the Engineers be selected were only going to be liable to serve three or four years of their total service as Professors. As I submit that special qualities are required for professorial work, I am inclined to think that these could best be secured by the authorities reserving to themselves a free hand to select the most suitable men from England or elsewhere. The advantages of improved status and prospects might be secured to a great extent by increasing the pay of the appointments as proposed. If the appointments were non-pensionable appointments the value of the pensions of the grades of Public Works Department officers proposed should be added to the rates of pay proposed. Taking the pension of an Executive Engineer to be worth Rs. 300 per mensem and that of a Superintending Engineer Rs. 400, the equivalent non-pensionable rates of pay for the Principal and Professors would amount to about Rs. 2,350 per mensem *and quarters* and Rs. 1,495 for the average Professor respectively.

In the event of a Public Works Department officer being lent he would only draw the rate of pay laid down.

6. I conclude, then, that it may not be in the best interests of the College, and I doubt whether it is, in the interests of the legitimate work of the department, that the College professorial staff should be entirely recruited from the Public Works Department.

F. J. WILSON—9-5-07.

The proofs were apparently lost sight of in the office. They seem to have
Better circulate. After this lapse of time, if the subject is to be discussed in Council, and
as there is fresh matter, the Honourable Members should see the papers again first.
H. D. TAYLOR. | The papers may be sent to His Excellency.

C. A. SOUTER—1-8-07.

H. D. TAYLOR—2-8-07.

I have already expressed my views.

G. S. F[ORBES]—8-8-07.

I gather from these papers that the recruitment of the College staff from the Public Works Department will add Rs. 42,000 to the cost of the College. I do not think that the advantages of the amalgamation are worth that amount and, under the circumstances, I am prepared to agree that the existing system of recruitment from England should continue.

G. S. T[OKES]—9-8-07.

We are now agreed that the present system of recruitment should continue.

A. L[AWLEY]—14-8-07.

Please draft with reference to paragraph 11 of G.O., No. 657, Educational, dated 10th October 1906.

H. D. TAYLOR—15-8-07.

The draft order placed below is submitted for approval. If approved, it may be sent to Public Works Department for acceptance.

K. RANGASWAMI AIYANGAR—22-8-07.

C. A. SOUTER—24-8-07.

H. D. TAYLOR—26-8-07.

Does the "present system" (as in draft) include the Principal? We are now to make the whole recruitment in Educational Department.

G. S. F[ORBES]—27-8-07.

Is the appointment of "Principal" included in the cadre of recruitment for the Indian Educational Service? I think not.

H. D. TAYLOR—29-8-07.

The appointment of Principal of the College of Engineering is not included in the cadre of the Indian Educational Service—*vide* G.O., No. 479, Educational, dated 10th August 1896. In paragraph 4 of G.O., No. 328, Educational, dated 27th May 1886, it was decided that the Principal should be an Engineer, Civil or Military.

K. RANGASWAMI AIYANGAR—29-8-07.

No. 586, EDUCATIONAL, 7TH SEPTEMBER 1907.

13

Though the post of Principal is not included in the Educational Service, the Principal is appointed by the Educational Department. Colonel Rogers and Colonel Love were both so appointed. There is to be no alteration, so far as I understand, in this method of recruitment. The "present system" will therefore continue.

C. A. SOUTER—29-8-07.

Where Public Works Department officers are recruited the appointments will be made in the Educational Department, with the concurrence of Public Works Department.

H. D. TAYLOR—30-8-07.

For the future the Principal as well as the Professors will normally be recruited in the Indian Educational Service. Of course Government can always make an appointment outside, if it is desirable to do so for very special reasons.

I have revised the draft somewhat.

G. S. F[ORBES]—30-8-07.

Public Works Department for acceptance.

H. D. TAYLOR—31-8-07.

Accepted in Public Works Department.

F. J. WILSON—5-9-07.

To the Educational Department.

Issue.

H. D. TAYLOR—7-9-07.

[G.O., No. 586, Educational, dated 7th September 1907.]

10 11
Government of Madras.

EDUCATIONAL DEPARTMENT.

Recd.

Enclosures

1905.

Recd.

Spare copies

G.O., No. 655, 3rd October 1905.

College of Engineering.

Passing orders on the report of the Committee appointed to consider the extension and reorganization of the —.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following papers:—

I

G.O., No. 723, Educational, dated 12th December 1904.

ABSTRACT.—Appointing a Committee to consider the revision of the syllabus of studies and the curriculum of the College of Engineering, Madras.

II

G.O., No. 754, Educational, dated 21st December 1904.

ABSTRACT.—Referring to the Committee appointed by G.O., No. 723, Educational, dated 12th December 1904, certain proposals for consideration regarding the practical course of Apprentice Engineers in connection with the revision of the syllabus and curriculum of the College of Engineering, Madras.

III

Letter—from J. P. DAVIDSON, Esq., President, College of Engineering Committee.

To—the Secretary to Government, Educational Department.

Dated—Chepauk, 31st March 1905.

No.—340.

I have the honour to submit the report on the College of Engineering of the Committee appointed in G.O., No. 723, Educational, dated 12th December 1904.

2. The appendices referred to under "Syllabuses," page 6 of report, have not yet been received from the printers. They will be forwarded as soon as received.

3. I would explain that owing to the absence of Mr. Spring on leave the Committee was not able to get to work till the 16th February on which date it held its first meeting.

ENCLOSURES.

Report of the Committee appointed in G.O., No. 723, Educational, dated 12th December 1904, to consider the reorganization of the College of Engineering.

Preliminary.—The Committee was appointed under G.O., No. 723, Educational, dated 12th December 1904, to consider the revision of the syllabus of the studies and the curriculum of the College of Engineering, Madras, and three other subjects, viz.—

(a) whether any extension of the College buildings is necessary so as to provide sufficient accommodation for an increased number of students;

(b) whether any and if so, what additional laboratories should be constructed and what further facilities should be afforded for the practical out-door instruction of students in surveying and other Engineering subjects;

(c) the future location of the College, if the present site is deemed to be unsuitable for an extension of the buildings required to provide adequate accommodation both for students and instructors and for the practical training of the students in field work.

2. In its report the Committee has thought it advisable to go outside the limitations of the Government Order, as without doing so it was impossible for it to submit a report which would deal fully with the important questions put before it. Moreover since the issue of the Government Order No. 723, Educational, other questions bearing on the organization of the College have been sent to the Committee for discussion and opinion, a very clear indication that the limitations of the Government Order need not be closely observed.

Further, there can be no question that, when submitting revised syllabuses the adoption of which it recommends, the Committee is justified in considering how instruction in these syllabuses can best be given; and this naturally leads to a discussion on the efficiency and sufficiency of the existing staff, recruitment of the staff, and administrative and other cognate subjects, all of which the Committee has had under consideration.

3. The main subjects dealt with were the following, and they are taken in the order named:—

- (a) Revision of the syllabus.
- (b) Staff.
- (c) Administration.
- (d) Accommodation.

Under each of these main heads a number of cognate subsidiary questions arose, which were dealt with as they came up, and which will be referred to under the main heads.

4. *Revision of the syllabus.*—As a necessary preliminary to dealing with this subject the Committee felt it incumbent on it to consider very closely and fully three questions, viz., the educational qualifications requisite in the candidates for the different classes, the fees to be paid by these classes, and the time available for the instruction of the students in the College.

5. *Recruitment of the college classes.*—The Committee had no difficulty in deciding that the present system of recruiting the same class from candidates possessed of unequal educational qualifications is wholly wrong. It is unfair to the student and unfair to the teaching staff because it involves immense waste of time.

For these and other reasons the Committee is of opinion that the recruitment of the several classes should be as follows:—

The Engineer class from B.A.'s who have taken either Mathematics or Physics as optional subjects;

The Upper Subordinate Class from F.A.'s;

and all other classes in the College from Matriculates.

Before finally recommending the above modifications, the Committee has carefully considered the effect they will have on the recruitment for the several classes, and it is satisfied that there will be no difficulty in recruiting each class up to its full strength.

6. *Fees.*—As to the question of fees the Committee is of opinion that, in view of the recommendations for the extension of the College course of the Upper Subordinate Class (present Engineer Subordinate Class) and for the amalgamation of Sub-Overseer and Surveyor and Draftsman classes (vide pages 7 and 8), the scale of existing fees calls for some readjustment.

After full consideration of the effect the modifications it now proposes will have on the future recruitment of the classes, the Committee recommends the adoption of the following tentative scale of fees:—

	RS.	
Engineer Class	360	} for the full theoretical course, if paid in advance.
Upper Subordinate Class	180	
Lower Subordinate Class	100	

7. *The College year.*—With regard to time available for instruction, the Committee is unanimously of opinion that the present arrangement of the College year is very defective and gives too low a proportion of working days. After due consideration it has drawn up a College year which appreciably increases the number of working days and generally distributes work throughout the year in a more efficient manner.

The Committee recommends very strongly that the College year as now modified be accepted and given effect to with as little delay as possible.

The College year as now proposed will begin about July 15th; the 1st term will continue until about 1st October when there will be an interval for inspection tours, the 2nd term will last from the end of the inspection tours, i.e., about October 10th, until the beginning of the official Christmas holidays; the survey camp will begin immediately after the termination of the Christmas holidays and last for about one month; the term will last until the end of April, during the last fortnight of which the annual examinations should take place; the long vacation should begin about 1st May and end about July 15th.

8. *Rules incidental to College reorganization.*—The following points also forced themselves on the attention of the Committee, and as the result of careful deliberation in each case it recommends the adoption of the rules which follow:—

(1) "A student who fails to obtain qualifying marks in the examination held at the end of the year's course shall not be promoted and must either leave the College or join the class below"—

"No student will be permitted to remain more than four years in the College".

"A student who is not promoted at the end of any year will not be eligible for any College prizes, honours or appointments."

This rule the Committee considers follows as a logical sequence of the alteration in the recruitment of the classes.

(2) "No student will be allowed to appear for any degree examination until he has completed his practical course satisfactorily."

(3) "The theoretical course of the Civil and Mechanical Engineer students will be one and the same during the first year, but from the end of this period the further instruction of the two classes of students will be on different lines; in other words the bifurcation of the civil and mechanical course will take place at the end of the first year."

(4) "The duration of the practical course shall be in the case of Civil Engineer students one year, and in the case of Mechanical Engineer students two full years, one of which must be passed in outside workshops, that is shops other than those under the direct control of the Public Works Department."

(5) "The Apprentice Engineership will be awarded by the Chief Engineer, Public Works Department, to the student, whether he be a Civil or Mechanical Engineer, who may have been selected conjointly by the Board of Examiners and the full Professorial Staff of the College."

The last three rules are intended to meet the requirements of the College in its new department, viz., that of having a mechanical and a civil course. The Committee is of opinion that the instruction during the first year must be the same for the two classes of students, but that with the end of this first year the instruction given to the two classes must necessarily be different.

In the matter of the practical course, the Committee held the opinion very strongly that a 12 months' course in shops is too short for a student who wishes to become a really efficient Mechanical Engineer; they have therefore recommended the extending of this course by another 12 months; but recognising that this extension of the course will entail expense on the Mechanical Engineer in excess of that which falls on the Civil Engineer, it recommends most strongly that Government should bear the whole of this extra cost for a period of five years from the date on which a student leaving the College comes under this ruling.

Rule (5) explains itself, and the Committee feels it unnecessary to do more than point out that inasmuch as the Apprentice Engineer must be a member of the Public Works Department, it will naturally rest with the then Chief Engineer, Public Works Department, to decide the question of the students' practical course. The work of the department affords but few opening for the Mechanical Engineer pure and simple.

9. *School and College.*—There is one further recommendation the Committee would wish to make, and that is that the distinction between "School" and "College" should disappear, and the whole institution be regarded as a College.

10. *Syllabuses.*—Having disposed of all the points noted above, the Committee proceeded to the work of revising the syllabuses. These as revised for the three classes, viz., Engineer, Upper and Lower subordinate, are given in appendices I, II and III. The only alteration common to all is the excision of the language course. The Committee sees no necessity for wasting valuable time in College over learning languages, and considers that those who through the College seek employment in the public service should be required to learn and pass languages in the same manner as persons recruited from other sources. The main features of the alterations in the syllabuses will be alluded to under the several classes, and it only remains to add here that all the syllabuses are based upon an assumption of a twenty-five hour lecture week exclusive of out-door, workshop, and other morning attendances, and upon an assumed duration of three years for the theoretical course for each class.

11. *Engineer class.*—The syllabuses have been entirely recast to provide a theoretical course which affords common preliminary training for both civil and mechanical students, the bifurcation taking place at the end of the first year's course. After the bifurcation certain lectures which it is not necessary to specify in this report will be common to the two courses as far as the courses permit. It will be noticed that geology has been included in the Civil Engineer's course and mechanism and steam engine omitted. The Committee considers that a knowledge of the former subject is essential to the Civil Engineer and that he can acquire all the knowledge of the latter that is necessary during his College workshop course. As regards the Mechanical Engineer course, elementary electrical engineering has been introduced, the Committee being of opinion that some knowledge of this subject is now-a-days absolutely necessary for the Mechanical Engineer.

Turning to mathematics, the course is devised to develop practical as opposed to analytical methods, the former being what is required of the Engineer. The Committee anticipates that those graduates who have taken mathematics as their optional subject will devote a considerable portion of the mathematical lecture hours to science, and *vice versa* in the case of those who have taken physics as their optional subject.

Freehand and model drawing have been eliminated from the syllabus itself, but the Committee considers that the College staff should insist on a qualifying standard in this subject, and that should any student fail to attain this standard he should be required to work extra hours at this subject until he has attained the standard required.

12. *Upper subordinate class.*—The Committee considers it advisable to alter the designation of the Engineer Subordinate class and recommends that in the future this class be known as the Upper Subordinate class.

The designation now in force is misleading, or at the best conveys no very definite meaning to the generality of employers. The new designation will be intelligible to the public and it has the further advantage of bringing this College in the matter of the designation of the class into line with the Roorkee College, and with the Public Works Department. In the latter the term Engineer Subordinate is unknown.

The Committee is further of opinion that in the case of this class the length of the present theoretical course, viz., 2½ years, is insufficient to enable the necessary instruction to be imparted and absorbed, and is of opinion that it is imperatively necessary to prolong the course by six months and to make it a three-year course.

The alterations made in the syllabus are in the main only verbal, except in applied mechanics and mechanism and the steam engine. The Committee is of opinion that the instruction in the first-named subject, so far as it goes, should be complete, and the syllabus has been altered accordingly.

As regards mechanism and the steam engine, the Committee considers that the syllabus recommended under the title of "Mechanical Engineering," together with the knowledge the students may be expected to acquire during their College workshop course, will give all the training necessary for the class of work the students will be called on to execute in after life.

13. *Military Subordinates.*—The higher educational qualifications which the Committee considers is necessary to insist on in the candidates for this class, viz., the F.A. standard, will, except in a few very exceptional cases, make it very difficult if not impossible for the present class of Military students to compete. It was originally hoped that by recruiting from the ranks of the army a leaven of British tradesmen born and bred out of India would be obtained in the subordinate ranks of the public service. This hope has not been realised, and, while recognising the fact that capable subordinates have occasionally been obtained by the present means of recruitment, the Committee considers that such cases are not sufficiently numerous to justify the continuance of this method of recruitment on the present lines. The majority of the Military students are sons of former and present Military Subordinates in the Public Works Department or of subordinates of other departments, who have enlisted with the idea of entering the Public Works Department by this means; they have in most cases been born and bred in the country. The home-bred Britisher is comparatively speaking a rarity and unless in some measure a social derelict he seldom has the education necessary to ensure collegiate success. The Committee considers that no soldier student should be admitted unless he is a tradesman and has a first-class army school certificate, and that he should be British born and bred. Such students should be admitted to a probationary class for a period of one year to prepare them for a qualifying College examination which should be passed prior to their joining the Upper Subordinate class. All failures should at once rejoin their units. The Committee is of opinion that, should this system fail to produce men of the required stamp, then recruitment from the army should be abandoned, tradesmen when and if required being obtained from England under covenant.

14. *Lower subordinate class.*—The Committee considers that under this title a new class should be formed to replace the present sub-overseer and surveyor and the draftsman class.

The latter class has always been hard to fill, and now that, under the advice of the Director of Public Instruction, Government have ruled that the higher paid draftsman posts reserved for passed College draftsmen may in the future be filled by men with Overseer's qualifications the prospects of filling the draftsman class in the College with the right stamp of men are practically nil. Further the class itself has furnished and does furnish recruits to the sub-overseer and surveyor class, with the result that the best men do three years in the College, viz., one year in the draftsman class and two years in the sub-overseer and surveyor class, while in some successful instances men have actually taken both courses, which means a period of four years spent in the College. The average product of this class on its present footing is useless for anything except mere tracer's work. This is partly accounted for by the educational qualifications now necessary for admission being very low. At the last entrance examination only three qualified on the marks as originally allotted, and it was necessary to lower the qualifying minimum by 25 per cent. and to fill the remaining vacancies from the sub-overseer and surveyor candidates who had failed to obtain a place in that class. This moreover is by no means an isolated instance. The Committee considers that the new class, the formation of which it strongly recommends, will be capable of meeting all the demands now made both for sub-overseers, surveyors and draftsmen. The course proposed will, in its opinion, furnish more efficient men of the first-named class than is the case at present, and will remove the complaint now frequently made that these men cannot draw or plot their own work. The Committee recognises that in a few individual cases the abolition of the rule concerning draftsmen's qualifications will lead to some hardship. It is of opinion that these cases can be met by the grant of personal allowances to the individuals injured.

15. *Board of Examiners.*—The revision of the syllabus disposed of, the Committee turned to the consideration of the composition of the Board of Examiners, staff, etc., subjects which are so intimately connected with those specifically set down for consideration that it was impossible for the Committee to ignore them.

The Committee is of opinion that the Board, as at present composed, should be increased and strengthened by the addition of two members of the College Professorial staff, who will be ex-officio members.

In making the above recommendation the Committee would explain that the two new members will not be examining members; their duty will be to guide the examining members through the syllabus, thereby, ensuring that the papers set will not travel beyond the limits of the work actually done by the class.

This recommendation is based on past experience, and the Committee feels confident that these ex-officio members, while they will undoubtedly prevent the setting of unduly hard questions and questions outside the limits of the lectures that have been given, will in no way interfere with the independence of the Board.

16. *College Staff and Administration.*—On the subject of the College staff the Committee holds very strong views. It is of opinion that the College staff should be recruited from the Public Works Department, and that, consequent on this, the administration should naturally be in the hands of the chief of that department, who would, however, be subordinate, as regards general policy to the Director of Public Instruction but independent in all other matters. As regards expenditure in connection with the College including cost of staff, this should, the Committee considers, be met by grants under Educational. The Committee is satisfied that the existing staff, handicapped as it is by incompetent and inadequate assistants, cannot efficiently teach up to the existing syllabus and *a fortiori* that it is inadequate for the revised syllabus. It further considers that the present method of recruitment is in no way suitable to the needs of the College.

There being no kindred institution in the Presidency, promotion for the technical assistants is only possible within very restricted limits. Further there is no means of automatically filling the senior assistants' places when the latter go on leave. The true cause of the existing evils lies in the fact that the assistants' posts are listed in the Provincial Educational Service, and consequently, owing to the rules regarding acting allowances, it is not possible to fill leave vacancies with men possessing suitable qualifications. The existing difficulties would disappear if the Committee's recommendation to transfer the staff to the Public Works Department were adopted. At the same time it considers that in order to attract the best men staff allowances of Rs. 30, Rs. 100 and Rs. 200 per month should be given in addition to the pay and allowances which those seconded would draw, were they employed on purely departmental duty in the Presidency town. The three grades of staff allowances will meet the cases of junior and senior assistants (now termed instructors) and professors respectively. The Committee recognises that in certain cases special recruitment from home must be resorted to, and is of opinion that the staff so recruited, who would as a matter of course form part of the Public Works Department establishment, should be non-pensionable and under covenant for a term of years (say 5), that the covenant should be renewable if the employee is satisfactory, and that a Provident Fund similar to the Provident Fund of Railway Companies in this country should be established for them. The Committee considers that all professors specially recruited from home should be engaged on such covenants, and that the initial pay should be Rs. 750 rising to Rs. 1,500. The Committee sees no reason why this system cannot be at once adopted, the cadre numbers of the Public Works Department being increased to cover the strength of the staff required. As regards the Principal of the College, the Committee is agreed that he should be an Engineer by profession, and that the post should carry free quarters, the minimum pay being that of a third-grade Superintending Engineer rising to that of a first-grade Superintending Engineer. It further considers that neither the principalship nor a professorship should be held by an officer for a period exceeding ten years without the officer doing at least one year's practical work for every five years' educational work.

Turning to the actual requirements as regards the strength of the staff which the classes and syllabus as revised require, the Committee considers that the following is the minimum staff which will meet requirements:—

One professor of Mathematics and one assistant. (It is preferable if the professor is an Engineer.)

The Professor of Mechanical Engineering with five assistants, one of whom must be a Science Assistant.

The Professor of Civil Engineering and seven assistants.

In addition to the above a gymnastic and drill sergeant is required.

Should the staff remain organised on its present basis, one more professor and three more assistants will be required to cover leave vacancies; these, however, will not be required if the responsibility for staffing the College is handed over to the Public Works Department as recommended. The Committee is of opinion that the transfer of this responsibility from the Educational to the Public Works Department is reasonable, inasmuch as the latter is the chief employer of the students who pass.

The strength of the staff required is arrived at on the basis of a 15-hour lecture week and assumes that the Principal will be able to assist the two engineering professors by lecturing 8 hours a week. Three hours' lecturing a day is as much as can be expected of any man who has to keep himself abreast of modern developments in engineering and gives a reasonable time to the preparation of his lectures.

17. *Board of Visitors.*—With a view to check any tendency under a Public Works Department régime to subordinate the College to the mere needs of the department, and also to assist Government in the future in the disposal of all questions of reorganisation, development, etc., the Committee recommends that a Board of Directors be established, composed as below:—

The Director of Public Instruction.

„ two Chief Engineers.

„ Consulting Engineer for Railways.

„ Chief Engineer, Madras Railway Company.

„ Chief Engineer, South Indian Railway.

„ President, Faculty of Engineering, Madras University.

„ Chairman of the Board of Examiners.

„ Surgeon-General.

„ Secretary in charge of Education.

Any available past Principals, Professors or Officers of the Public Works Department up to four in number with the Principal of the College ex-officio Member and Secretary.

It considers that the quorum of this body should be five. Of so much importance to the welfare of the College and to the furthering of professional education do the Committee consider the establishment of this Board or Standing Committee that it recommends Government to appoint it without any delay.

18. *The Removal of the College.*—The last question the Committee took into consideration was the suitability of the College, as at present placed, to meet all the demands of the present and the future which may come upon it. It is unanimously of opinion that neither the accommodation nor equipment gives the minimum that is absolutely necessary, and it further considers that it is not possible to erect suitable buildings on the existing site, nor is it possible suitably to extend those now existing so as to afford room for expansion in the future to meet modern developments. The Committee therefore cannot but consider that any large expenditure on the present site such as is needed for the immediate provision of laboratories will be sheer waste of money, and it urges upon Government the wisdom of at once arranging for the construction of new buildings in a suitable site, the present buildings being given up at the earliest possible date. Should the site of the Agricultural College become available in the immediate future, the Committee considers that that site will be in every way a suitable one for the location of the new College; should however this site not be available, then a site should be acquired in that neighbourhood or in the neighbourhood of St. Thomas' Mount or Guindy.

The Committee recommends that the College be residential. The success of residential institutions is undoubted and there is no reason to apprehend that the Engineering College would be any exception to the general rule. The Committee's recommendation regarding removal has not been put forward without due consideration of what will be the probable cost of this step. They append to this report an estimate of the cost so far as it is possible to do so without drawing up detailed plans and estimates, and from this it would appear that the cost is not likely to exceed 8 lakhs. This the Committee would point out, is a smaller sum by several lakhs than that which the Government of Bengal is prepared to spend on the removal of the Sibpur Engineering College. The Committee would point out that the erection of suitable hydraulic, mechanical, electrical, chemical and physical laboratories and the extension of the workshop is an urgent matter, and it again draws attention to the impossibility of erecting them economically near the existing premises. It is hardly necessary for the Committee to point out that every rupee spent on improving the intellectual equipment of the Engineering College graduates will be repaid twenty-fold to the pockets of the tax-payer with the spending of whose money they, the College graduates, are the principal primary agents. Taking the expenditure on public works at one crore per annum, a figure which, from inquiries made, is fairly accurate, and assuming that a saving of 2 per cent. on this sum (a moderate estimate) would result from the increased efficiency of the graduates educated in a College capable of educating up to the most modern standards, an outlay of 8 lakhs on the removal of the College does not appear unreasonable.

The Committee would emphasize the fact that this removal of the College is an event which must take place unless the College is permitted to take over the whole of the existing Public offices at Chepauk. This latter contingency, which would at best be an unsatisfactory arrangement, may be dismissed as improbable; and it only remains therefore for the Committee to press home the fact that, in the circumstances, the sooner the removal is carried out the less it will cost, and by so much the earlier will the College itself be able to develop and supply the needs of the engineering student of the present day.

19. *Deputation of a Special Officer.*—The first step in the removal of the College is the preparation of well-considered plans and estimates for the new buildings; and to admit of this being efficiently done, the Committee recommends that an officer be at once placed on special duty to draw up a complete scheme in consultation with the Principal of the College and to prepare the plans and estimates required. It will be necessary for this officer to pay a visit to Europe to study on the spot the best of the laboratories devoted there to the teaching of engineering.

The Committee is of opinion that the whole scheme of removal with complete plans and estimates might be submitted within eight months from the date the officer is placed on special duty.

20. In conclusion the Committee appends an Index to its recommendations. It would draw attention to the fact that in the case of Nos. 1 to 13 inclusive of these recommendations, immediate action is possible and most advisable.

Approximate estimate of cost of Removal of College.

	RS.	RS.
Required per student—		
3,000 cubic feet per student (200 square feet × 15)		
then		
for 300 students at 6 annas per cubic foot ...	3,37,500	
Add for Offices, Store rooms, etc. ...	1,12,500	
	4,50,000	
Hostel, for 300 students at Rs. 600 per student		
(Cost per student of the Victoria Students' Hostel) ...	1,80,000	
		6,30,000
Workshop, Laboratories, etc. ...		2,00,000
		8,30,000
Residences ...		1,50,000
		9,80,000
Equipment ...		2,20,000
		12,00,000
Deduct book value of present buildings ...	2,48,000	
" " " Recreation ground ...	77,000	
" " " Principal's house and ground ...	75,000	
(This is a low figure) ...		4,00,000
Net cost ...		8,00,000

Index to the Committee's Recommendations.

1. Revision of Syllabus ...	Page 3 also
	Appendices I, II and III.
2. Recruitment of the College classes ...	Page 3
3. Fees ...	" 3
4. College year ...	" 3
5. Rules incidental to reorganisation ...	" 3 and 4
6. School and College ...	" 4
7. Engineer class ...	" 4
8. Upper Subordinate class ...	" 5
9. Military Subordinates ...	" 5
10. Lower Subordinate class ...	" 5
11. Board of Examiners ...	" 5 and 6
12. College Staff and College Administration ...	" 6
13. Board of Visitors ...	" 7
14. The Removal of the College ...	" 7
15. Deputation of a Special Officer ...	" 7

IV

Letter—from J. P. DAVIDSON, Esq., President, College of Engineering Committee.
To—the Secretary to Government, Educational Department.
Dated—the 10th April 1905.
No.—360.

As promised in paragraph 2 of my letter No. 340, dated 31st March 1905, I have the honour to forward copies of the syllabuses for the three classes of students. These syllabuses are appendices I, II and III of the report.

ENCLOSURE.

SYLLABUSES.

ENGINEER CLASSES.

BRANCH I.

I.—PURE AND APPLIED MATHEMATICS.

PURE MATHEMATICS.

Algebra—

Binomial theorem. Exponential theorem. Logarithms. Summation of series. Solution of equations by graphs: Approximate solutions of equations by Horner's Method.

Geometry—

Simple problems on the straight line, circle, parabola, ellipse, and hyperbola by analytical or pure geometry.

Mensuration—

Plane and solid.

Plane Trigonometry—

Practical use of logarithms. Adaptation of formulæ to logarithmic computation. Solution of triangles. Calculation of areas. Heights and distances. Circular and hyperbolic functions and the use of their expansions.

Differential Calculus—

Fundamental notions with special applications to Geometrical and Mechanical problems. Theorems of Taylor and Maclaurin. Maxima and minima of one variable. Tracing of well-known curves from their cartesian and polar equations. Curvature, Envelopes, Evolutes and Involute. Change of the variable. Simple cases of partial differentiation.

Integral Calculus—

Integration of standard forms. Calculation of curve lengths and areas. Volumes and surfaces of solids of revolution. Formula of reduction. Integral as the limit of a sum. Double and Triple integrals as applied to Mass Centres and Moments of Inertia. Planimeters. Elementary standard forms of differential equations.

APPLIED MATHEMATICS.

Kinematics—

Displacement in one plane. Translation and rotation. The instantaneous centre. Composition and resolution of displacements, velocities and accelerations. Circular motion and simple harmonic motion.

Rotation of a rigid body in two dimensions.

Kinetics—

Equations of motion deduced from Newton's Laws of Motion. Conservation of Momentum, Work and energy. Motion under gravity including projectiles. Kinetics of simple harmonic motion in a straight line or curve. Pendulums, simple and compound. Impact. Moment of Inertia and radius of gyration.

Hydrostatics—

Transmission of fluid pressure. Thrusts due to fluid pressure on a plane area. Centre of pressure. Thrusts due to pressure of a fluid on bodies wholly or partially immersed. Principle of Archimedes. Conditions of equilibrium of floating bodies. Metacentre. Determination of specific gravities of solids and liquids. Hydrometers. The general phenomena of capillary elevation and depression.

Machines for raising water. The principles underlying the action of the suction pump, force pump, centrifugal pump, and jet pump. The syphon. The Hydraulic press.

II.—SCIENCE.

CHEMISTRY.

1. Physical and Chemical change: Constitution of matter: Simple and Compound substances: Chemical action: Chemical Nomenclature and Symbols: The Atomic theory: Equivalent, Atomic and Molecular weights: Specific and Atomic Heats: Calculation of Weights and Volumes of substances involved in Chemical Reactions: General properties of Gases: Liquefaction: Diffusion, Solution: Dissociation: Electrolysis.

2. The chemistry of the following non-metallic elements and their more important compounds:—Hydrogen, Oxygen, Nitrogen, Chlorine, Bromine, Iodine, Fluorine, Sulphur, Phosphorus, Arsenic, Boron, Carbon and Silicon.

3. Chemical and Physical characteristics of metals as illustrated by:—Sodium, Calcium, Iron, Zinc, Lead, Mercury, Copper, Silver and Gold.

CHEMISTRY:—LABORATORY COURSE.

1. PREPARATION AND EXAMINATION of some of the more common gases, etc.—

Elements.—H, O, (air) N, S, Cl, Br, I.*Compounds.*—HF, HCl, H₂S, NH₃, CH₄, C₂H₄, CO₂, CO, HNO₃, NO, NO₂, N₂O, SO₂, SO₃, H₂SO₄, KClO.

2. QUALITATIVE ANALYSIS—

Simple mixtures of the following metals and acids:—

Bases in the form of metal, oxide, sulphide, haloid or oxysalt:—Na, K, NH₄, Mg, Ba, Sr, Ca, Zn, Mn, Ni, Co, Fe, Al, Cr., Hg, Pb, Bi, Cu, Cd, As, Sb,

Sn, Ag.

Recognition of different valencies of Mn, Fe, Cr, Hg, As, Sn.

Acids.—CO₂, SO₄, SO₃, NO₃, NO₂, CrO₄, Cl, ClO₃, S, Br, I, F, PO₄, AsO₄, BO₃, SiO₂.

Distinction in easy cases between normal and acid salt:—

E.g.—Carbonate and bicarbonate, etc.

NOTE.—Careful attention must be paid to the preliminary examinations of the substance by dry tests.

3. QUALITATIVE ANALYSIS—

(1) *Gravimetric.*—Estimation of Cu and water in pure crystals of Cu, SO₄, 5H₂O.

Separation and estimation of proportions of Ag and Cu in a silver coin.

Estimation of silicon in a specimen of glass.

Estimation of Ca and CO₂ in Calc Spar or any other impure carbonate.(2) *Volumetric.*—Preparation of standard solutions of permanganate, alkali and acid, and easy applications of these solutions to analysis, *e.g.*—Estimation of iron by titration with ferrous ammon, sulphate, etc.

PHYSICS.

Heat.—

Temperature. The construction and use of instruments for measuring temperature. The expansion of solids, liquids and gases with change of temperature. Heat as quantity, and the methods of calorimetry. Change of state. Latent heat; the laws of evaporation; boiling. The conduction of heat. Phenomena attending convection in fluids. Radiation, and the laws of cooling. The nature of heat, determination of the dynamical equivalent of heat. The laws of thermodynamics with simple applications.

Light.—

The Propagation of Light: rays and pencils; photometry. The laws of Reflexion and Refraction of Rays of Light; the sextant; passage of a ray through a prism. The direct reflection and refraction of small pencils at plane and spherical surfaces; passage through a lens. Formation of images. The telescope and microscope. The compound nature of white light, formation of a pure spectrum; the achromatic lens.

Electricity and Magnetism.—

1. Magnets, magnetic bodies. The magnetic field; lines of force. Forces and couples on magnets in the magnetic field. The earth's magnetic field. The phenomena of magnetic induction; the magnetic properties of iron and steel; hysteresis.

2. Electrification, conductors and insulators, the electrostatic field, and electrostatic induction. Charge, potential, and capacity of condensers; discharge, current; energy of charged condensers.

3. The more common cells for producing currents. The magnetic field of current galvanometers. The source of energy for maintaining it. Electromotive force. Ohm's Law, resistance and its measurement; Wheatstone's Bridge. The heating effects of currents, fuses, incandescent lamps. Elementary phenomena of electrolysis. The Clark cell and the potentiometer system of measuring E.M.F., current, etc.

4. Pot. Energy of circuit carrying current placed in magnetic field and derivation of forces and couples on circuit. Application to moving coil instruments (ammeters, voltmeters, etc.).

5. Electromagnetic induction, Maxwell's Law. The variable and steady period of current in a circuit. Simple dynamo machines for producing continuous and alternating currents; induction coil.

GEOLOGY.—(FOR CIVIL BRANCH ONLY.)

Object of Geology.—Its relation to other sciences.

The Earth.—Envelopes: Liquid and Gaseous. The solid globe: the outer crust and interior or nucleus. Distribution of temperature and pressure in the crust.

Petrography.—Classification of rocks according to their character, origin and age. Rock-forming minerals. Determination of rocks. Megascopic examination. Tests in the field. Fracture. Specific gravity. Mechanical analysis. Chemical analysis. Treatment with acid and blowpipe tests, etc. Microscopic analysis. Preparation of slides of rocks and minerals. Microscopic characters of minerals, such as—quartz, orthoclase, plagioclase, augite, hornblende, etc. Microscopic characters and essential constituents of rocks more commonly met with such as—limestone, dolomite, quartzite, flint, gneiss, micaceous and chloritic schists: granite: quartz porphyry: syenite, trachyte, obsidian, pumice: diorite: diabase, dolerite: sand and gravel, sandstones, conglomerates, breccias, slab, clay: laterites: shell marl, chalk: peat, lignite, coal: anthracite, graphite, oil shale petroleum, asphalt: clay iron stone. Origin of above mentioned rocks.

Dynamical Geology.—Volcanoes and volcanic action. Geographical and geological distribution of volcanoes. Earthquakes. Secular upheaval and depression. Geological functions of air, water and ice: chemical and mechanical action: denudation and deposition: river valleys with special reference to Indian rivers. Geological functions of plants and animals.

Structural Geology.—Bedding. Surface marks. Concretions. Relative persistence of strata. Overlap. Groups of strata. Joints. Inclination of rocks; dip, outcrop and strike. Curvature: monocline, syncline, anticline. Nature and origin of faults. Igneous rocks: phase of eruptivity: bosses, sheets, veins and dykes, necks. Interbedded phase of eruptivity: lavas and tuffs. Metamorphism. Ore deposits. Unconformability.

Stratigraphical Geology.—Scope of historical geology. Fossils, their mode of petrification and uses. Classification of animals and plants. The leading stratigraphical laws. General outline of the stratigraphy of Southern India. The geological formations, their rock divisions, characteristic fossils and economic products.

MINERALOGY.

Crystallography.—*Physical.*—Cleavage. Fracture. Hardness. Optical and magnetic properties of minerals.

Geometrical.—Relation of physical properties to geometrical form: arrangement of molecules. Crystalline form: faces. Planes of reference: axes, parameters: indices, symbols. Symmetry. The six crystallographic forms characterized with reference to planes of symmetry. Simple forms and combinations.

Descriptive.—Detailed descriptions of the more common minerals.*Practical.*—Application of above and blow pipe analysis to the identification of minerals.

BRANCH II.

ENGINEERING DRAWING.

1ST YEAR

(Civil and Mechanical Engineering).

Geometry.—

(a) *Practical Plane Geometry.*—Elementary problems dealing with Lines, Triangles, Quadrilaterals, Circles, Polygons: Methods of Construction and Problems relating thereto: Tangents; Inscribed and Described figures: Proportional Lines and Angles: Areas of Plane Figures: Plane Curves: Parabola, Ellipse and Hyperbola: Methods of Drawing and Chief Properties: Cycloidal, Spiral and other Common Curves.

(b) *Practical Solid Geometry and Projection.*—Lines. Points and Planes: Projection of Simple Solids: Regular Solids: Sections of Solids: Development of Plane and Curved surfaces: Tangent Planes and Solids: Interpenetration of Solids: Determination of Shadows: Isometric Projection: Elements of Perspective.

(c) *Graphics.*—Arithmetic: Determination of C.G. of Plane areas.*Machine Drawing.*—

Ability to copy accurately to scale and supply additional views: Drawings of simple machine parts from sketches: Ability to supply and give some idea of the proportions of the more simple machine details such as bolts, nuts, keys, cotters, etc.

Building Drawing.—

Ability to copy plans accurately to scale and to make plans from sketches. *Masonry Details:* Bond in Brickwork, Gauged, Relieving and Inverted arches, Footings and ordinary Foundations; Uncoursed and Coursed Rubble, Ashlar, etc. Dressings such as:—Window Sills, Window and Door Jambs, etc. *Timber Details:* Joints, Halving, Lapping, Notching, etc., also as applied to Wall Plates, Floors, Ceilings, etc. Floors. Doors. Windows: Partitions: Roof Frames. *Iron and Steel Details:* Sections of Cast and Rolled Beams and simple applications: Simple Iron Frames.

SURVEYING.

A. *Surveying.*—Surveying with the chain, compass and plane table. Plotting surveys.B. *Levelling.*—Levels; their adjustment and manipulation. Levelling. Contouring. Plotting.C. *Theodolite work.*—Theodolites; their adjustment and manipulation. Traversing. Setting out straight lines and curves in the field.D. *Topographical Drawing.*—Conventional signs, map-drawing. Representation of ground. Sections on contoured plans. Location of road or railway on contoured plans, showing cuttings and embankments. Estimation of areas.

NOTE.—Students may be sent out into camp for a fortnight or more at a time.

Students will be found into small squads, the size of which will be regulated by the nature of survey under execution. Each student of a squad will be told off to a particular duty, and duties will be frequently interchanged. The instructor will show each squad how to commence work and will then leave it to its own resources, visiting it only occasionally. He will check independently the accuracy of the work performed. Each student must be fully practised in every detail of the work required in the field, such as chaining, holding levelling staves, observing, etc.

Third year students failing to qualify survey field work will attend the following survey camp and will be re-examined at the termination of the camp. Students failing at this re-examination will receive no certificate.

APPLIED MECHANICS (CIVIL AND MECHANICAL).

1. *Stress Strain and the Mechanical Properties of Materials used in Engineering*—
 - (a) Modulus of Elasticity: Elastic Limit, Ultimate Strength, Resilience: Strain beyond the Elastic Limit: Fatigue of Metals: Applications of the Theory of Stress and Strain.
 - (b) Mechanical Properties of the Materials of Construction.
 - (c) The Testing of Materials.
2. *Applications of Statics to Structures*—
 - (a) Definition of a structure: Simple and Compound structures: Perfect, Imperfect and Redundant Frames.
 - (b) The Principles of Graphic Statics: Applications to Roofs, Bridges and similar structures.
 - (c) Beams: Bending Moment and Shearing Force: Load Diagrams: Deflection: Stiffness: The Continuous Beam.
 - (d) Strength of Struts and Columns.
 - (e) The Metal Rib and Hanging Chains
 - (f) Theory of Torsion: Strength of Shafting and other practical applications.
 - (g) Shells and Thick Cylinders.
3. *Hydromechanics*—
 - (a) Floating Bodies: Stability of Floating vessels.
 - (b) General Principles applicable to designs of Dams, Gates, etc.

(FOR MECHANICAL BRANCH ONLY.)

4. *Kinematics and Pure Mechanism*—
 - (a) Definition of a Machine: Machine Elements and Pairs: Links, Chains and Mechanisms.
 - (b) Simple Constrained Motion, Translation and Rotation: Instantaneous Centres: Centroids.
 - (c) Virtual Motion in Mechanism.
 - (d) Linear and Angular Velocity: Speed: Diagrams of Relative Velocities for Elementary Mechanisms.
 - (e) Mechanisms other than Linkwork:—Spur Wheel Trains, Trains, etc., Altered Mechanisms, Expansion of Elements: Reduction of Links: Parallel Motions: Chains containing Non-rigid Links.
 - (f) Dynamics of Mechanism. Velocity and Acceleration: Linear Velocity and Acceleration Diagrams. Force, Mass and Weight: Momentum and Impulse, Work and Energy.
 - (g) Friction. Friction of Rest and Motion: Laws of Dry Friction: Friction of Lubricated Surfaces: Friction in Mechanism and Machines. Efficiency of a Machine.
5. *Applications of Statics and Kinetics to Machinery*—
 - (a) Inertia Forces in the Steam Engine and other Mechanisms.
 - (b) Effort and Resistance: Steadiness: Governors and Fly wheels.

CONSTRUCTION.

1. *Building Materials*—
 - Stones of Southern India.*—Characteristics and preparation.
 - Bricks and Tiles.*—Manufacture and uses.
 - Lime, Cement, Mortar, Concrete and Plaster.*—Sources of supply preparation and working.
 - Timber.*—Varieties used for building purposes, seasoning, preservation.
 - Metals.*—Iron and Steel: Elementary description of metallurgical processes for production.
 Varieties and suitability for use. Other common metals, such as copper, zinc, lead, tin and alloys.
2. *Theory and Design of Structures in Wood.*—Iron, Steel, Masonry and Earth—
 - (a) *Masonry Structures.*—Foundations: Buildings: Bridges: Retaining walls: Tunnels.
 - (b) *Structures in Iron and Steel.*—Roofs, Bridges, Gates and Shutters.
 - (c) Ability to make intelligible dimensioned sketches of structures and simple machines.
3. *General Principles governing the Design of*—Railways, Roads, Harbours and other works.

NOTE.—The above syllabus connotes Building drawing exercises, designs, and estimating.

HYDRAULIC ENGINEERING.

1. *Discharge from Orifice and Notches.*—Volume of flow. Principle of continuity. Small orifices. Velocity of discharge. Co-efficients of Velocity, contraction, and discharge. Adjutages. Short pipes. Large orifices. Rectangular notch and orifice. Triangular notch. Velocity of approach. Submerged and partly submerged orifices. Submerged notch.
2. *Practical cases of Discharge from Orifices and Notches.*—Tank surplus weirs. Drowned weirs. Gauging weirs. Anicuts with clear overfall or drowned. Sluices: head, under, tank, weir, lock and irrigation. Bridge openings. Afflux, backwater. Modules.
3. *Discharge under variable Heads.*—Free discharge from prismatic vessels. Time of emptying or filling. Discharge during a given time. Canal locks. Discharge from irregular basins. Discharge from one prismatic vessel into another.

4. *Flow of water in Pipes.*—Fluid friction. Velocity in pipes. Virtual slopes. D'Arey's co-efficients of friction. Velocity and discharge. Short pipes. Siphon sluice. Inclination of pipes. Branched mains. Pipes not running full. Minor losses of head. Jets.

5. *Flow of water in Channels.*—Open channels. Co-efficients: Channel section. Discharge. Trapezoidal section in earth. Practical data. Channels of minimum border. Channels for variable discharge. Variation of velocity in a cross section. Falls. Standing waves.

6. *Pumps and Waterlifts.*

7. *Rivers.*—Estimation of discharge. Maximum flood discharge from catchment basins. Discharge formulæ. Bends in rivers. Regime of rivers.

8. *Storage and distribution of water.*—Supply for irrigation, navigation or to a town. Rain-fall. Supply from wells, rivers and reservoirs.

9. *Masonry works in irrigation projects.*

10. *Canals and Channels.*—Irrigation canals in deltaic and non-deltaic country. Supply from rivers and tanks. Capacity of canal. Limiting velocities. Fall. Side slopes. Alignment. Disposal of cross drainage; Height of banks. Navigable canals.

11. *Tanks.*—Isolated rain-fed tanks. Tanks in groups. Tanks supplied by rivers or streams; Capacity. Irrigating duty. Loss of water by evaporation and absorption. Construction of earthen bunds. Puddle walls. Revetment of earthen bunds. Design and construction of surplus weirs. Tank sluices and their regulation. Repairs to bunds, and closing breaches.

12. *Water-supply of Towns.*

13. *Town drainage and sewage disposal.*

NOTE.—The above syllabus connotes Building drawing exercises, design and estimating.

MECHANICAL ENGINEERING.

1. *General Machine Design.*

Fastenings.—Bolts, nuts, keys and cotters: Rivetted joints and connections generally: Pipes and cylinders: Shafting and journals: Pedestals: Wall fixings, etc., Belt and rope gearing: Friction and spur gearing.
2. *Boilers and Fuel*—
 - (a) Coal, wood, gas and petroleum: Physical characteristics: Approximate chemical composition: Heat of combustion: Evaporative powers: Air of dilution.
 - (b) *Draught.*—Natural, forced and induced: Chimney design.
 - (c) *Boilers.*—Ordinary forms of stationary: Locomotive, marine, water-tube and other types: Heating surface: Fire-grate area: Boiler efficiency: Feed pumps and injectors: Feed heaters: Mountings: Management and cleaning.
3. *Theory of Heat*—
 - (a) Thermodynamical Principles: Joule's Law: Carnot's Cycle: Perfect Heat Engine: Second Law: Laws of Gaseous expansion.
 - (b) Air Engines: Stirling and other forms.
 - (c) The Internal Combustion Engine.—The Gas Engine, The Oil Engine.
 - (d) *Steam.*—Thermodynamics of the Generation, Expansion and Condensation of steam: Heat diagrams, etc.
 - (e) The Steam Engine: Early forms and modern developments: High speed Engines: Efficiencies of non-condensing, condensing, simple, compound and multiple expansion types: steam jacketing: superheating.
 - (f) *Steam Turbines.*—Parson, De Laval and other types.
 - (g) *Engine Testing.*—Consumption of steam and Fuel, Gas and oil: Brakes and Dynamometers: Indicators and Indicator Diagrams.
4. *Engine Accessories and Details*—
 - (a) Condensers, air pumps, circulating pumps, cooling tanks, etc.
 - (b) Cylinders, pistons, cross heads, guides, connecting rods, cranks, governors, fly wheels, valves and valve gears, glands and pipes.
5. *Hydraulic Machinery*—
 - (a) Bucket and Plunger: Piston forms: Valves: Air vessels and stand pipes: Efficiency of pumps.
 - (b) Water wheels: Theory, design and efficiency: Undershot, overshot, breast and other forms.
 - (c) Turbines: Theory, design and efficiency: Parallel, outward and inward flow: Governing.
 - (d) The Centrifugal pump: Pulsometer: Rams: Air Lift Pumps, etc.
 - (e) Hydraulic transmission of power: Accumulators: Valves, etc.

6. *Machine Tools and Mechanical Manipulation—*

(a) Cutting of Metals : Tool Steels : Shape and preparation of tools : Lubrication of tools : Speed of cutting and power required.

(b) Surface Plates : Callipers and gauges.

(c) Lathes: Early forms and modern developments: Turret and other lathes adopted for special purposes: Screw cutting: Tools and chucks.

(d) Screw Machines: Boring and turning mills, Milling machines: Planing machines: Shaping machines: Slotting machines: Drilling machines: Sawing machines: Gear cutting machines: Grinding and other miscellaneous machines:

(e) Methods of driving and general arrangement of machine tools: Shafting: Electrically driven machines.

N.B.—Stress will be laid on the ability to make intelligible dimensioned sketches. The above syllabus connotes all Machine Drawing and Design.

ELECTRICAL ENGINEERING (FOR MECHANICAL ENGINEERING STUDENTS).

1. *Fundamental Laws, Units and Standards.*
2. *Electrical Measuring Instruments and Testing Processes.*

Measurement of Current, Potential Difference, Resistance and Power: Galvanometers, Ammeters and Voltmeters: The Potentiometer and other Standard Instruments. Testing and Checking Electrical Instruments. Electric Meters.

- ### 3. Magnetism and Electro-magnetism considered in Relation to Electrical Energy—

Magnetisation of Iron : Practical Determination of Magnetic Qualities of Iron and Steel ;
Electric-magnetic Induction.

- #### 4. Design and Construction of Dynamos—

Series, Shunt and Compound Machines: Simple and Polyphase Alternators: Methods of Testing: Characteristic curves.

- ### 5. *Electric Distribution and Power supply—*

System of Electric Supply : Continuous Current : Simple and Polyphase Alternating Systems : High and Low Tension. Transformers : Rotary Convertors : Accumulators : Lamps : Mains, etc. : Electric Traction. General Principles of Artificial Illumination : Photometry.

CIVIL ENGINEERING.				Branch-I.		Branch-II.		PHYSICAL EXERCISE.?	
MATHEMATICS (1st and 2nd years).		SCIENCE.?		Engineering .. 6,400.		Engineering .. 6,400.		Grand Total .. 8,000.	
Pure and Applied .. 900		Chemistry .. 100 1st year. (25)							
		Physics .. 300 (75)							
		Geology .. 200 2nd year. (50)							
Total .. 1,500.									
DRAWING.?		SURVEYING.?							
Geometrical { Geometry .. 300 (100)		Chain Compass Plane Table.. 300 (200)	1st year.	Applied Mechanics, 2 papers .. 1,000 (200)	Engineering Laboratory (400)				
Drawing. { Free-hand .. 50 (50)		Level .. 300 (200)	2nd year.	Construction, 2 papers .. 1,000 (200)	Workshop .. (200)				
Model .. 50 (50)		Theodolite .. 400 (200)	3rd year.	Hydraulic Engineering, 2 papers .. 1,000 (200)					
Building Drawing .. 200 (100)		Total .. 1,000 (600)		Drawing, 4 papers .. 1,000 (500)	Total .. (600)				
Machine Drawing .. 200 (100)				Total .. 4,000 (1,100)					
Total .. 800 (400)									

N.B.—The bracketed marks show those allotted by the College, while the total is shown unbracketed.

MECHANICAL ENGINEERING.				Branch-I.		Branch-II.		PHYSICAL EXERCISE.	
MATHEMATICS (1st and 2nd years).		SCIENCE.?		Engineering.		Engineering.		Grand Total .. 8,000	
Pure and Applied .. 900		Chemistry .. 100 (25)							
		Physics .. 300 (75)							
Total .. 1,300 (100)									
DRAWING 1st Year.		2nd and 3rd Years.							
Geometrical Drawing { Geometry .. 300 (100)		Applied Mechanics, 2 papers .. 1,000 (200)							
Free-hand .. 50 (50)		Mechanical Engineering, Theory and Practice, 3 papers .. 1,500 (300)							
Model .. 50 (50)		Note-Books, etc. .. 1,200 (800)							
Building Drawing .. 200 (100)		Drawing, 4 papers .. 200 (200)							
Machine Drawing .. 200 (100)		Engineering Laboratory (including Strength of Materials, Heat Engines, etc.) .. 200							
Total .. 800 (400)		Note-Books .. 200							
		Examination in Lab. .. 400 (400)							
		Workshop (Mechanical and Electrical Engr. Practice) .. 4,500 (1,900)							
		Total .. 4,500 (1,900)							

Y Z—The bracketed marks show those allotted by the College, while the total is shown unbracketed.

SYLLABUSES.

UPPER SUBORDINATE CLASS.

BRANCH I.

I.—MATHEMATICS*.

A.—Arithmetic—

Use of decimals in preference to vulgar fractions for practical calculations. Degree of accuracy of measurements. Contracted multiplication and division. Labour-saving methods;

(1) use of tables of squares, cubes, square roots and cube roots; evaluation of the forms $\frac{a}{\sqrt{b}}$, $\frac{a}{\sqrt{b}}$,

$\sqrt{\frac{a}{b}}$, $\sqrt{\frac{a}{b} + \frac{c}{d}}$; (2) use of logarithms and antilogarithms in multiplication and division, involution and evolution.

B.—Algebra—

Factorisation. Simplification. Rules of indices. Easy problems leading to simple and quadratic equations. Determination of constants in equations of known form such as $y = ax + b$, $y = ax + bx + c$. Arithmetical progression; geometrical progression.

Co-ordinates of a point in a plane. Plotting observations on section paper. Probable intermediate values. Plotting of simple functions, such as $y = mx$, $y = mx + n$, $ay = x^2$, $y = ax^2 + bx + c$, $y = (x-a)(x-b)$, $y = (x-a)(x-b)(x-c)$. Use of section paper for obtaining maximum and minimum values and roots of equations.

NOTE.—The co-efficients in equations like $y = ax^2 + bx + c$, etc., will be numerical. Discussion of the forms of graphs for different values of a , b , c is not required.

C.—Geometry—

The inscribed, escribed and circumscribed circles of a triangle. To describe the following regular polygons, (1) on a given base, (2) in a given circle, (3) about a given circle;—(a) square, octagon; (b) hexagon, equilateral triangle, dodecagon; (c) decagon, pentagon, quindecagon. The in- and circum-scribed circles of regular figures. Area of a parallelogram = base $\times$ altitude; area of triangle = $\frac{1}{2}$ base $\times$ altitude. Deduce Euclid VI, 1 and corollary. Euclid VI, 2, 9 to 13, 3, A. To describe a triangle equiangular to a given triangle (1) on a given base, (2) in a given circle, (3) about a given circle. Euclid VI, 4, B, C, D, 8, 24. Ratio of two triangles or parallelograms having one angle of the one equal to one angle of the other. Similar triangles are to one another as the squares on the homologous sides or lines. Ratios of similar figures and solids. Euclid VI, 5, 6, 26. Explanation of the enunciation of VI, 33 and illustrations.

NOTE.—The geometrical analogues of the propositions in Algebra relating to four quantities in proportion will be assumed.

D.—Mensuration—

Rule for length of circumference of a circle. Rules for area of triangle, parallelogram, circle, sector and segment of circle. Area of irregular plane figure by mid-ordinate rule and Simpson's rule. Rules for surface and volume of prism, cylinder, cone, sphere and ring. Volume of an irregular solid by plotting ordinates representing areas of cross sections. Estimation of areas, surfaces and volumes from actual measurements of objects. Measurement of areas and volumes by weight or displacement. Meaning of specific gravity. Calculation of the weight of a body when its volume and specific gravity are known.

E.—Plane Trigonometry—

Measurement of angles in degrees and radians. Definitions of sine, cosine, etc., and graphic determination of their values. Setting out angles from values of sine, cosine, etc. Use of tables of natural sines, cosines, etc. Solution of right-angled triangles by calculation and drawing. Formulæ for the sine, cosine and tangent of the sum and difference of two angles, and of the double and half angle. Other simple formulæ required in the solution of triangles. Use of logarithmic tables. Solution of triangles heights and distances.

NOTE.—Four-figure tables of logarithms only will be used; angles will be estimated only to minutes.

ENGINEERING DRAWING.

Geometry—

(a) *Practical Plane Geometry*.—Elementary problems dealing with lines, triangles, quadrilaterals, circles: polygons: methods of construction and problems relating thereto: tangents: inscribed and described figures: proportional lines and angles: area of plane figures: plane curves: parabola, ellipse and hyperbola: methods of drawing and chief properties: cycloidal, spiral and other common curves.

* This syllabus and mark distribution are first applicable to the class joining in July 1902.

(b) *Practical Solid Geometry and Projection*.—Lines, points and planes: projection of simple solids. The regular solids: sections of solids: development of plane and curved surfaces: tangent planes and solids: interpenetration of solids: determination of shadows: isometric projection: elements of perspective.

(c) *Graphics*.—Arithmetic, determination of C. G. of plane areas.

Machine Drawing—

Ability to copy accurately to scale and supply additional views: drawings of simple machine parts from sketches: ability to supply some idea of the proportions of the more simple machine details such as bolts, nuts, keys, cotter, etc.

Building Drawing—

Ability to copy plans accurately to scale: *Masonry Details*:—Bond in brickwork, gauged, relieving and inverted arches, footings and ordinary foundations: uncoursed and coursed rubbles, ashlar, etc. Dressings such as:—Window sills, window and door jambs, etc. *Timber details*:—Joints halving, lapping, notching, etc., also as applied to wall plates, floors, ceilings, etc. Floors, doors, windows: partitions: roof frames. *Iron and steel details*. Sections of cast and rolled beams and simple applications: iron roof frames of small span.

Freehand and Model Drawing—

Ornamental outlines. Applications of elementary perspective to model drawing of simple objects.

NOTE.—*Machine Drawing*, *Building Drawing* and *Hydraulic Engineering Drawing*, and *Estimating* a special teaching in these subjects will be given during the courses of lectures in which Mechanical Engineering, Construction and Hydraulic Engineering are respectively taught. Marks will be allotted by the College for the drawing work done by students during these courses. A paper will also be set by the Board of Examiners in each of the above three branches of drawing.

HYDRAULIC ENGINEERING.

1. *Hydrostatics*.—Hydrostatic laws. Pressure at a point and on a surface. Equal transmission of pressure. Atmospheric pressure. Siphon. Specific gravity. Flotation.

2. *Discharge from orifices and notches*.—Small orifices. Velocity of discharge. Co-efficients of velocity, contraction and discharge. Rectangular orifice and notch. Triangular notch velocity of approach. Submerged and partly submerged orifices. Submerged notch.

3. *Practical cases*.—Tank weirs. Drowned weirs. Gauging weirs. Anicuts, sluices, head, under, lock and tank. Modules.

4. *Discharge under variable head*.—Free discharge from prismatic vessels. Time of emptying or filling locks. Discharge from one prismatic vessel into another.

5. *Flow in pipes*.—Fluid friction. Velocity in pipes. Virtual slope. Discharge. Inclination of pipes. Pipes not running full.

6. *Flow in channels*.—Sections for channels. Co-efficients. Discharge of channels. Practical data. Channels of minimum border. Falls.

7. *Rivers*.—Cross sections. Measurement of velocity and discharge. Flood discharge from catchment basins. Bends. Regime of rivers.

8. *Storage and distribution*.—Irrigation, navigation and town supply. Rainfall. Supply from wells, rivers and reservoirs.

9. *Masonry works in irrigation projects*.

10. *Canals and channels*.—Irrigation in deltas and elsewhere. Supply from rivers. Storage in tanks. Capacity of channel, limiting velocity. Surface fall, side slopes alignment. Cross drainage. Navigation canals.

11. *Tanks*.—Isolated rain-fed tanks. Tanks in groups. Tanks supplied from rivers or streams. Catchment and capacity of a tank. Irrigating duty of water. Tank bunds, puddle walls, revetment. Surplus weirs. Tank sluices. Closing breaches.

This syllabus connotes drawing and design of works mentioned.

APPLIED MECHANICS.

1. Mechanical properties of Engineering materials: stress and strain: Modulus of elasticity: elastic limit: ultimate strength: factor of safety and working stress.

2. Statics and applications to structures: coplanar forces: parallelogram, triangle and polygon of forces: applications by graphical methods to simple frames with pin joints, such as cranes, etc. Wind pressure on roofs.

3. Elementary study of beams: bending moment and shearing force: sections in iron, steel and wood.

4. Struts and columns: formulæ of Gordon and Euler.

5. Simple shear and torsion: strength of shafts.

6. Elementary application of theory in design of small bridges and arches generally, retaining walls and dams.

7. Principle of work: potential and kinetic energy: centrifugal force.

MECHANICAL ENGINEERING.

Transmission of motion and power.—Shafts, couplings, clutches, pedestals and wall fixings, Belts, ropes and pulleys. Telodynamic transmission. Toothed gearing, spur and bevil wheels, rack and pinion, worm gearing. Cam's examples of uses of above in ordinary machines.

Boilers.—General description and management of Cornish, Lancashire, vertical, locomotive flash and water-tube boilers. Feedheaters, economizers, superheaters and other accessories and mountings.

Steam and other Heat Engines.—Description and method of working of stationary and locomotive engines. Steam turbines. Gas and oil engines. Engine accessories and details:—condensers, air and circulating pumps, cylinders, pistons slide valves, governors, fly wheels, etc.

Hydraulic Machinery.—General description of ordinary forms of force and centrifugal pumps, pulsometer and rams. Water wheels, parallel, outward and inward flow turbines. Presses and riveters. Hydraulic transmission of power, accumulators, valves, etc.

Machine Tools and Mechanical Manipulation.—Cutting of metals. Surface plates, calipers and gauges. Arrangement of drilling shaping, planing, slotting and milling machines. Lathes, turning and boring mills. Punching and shearing machines.

This syllabus connotes drawings of works mentioned.

CONSTRUCTION.*

Construction Materials†—

1. *Stone.*—Varieties met with in Southern India. Quarrying. Blasting with powder and dynamite. Dressing. Average strength and weight of stone.

2. *Bricks and Tiles.*—Brick earth. Tempering. Hand and machine moulding. Drying, Burning in clamps and kilns. Hoffman's kiln. Coloured bricks and tiles. Pressed bricks. Roofing, flooring and drain tiles. Fire bricks. Average strength and weight of brick Characteristics of good bricks and tiles.

3. *Lime, Cement, Mortar, Concrete, Plaster.*—Sources and properties of lime. Burning in intermittent and running kilns. Slaking. Mortar mixing. Fat and Hydraulic limes. Portland cement manufactured in England and in Madras. Hydraulic mortar. Surki. Concrete. Practical tests for limes and cements. Strength of mortars and concretes. Plaster and plastering. Pointing. White and colour washing.

4. *Timber.*—Growth. Felling. Seasoning, natural and artificial. Conversion. Preservation of timber. Varieties of timber used in Southern India—teak, saul, erool, karimaridoo, padowk, vengay, benteak, aynee, red and white cedar, rosewood, casuarina, mango, palmyra, cocoanut, bamboo. Strength and weight of timber. Characteristics of good timber.

5. *Metals.*—Iron ores. Smelting. Grey and white pig iron. Castings. Pipes and columns of cast iron. Chilled castings. Strength of cast iron. Brief description of the manufacture of wrought iron. Forms of wrought iron. Galvanized and corrugated iron. Tests and strength of wrought iron. Rivets and bolts. Punching and drilling holes. Riveting. Cutting plates and bars. Welding. Steel, hard and mild. The Bessemer process. Strength of steel. Copper. Zinc. Lead. Tin. Alloys. Soldering metals.

6. *Paints and Varnishes.*—Ingredients of paint. Litharge. Turpentine. Linseed oil. Mixing paint. Painting old and new work. Wood oil. Coal tar. Distemper. Varnish. Papering. Putty. Glazing.

7. *Masonry.*—Coursed and uncoursed rubble. Block in course. Ashlar. String courses. Copings. Bricklaying. English and Flemish Bond at angles of walls, in footings with offsets, and footings. Plinth. Damp proof course. Thickness of main and cross walls. Wall plates. Wood bricks and plugs. Openings for timber beams, for doors and windows. Corbelling. Flat, segmental, pointed and relieving brick arches. Inverts. Centres for small arches. Bond in brick and stone arches. Small oblique arches. Enclosure walls. Buttresses and counterforts. Retaining and breast walls. Scaffolding.

8. *Foundations.*—Excavation. Masonry and concrete foundations. Unequal settlement. Pressure on soil under foundations. Foundations on rock, good and bad soils. Piles. Cofferdams and caissons. Well foundations. Brick and iron wells. Mode of sinking wells. Patent excavators for well sinking. Setting out buildings from working plans.

* Great stress will be laid on the importance of making large size detail sketches completely dimensioned. Visits of inspection will be made to buildings and bridges in progress, and note-books of sketches will be submitted. Buildings and bridges will be set out on the ground. Arches will be set out on a floor and skewbacks and courses marked.

† In connection with this subject, Building drawings will be executed as part of the Drawing course.

‡ During this course, visits of inspection will be made to the following and other works:—

- (a) Pallavaram stone quarries.
- (b) Perambur brickfields.
- (c) Government brickfield, Poonamalee Road.
- (d) Lime-kilns, Cochrane's basin.
- (e) Madras cement works.
- (f) Gun Carriage Factory or other foundry.

Written reports are not required, but students will submit note-books of dimensioned sketches illustrative of the processes witnessed.

9. *Carpentry.*—Mortise and tenon joint. Fishing and scarfing. Iron straps and bolts. Roofs and bridge frames, nature of stress in the different members. Detail of joints. Frames of timber and iron combined. Trussed beams. Timber floors. Stairs, designing and setting out. Doors and windows. Centerings for arches. Striking centres.

10. *Roofs and Floors.*—Terrace roofs and floors on joists, beams joists, or iron girders and joists. Bengal terrace roofs. Fire-proof floors. Brick arched roofs. Pitched roofs. Couples. Trusses. Rafters, purlins and reebers. Roof coverings of thatch, tiles, slates and shingles. Ceilings. Floors of stone, brick, tiles, concrete, timber and asphalt. Simple forms of iron roof. Use of tee, angle and channel iron in compression, and of rods and flat bars in tension. Joints and connections. Shoes, rivets, bolts. Iron and timber purlins. Brackets. Patent tiles corrugated iron, lead and zinc roofing. Modes of attachment. Ventilators.

11. *Bridges.*—Names of parts. Thickness of arch-ring, wing-walls, centerings. Setting out arches full size.

12. *Roads.*—Road construction and maintenance.

This syllabus connotes Building Drawing, designs and estimates.

SURVEYING.

A. *Surveying.*—Surveying with chain, compass and plane table. Plotting surveys.

B. *Levelling.*—Levels: their adjustment and manipulation. Levelling. Contouring. Plotting.

C. *Theodolite.*—Theodolites their adjustment and manipulation. Traversing. Gale's traverse system. Setting out straight lines and curves in the field.

D. *Topographical Drawing.*—Conventional signs, map-drawing, representation of ground by contours. Sections on contoured plans. Plan of road or railway on contoured ground showing cuttings and embankments. Estimation of areas.

Students may, however, be sent out into camp for a fortnight or more at a time.

Branch I.	Branch II.	Physical Exercises.
Mathematics. 700	Engineering.	100 (100)
	Construction ...	700 (100)
	Hydr. Engineering ...	700 (100)
	Applied Mechanics ...	700 (100)
	Mechanical Engineering ...	400 (100)
	Drawing ...	500 (250)
	Surveying ...	700 (400)
700	3,700	(1,050) 100 (100)

N.B.—The bracketed marks show those allotted by the College while the total is shown unbracketed.

SYLLABUSES.

LOWER SUBORDINATE CLASS.

ENGINEERING DRAWING.

Geometry.—

(a) *Practical Plane Geometry.*—Elementary problems dealing with Lines, Triangles, Quadrilaterals, Circles: Polygons: Methods of Construction and Problems relating thereto: Tangents: Inscribed and Described figures: Proportional Lines and Angles: Areas of Plane Figures: Plane Curves: Parabola, Ellipse and Hyperbola: Methods of Drawing and Chief Properties: Cycloidal, Spiral and other Common Curves.

(b) *Practical Solid Geometry and Projection.*—Lines, Points, and Planes: Projection of Simple Solids. The Regular Solids: Sections of Solids: Development of Plane and Curved Surfaces: Tangent Planes and Solids: Interpenetration of Solids: Determination of Shadows: Isometric Projection: Elements of Perspective.

(c) *Graphics.*—Arithmetic, Determination of C.G. of Plane areas.

Machine Drawing.—

Ability to copy accurately to scale and supply additional views: Drawings of simple machine parts from sketches: Ability to supply some idea of the proportions of the more simple machine details such as bolts, nuts, keys, cotters, etc.

Building Drawing.—

Ability to copy plans accurately to scale: *Masonry Details*:—Bond in Brickwork, Gauged, Relieving and Inverted Arches, Footings and ordinary Foundations: Uncoursed and Coursed Rubbles, Ashlar, etc. Dressings such as:—Window Sills, Window and Door Jumbs, etc. *Timber*

Details:—Joints Halving, Lapping, Notching, etc., also as applied to Wall plates, Floors, Ceilings, etc. Floors, Doors, Windows: Partitions: Roof Frames. *Iron and Steel Details*. Sections of Cast and Rolled Beams and simple application:—Iron Roof Frames of small span.

Freehand Model Drawing—

Ornamental outlines. Application of elementary perspective to model drawing of simple objects.

NOTE:—*Machine Drawing*. *Building Drawing* and *Hydraulic Engineering Drawing*, and *Estimating* a special teaching in these subjects will be given during the courses of lectures in which Mechanical Engineering, Construction and Hydraulic Engineering are respectively taught. Marks will be allotted by the College for the drawing work done by students during these courses. A paper will also be set by the Board of Examiners in each of the above three branches of drawing.

SURVEYING.

Field work same as Upper Subordinate. Theory the same, with due regard to mathematical limitations.

A. *Surveying*.—Surveying with the chain, compass and plane table. Plotting surveys.

B. *Levelling*.—Levels; their adjustment and manipulation. Levelling. Contouring. Plotting.

C. *Theodolite work*.—Theodolites; their adjustment and manipulation. Traversing. Setting out straight lines and curves in the field.

D. *Topographical Drawing*.—Conventional signs, map-drawing. Representation of ground. Sections on contoured plans. Location of road or railway on contoured plans, showing cuttings and embankments. Estimation of areas.

NOTE.—Except during the month of April, one day will be set apart for field work. Students may be sent out into camp for a fortnight or more at a time.

Students will be formed into small squads, the size of which will be regulated by the nature of survey under execution. Each student of a squad will be told off to a particular duty and duties will be frequently interchanged. The instructor will show each squad how to commence work and will then leave it to its own resources, visiting it only occasionally. He will check independently the accuracy of the work performed. Each student must be fully practised in every detail of the work required in the field, such as chaining, holding levelling staves, observing, etc.

Third year students failing to qualify in survey field work will attend the following survey camp and will be re-examined at the termination of the camp. Students failing at this re-examination will receive no certificate.

ENGINEERING.

Materials—

1. *Stone*.—Varieties met with in Southern India. Quarrying. Blasting with powder and dynamite Dressing.

2. *Bricks and Tiles*.—Brick earth. Tempering. Hand and machine moulding. Drying. Burning in clamps and kilns. Pressed bricks. Tiles. Strength and weight of brick. Characteristics of good tiles and bricks.

3. *Line, Cement, Mortar, Concrete, Plaster*.—Sources and properties of lime. Burning in intermittent and running kilns. Slaking. Mortar mixing. Fat and hydraulic limes Portland cement. Hydraulic mortar. Surki. Concrete. Practical tests for limes and cements. Plaster, sources and plastering. Pointing. White and colour washing.

4. *Timber*.—Seasoning, natural and artificial. Conversion. Preservation of timber. Varieties of timber used in Southern India. Strength and weight of timber. Characteristics of good timber.

5. *Paints and Varnishes*.—Ingredients of paint, litharge, turpentine, linseed oil. Mixing paint. Painting old and new work. Wood oil. Coal tar. Varnish. Putty. Glazing.

CONSTRUCTION.

1. *Masonry*.—Coursed and uncoursed rubble. Bolek in course. Ashlar. String courses. Copings. Bricklaying. English and Flemish bond. Bond at angles of walls, in footings with offsets, between main and cross walls, at door and window openings and in circular pillars. Foundations and footings. Plinth. Thickness of main and cross walls. Wall plates. Wood bricks and plugs. Openings for timber beams, for doors and windows. Corbelling. Flat segmental pointed and relieving brick arches. Centres for small arches. Bond in arches. Small oblique arches.

2. *Foundations*.—Excavation. Masonry and concrete foundations. Unequal settlement. Foundations on rock, good and bad soils. Well foundations. Setting out buildings from working plans.

3. *Carpentry*.—Mortise and tenon joint. Fishing and scarfing. Iron straps and bolts. Simple roof and bridge frames. Detail of joints. Frames of timber and iron combined. Doors and windows.

4. *Roofs and floors*.—Terrace roofs and floors on joists, beams and joists, or iron girders and joists. Bengal terrace roof. Pitched roofs; Couples. Trusses. Rafters, purlins and reepers. Roof covering. Ceilings. Floors of stone, brick, tiles, concrete, timber and asphalte. Simple forms of iron roofs. Joints and connections. Iron and timber purlins. Ventilators.

5. *Bridges*.—Names of parts. Thickness of arch-ring, wing-walls, centerings. Setting out arches full size.

6. *Road*.—Road construction and maintenance.

7. *Tanks and Channels*.—Supply from wells, tanks and rivers. Discharge from catchment areas. Construction of tank bunds, escapes and irrigation sluices. Use of simple formulæ for the discharge of escapes and sluices. Discharge of channels. Permissible limits of fall and velocity in minor channels. Laying out and construction of channels. Regulation of supply from head sluices.

This syllabus connotes all Drawings, designs and estimates.

APPLIED MECHANICS.

1. *Stress and Strain*.—Hooke's law. Modulus of elasticity. Elastic limit. Ultimate strength. Factor of safety and working stress.

2. *Elementary Statics*.—Parallelogram, triangle and polygon of forces. Easy graphical applications to ordinary frames. Wind pressure on roofs.

3. *Elementary Study of Beams*.—Bending moment and shearing force. Sections in iron, steel and wood.

4. *Simple Shear*.—Examples of applications in ordinary structures.

5. Easy applications of theory and the use of empirical formulæ in the design of small bridges, arches and retaining walls.

6. *Principle of work*.—Graphic representation. Simple applications to machines. Potential and kinetic energy.

Marks—

First year—

Surveying	...	...	...	...	...	...	800	(400)
Geometrical Drawing	...	...	...	...	...	...	600	(300)
Engineering	...	...	...	...	...	...	1,000	(500)
Workshop	...	...	...	...	...	...	200	(200)

Second year—

Surveying	...	...	...	...	...	...	800	(400)
Geometrical Drawing	...	...	...	...	...	...	400	(200)
Engineering	...	...	...	...	...	...	1,200	(600)
Workshop	...	...	...	...	...	...	200	(200)

Third year—

Surveying	...	...	...	...	...	...	800	(400)
Geometrical Drawing	...	...	...	...	...	...	100	(50)
Engineering	...	...	...	...	...	...	1,500	(750)
Workshop	...	...	...	...	...	...	200	(200)

7,800 (4,200)

Physical Exercises ... 100 (100)

7,900 (4,300)

Note.—The unbracketed figures show the total marks whilst the bracketed figures show the marks to be allotted by the College staff.

V

Memorandum No. 310, Educational, dated 2nd June 1905.

The report is referred to Mr. Chatterton for remarks.

H. D. TAYLOR,
Ag. Secretary to Government.

To A. Chatterton, Esq., through the Director of Public Instruction.

VI

Telegram—from the Secretary to Government, Educational Department.

To—A. CHATTERTON, Esq., School of Arts, Madras.

Dated—the 27th June 1905.

No.—29.

Please return at an early date file regarding reorganization Engineering College.

VII

Telegram—from A. CHATTERTON, Esq., School of Arts, Madras.
To—the Secretary to Government, Educational Department.
Dated—the 27th June 1905.

File returned to Director of Public Instruction with remarks on the 16th.

VIII

Telegram—from the Secretary to Government, Educational Department.
To—the Director of Public Instruction, Madras.
Dated—the 28th June 1905.
No.—30.

Please expedite submission of [the] file regarding reorganization [of the] Engineering College.

IX

Letter—from A. CHATTERTON, Esq., Professor of Engineering on Special duty,
School of Arts, Madras.
To—the Director of Public Instruction.
Dated—the 16th June 1905.
No.—524.

In reply to Ref. on Cur. No. 7291 of 1904, I have the honour to submit the following remarks upon the report of the committee on the reorganization of the College of Engineering, Madras. It will be convenient to deal with the report of the committee under the same heads and in the same order as therein set forth.

2. *Revision of the Syllabus.*—I fully concur with the recommendations of the committee that the educational qualifications of candidates for admission to the Engineering College should be raised and I consider that the standards they have set are no more than necessary.

3. The proposed rearrangement of the college year will, I think, be a great improvement upon that which has hitherto existed. The shortening of the Christmas holidays and the lengthening of the Summer vacation will prove of advantage to both students and staff. The transfer of the end of the college year from December to April is logical and convenient. The objection may possibly be raised that it is better to hold the examinations in the cold weather, but to this I am inclined to attach no weight whatever. Under existing arrangements students of the Engineer classes generally spend the month of January cramming for the F.E. or the B.E. examination of the University which examinations are usually held during the last week of the month. If students are still to go up for the University examinations, and if the proposal to hold the survey camp immediately after the termination of the Christmas holidays is approved of, it will, I think, be necessary to get the Syndicate of the University to alter the date of the examinations and it will probably be convenient to hold them at the beginning of July before the college reopens. Those going up for the F.E. will be able to do so without any interruption to their college work and those going up for the B.E., which they usually take up at the end of their college course, will have two clear months to rest or to cram as they choose between the college and the University examinations. It may be here pertinent to raise the question as to whether the University examinations are of any practical value. The college examinations are held by an independent Board and differ but little in their general character from those of the University. Except in the case of the Engineer Works Department the taking of University degree in Engineering is purely an optional matter and I think it also should be so in his case. At the present time the majority of passed students from the Engineer class obtain the B.E. degree of the University mainly because the courses of study prescribed by the University have naturally had to follow more or less closely those laid down by the Engineering College.

The institution of separate courses of study for Mechanical Engineer students will mark a real advance in the development of the College and I am in general agreement with the recommendations of the Committee on this point. The appointment of an apprentice Engineer is a great prize for students in the Engineering College and, unless it is made perfectly clear that it will be awarded to the best student in the College quite irrespective of whether he is a Mechanical or Civil Engineer, it is probable that all the best students will select that branch of engineering in which they have the best chance of getting this appointment. The Committee remark: "The work of the department offers but few openings for the Mechanical Engineering pure and simple." This is quite true, but men who have been trained as Mechanical Engineers are likely in the long run to prove just as good men in the department as those who have received a Civil Engineering training. In any case the Civil Engineering side of the College is always likely to be more popular than the Mechanical Engineering and I would suggest the desirability of considering whether it would not be possible to offer one of the Government of India technical scholarships to the Senior Mechanical Engineer student if he does not obtain the apprentice Engineer appointment and if in the opinion of the College authorities he is likely to be able to make good use of such a scholarship. The scholarship would be awarded, not to enable him to continue his studies in Mechanical Engineering but to enable him to acquire a practical knowledge of some industry in which his previous engineering training would be of value.

4. The duplication of examinations is undoubtedly a great evil and either the College or the University examinations ought to be abolished. I believe it would be quite practicable to arrange that the University should conduct the examinations and that the necessary control would be secured by appointing a strong Faculty of Engineering. If this be objected to, then as an alternative a joint Board consisting of six or eight examiners might be annually appointed, half of the members to be nominated by the Syndicate of the University and half of them by Government. This Board would conduct all the examinations of the College and the B.E. degree might be awarded to those who pass out at the end of the third year. Practically the F.E. examinations would disappear and there would be two annual examinations previous to the degree examination. The College diploma would be merged in the University degree.

5. To carry this scheme through, it would be necessary for the University to accept definitely the courses of study prescribed for the Engineering classes of the College of Engineering. I should imagine that the Senate of the University would welcome some such change as now proposed, since it would give the University through its Faculty of Engineering much more complete control over the engineering education than it now enjoys.

6. The recommendation of the Committee, that the distinction between the school and the College should disappear, automatically comes into effect if the proposal that the Matriculation examination be adopted as the lowest qualifying examination for entrance to any class, as educational institutions dealing with Matriculates are recognised by the Educational Department as colleges.

I have gone carefully through the new syllabuses and I consider them a great improvement on those at present in force. The proposal to abolish instruction in vernacular languages is perfectly sound, but I am distinctly opposed to the idea of the Committee that in each week there should be 25-hour lectures, exclusive of outdoor, workshop, and other morning attendances. Instruction should be mainly imparted in the workshop, drawing office and laboratory and I consider it perfectly practicable to so arrange the courses that each student is not required to attend more than twelve lectures per week, the rest of the time being spent at practical work. A student may well work under the supervision of the College authorities for 35 hours per week arranged as follows:—

	Hours.
Lectures	12
Drawing office	8
Workshop	6
Laboratories	9

7. From the Mechanical Engineering course Surveying has been entirely omitted, but I think that some provision should be made for giving Mechanical Engineers some knowledge of surveying instruments. A Mechanical Engineer has often to measure up ground, to set out buildings, and to take levels and I would strongly suggest that the Mechanical Engineering students be given a short course of instruction in Surveying. This might well be done in the Science course and need not be extended beyond one morning a week for a period of about three months.

8. The Civil Engineering students are now to be taught Geology and Mineralogy and are left to pick up their knowledge of mechanism and steam engines during the workshop course. I do not altogether approve of the change. The teaching of Geology is likely to become a farce unless a specially qualified geologist is appointed to deal with the subject, and the time spent in the workshops can be more usefully employed than in trying to obtain an elementary knowledge of mechanism and the construction of engines. The position of the Committee is somewhat inconsistent in this matter as they have provided that the Upper Subordinate class should receive instruction in these objects under the heading "Mechanical Engineering."

9. In connection with the remarks of the Committee upon the Military Subordinates I think that similar proposals were sent up to the Government of India about ten years ago and were negatived on the ground that they were not prepared to take any steps to diminish the prospects of the British soldier in India. In lieu of the Committee's proposals I would suggest that only soldiers who are non-domiciled Europeans should be admitted to the College, that the probationary class should be abolished and that they should be required to possess at the outset general educational qualifications sufficient to enable them to take advantage of the course of instruction for Upper Subordinates. I do not attach any importance to the suggestion of the Committee that the soldier student should be a tradesman as that is a very vague term and may include printers, bricklayers, butchers, cobblers, etc., and even if he be a tradesman he may be and very likely will be a very bad one, as good artisans do not as a rule enlist in the army. The abolition of military students from the College altogether, by increasing the prospects of the Upper Subordinates, would make the Upper Subordinate class much more popular and would attract a higher class of students.

10. The proposal to abolish the present Sub-Overseer and Surveyor class and the Draftsman class and to substitute in their place a Lower Subordinate class commends itself to me as a very practical one and the only criticism I have to offer on the proposed syllabus is that Elementary Applied Mechanics have been introduced somewhat unnecessarily and the proposed course of instruction does not go far enough to be of any practical value. I should therefore recommend that it be omitted.

11. *Board of Examiners.*—In this connection the Committee recommend that the Board should be strengthened by the addition of two members of the College Professorial staff. Apart from my previous remarks on the subject of the College examinations I do not consider it desirable to accept this proposal. I am aware that there have been in the past disputes between the College authorities and the Board of Examiners regarding questions which were said to have necessitated work beyond the range of the College syllabus, but no real hardship or injustice was ever caused thereby and the collective experience of the Board of Examiners should be sufficient to enable them to do their work in a satisfactory way without any assistance from the College Professors. The objection to the Professors of the College occupying any position whatever on the Board of Examiners is due to the fact that they acquire a knowledge of what examination questions will be set a month or two before the end of the term and they are thereby placed in a somewhat difficult position with regard to lectures which they may still have to give. These may or may not deal with subjects upon which questions have been set by the Board of Examiners and it will be difficult for them to go on with their work exactly as though they had no knowledge of the examination papers. Moreover they will constantly be pestered by students endeavouring to get by indirect means some hint as to the nature of the forthcoming examinations.

12. *College Staff and Administration.*—On this subject the Committee state that they hold very strong views but have not considered it necessary to exhibit the rational

basis upon which their strong convictions are founded. They are of opinion "that the college staff should be recruited from the Public Works Department and that consequent on this, the administration should naturally be in the hands of the Chief of that department, who would, however, be a subordinate as regards the general policy to the Director of Public Instruction but independent in all other matters." The experience of the last 15 years clearly shows that the Public Works Department would be quite incapable of supplying the necessary College staff, as on each occasion when application has been made to them for the service of a Professor of Engineering there has always been a great difficulty in getting any one to take the post, and on the last two occasions the Education Department have been compelled to apply to the Secretary of State for the services of temporary men and on these conditions both Mr. James and Mr. Griffith came out. But even supposing that the Public Works Department did supply the college with its staff, it is hardly a reason for removing the college from the Education Department and placing it in the hands of the Chief Engineer. At present it is true that the Public Works Department gives employment to the majority of students who pass out of the college, but in the future, when Mechanical Engineering and Electrical Engineering are properly provided for, the percentages of those who will not go into the Public Works Department will be much larger. The expedient proposed by the Committee "to check the tendency under a Public Works Department régime to subordinate the college to the mere needs of the department" by the appointment of a Board of Visitors is a cumbrous one, which in practice is not likely to prove very effective.

13. It appears to me that the Committee have not sufficiently considered the qualifications necessary for a successful teacher of Engineering and they have assumed that the grant of staff allowances will be sufficient to enable the college to secure at all times a competent teaching staff whether among the Professors or the Assistants. As a matter of fact, it might be possible to obtain a Professor of Engineering and some of his staff from the Public Works Department, but it is pretty certain that all the others would have to be obtained from England and I see no reason why such officers should be placed on a non-pensionable establishment. The proposed method of recruitment is contrary to the principles upon which practically the whole of the Government services have been appointed and it ignores the fact which is especially true in the case of professional men that, if you want to get good men out in India, you must catch them young or pay them very highly.

The difficulties pointed out by the Committee regarding the recruitment of the staff of the College of Engineering are no doubt very real, but it is questionable whether the measures they propose are calculated to satisfactorily remedy matters.

14. The Committee recommend that besides the Principal there should be three Professors and thirteen Assistants and in addition, to cover the leave vacancies, one Professor and three more Assistants. The line of demarcation between the various professorships in the College of Engineering is not a very rigid one and it may be assumed with more or less certainty that every Professor knows something about the other Professor's work. For instance, every Engineering Professor should be a sufficiently good mathematician to be able to teach any mathematics required in the college and though the work of teaching mathematics should be properly entrusted to a Professor of Mathematics, that man ought to be an Engineer who has a special knowledge of engineering mathematics. There ought also to be a Professor of Electrical Engineering as future developments in that direction are likely to become of great practical importance and he will necessarily be more or less a mathematician also. Similarly the dividing line between the Professors of Civil and Mechanical Engineering is likely to be a faint one and it should be possible for one man to act for the other when occasion demands it without any very serious detriment to the college work and finally the Science Assistant ought at any time to be capable of temporarily acting for the Professor of Electrical Engineering, so that with a staff consisting of a Principal, four Professors, a Science Assistant, and with the possibility of obtaining men from the Public Works Department to act as Professors of Civil Engineering there should be no great difficulty in arranging for leave vacancies.

15. As regards the subordinate staff dependence must be placed to a large extent upon the men trained in the Public Works Department and as far as possible getting

out subordinates from England on covenants should be avoided. The proposal to give men employed in the college staff allowances is the only effective way of securing the services of competent men.

16. *Board of Visitors.*—I am not in favour of the establishment of the proposed Board of Visitors, as I doubt whether it will serve any useful purpose and it would be likely to hamper subsequent developments; but if Government consider otherwise, then I would suggest certain alterations in its composition (1) by adding representatives of at least two of the large firms in Madras who directly or indirectly have a great deal to do with engineering work and give employment to a considerable number of Mechanical Engineers and (2) by reducing the number of the Board from 14 to not more than 10.

17. *The removal of the College.*—I am in complete agreement with the Committee as to the recommendation regarding the removal of the college, but I am doubtful if the approximate estimate of the cost of the removal is sufficient. It will be necessary to spend a good deal of money upon electrical equipment and without doubt the hostel, residences and part of the workshops should be equipped with electric light, so that there may be available plant on a sufficient scale to give students adequate training in running electrical machinery. It is very essential also that the college should be provided with a well devised hydraulic laboratory as such does not exist at present in India and is greatly needed. For the working of this laboratory fairly powerful pumping machinery will have to be provided and it seems to me doubtful if the Committee have made any attempt whatever to formulate even a vague idea as to how the Rs. 2,20,000 they have allotted for workshops and laboratory should be expended.

18. I endorse the proposal that a special officer should be deputed to draw up plans and estimates for the new buildings, but I think he should do so in consultation not only with the Principal of the College but also with each of the professors as in an important scheme of this kind it is desirable that the responsibility for the final arrangements should rest with the expert who has to make use of them.

N.R.O.C. No. 7291 of 1904, dated 23rd June 1905.

Submitted to Government with reference to Memorandum No. 310, Educational, dated 2nd June 1905, herewith returned with enclosures.

A. G. BOURNE,
Director of Public Instruction.

Order—No. 655, Educational, dated 3rd October 1905.

The Government have considered the report of the Committee appointed by their order No. 723, Educational, dated 12th December 1904, to advise on the proposed extension and reorganization of the College of Engineering, Madras. They have also considered the opinions of the Principal of the College and the Professor of Engineering on special duty, who were on leave when the Committee was appointed, and of the Director of Public Instruction and the Chief Engineer.

2. *Removal of the College.*—The Government will defer passing orders on this important matter till they have had an opportunity of discussing it further at Madras with the assistance of the members of the Committee and other authorities.

3. *Recruitment of the College classes.*—The Committee recommend that the Engineer class should in future be recruited from those who have taken the Bachelor of Arts degree with mathematics or physical science as their optional subject, the upper subordinate class from those who have passed the First Examination in Arts and all other classes from those who have passed the Matriculation examination. These recommendations are accepted in principle.

4. *Fees.*—The Committee recommend that the fees for the several classes should be fixed as follows:—

Engineer class	...	...	...	...	Rs. 360	} for the full theoretical course if paid in advance.
Upper subordinate class	...	...	...	...	180	
Lower " "	...	...	...	...	100	

This recommendation is accepted, but the students will have the option of paying slightly enhanced rates by the year or term as at present.

5. *The College year.*—The Committee are of opinion that the college year should consist of—

(a) a first term from about the 15th of July to about the 10th of October, the last ten days of it being devoted to inspection tours;

(b) a second term from about the 10th of October to about the end of April with a break in the middle of about nine days on account of the Christmas holidays and with survey camp for about a month after the termination of those holidays;

(c) the long vacation from about the 1st of May till about the 15th of July.

The Government consider that a more suitable arrangement will be to divide the college year as follows:—

(a) a first term from the 15th of June to the 31st of October, the last fortnight of it being devoted to inspection tours;

(b) a second term from the first of November to the 31st of March including the Christmas holidays and the survey camp as proposed; and

(c) the long vacation from the 1st of April till the 15th of June.

6. *Rules incidental to college reorganization.*—The Government accept the first three of these rules, but as regards the fourth which fixes the duration of the practical course in the case of Civil Engineer students at one year and in the case of Mechanical Engineer students at two years, they consider that its practical effect would be, if the additional year were made compulsory, to deplete the class of Mechanical Engineer students. The additional year for these students should therefore be entirely voluntary. Inducements to go through it may be held out, but Government cannot undertake to bear the whole of the extra cost involved as suggested by the Committee. With regard to the fifth rule which relates to the selection of the apprentice Engineer, the examiners should send up the name of one Civil Engineer and one Mechanical Engineer student for the Chief Engineer to select from.

The Committee also recommend the abolition of the distinction between the school and college departments. This recommendation is accepted. The whole institution will in future be a "College" for statistical and other purposes.

7. *Revision of Syllabuses.*—The syllabuses drafted by the Committee will be remitted to it for further consideration. The Government approve of the excision of the language course and of other recommendations of the Committee. But the Committee should consider—

(1) whether more time should not be spent in the workshop: at Roorkee working hours are divided equally between lectures and practical work;

(2) whether architecture should not be included in the Civil Engineering course;

(3) whether Civil Engineering students should not be taught as much mechanical engineering as upper subordinate students;

(4) whether a short survey course should not be prescribed for mechanical engineering students;

(5) whether the electrical engineering course for mechanical engineering students should not be more thorough.

Some modification seems also to be called for in the distribution of marks between the Civil and Mechanical Engineering classes.

8. *Reorganization of classes.*—The Committee's recommendations that the course for the Engineer subordinate class be extended from $2\frac{1}{2}$ years to 3 and its designation altered to "Upper subordinate class" are accepted.

The recommendation that the present sub-overseer and surveyor and draftsman classes be thrown together into a new class to be called the "Lower subordinate class" is accepted.

9. *Military Subordinates.*—The Government consider that the Committee's recommendations go too far and that to accept them would be tantamount to abolishing recruitment from the army, a result by no means to be desired. Some change in the

present regulations for the admission of soldiers to the college is, however, in the opinion of the Government, advisable and they propose to adopt in their entirety the rules of the Roorkee College relating to the matter. A copy of the new regulations should be furnished to the Commanding officer of every British regiment or battery as soon as it arrives in the Presidency with the request that it may be posted up in a conspicuous place with a synopsis of the career open to soldiers in the Public Works Department.

10. *Board of Examiners.*—The Committee recommend that the Board of Examiners as at present composed should be strengthened by the addition of two members of the College Professorial staff.

This recommendation is accepted provisionally until the University have decided when the examinations are to be held and whether they will combine them with the College examinations.

11. *Staff.*—The Committee are of opinion that the College staff should be recruited from the Public Works Department and that the administration of the College should be in the hands of the Chief Engineer. The Chief Engineer is entirely opposed to these proposals and considers that the College should remain under the Educational Department and the superior staff be recruited from home and from the Educational Department, the Public Works Department being indented upon to supply temporary vacancies only. He also considers it desirable that the senior assistants should be recruited from home, but if there are difficulties in the way of doing this the Public Works Department should provide the men. In that case they should, in his opinion, be given presidency pay and allowances *plus* a staff allowance of Rs. 50 for upper subordinates and Rs. 30 for lower subordinates. He would also fix the Principal's pay at Rs. 1,000—50—1,500 if the Principal is a civilian, and military pay proper *plus* a staff allowance to be decided in each case if he is a Royal Engineer officer. For the Professors Rs. 500—50—1,000 with a personal allowance after ten years is considered suitable. The Government concur generally with the Chief Engineer. The Public Works Department have no men available to fill the posts of Professors and are not likely to have them in the future while the present method of recruiting the staff is not known to be productive of harm in any way save that the staff being a small one cannot be provided with a reserve for leave vacancies. Before however a final decision is arrived at, the Committee will be requested to reconsider this question in the light of these remarks and favour Government with their further remarks thereon.

12. *Board of Visitors.*—The Committee's proposal to appoint a Board of Visitors will be unnecessary if the College remains under the Director of Public Instruction.

13. On receipt of the Committee's further remarks now called for, the Director of Public Instruction will be requested to submit proposals for the introduction of the scheme of reorganization and for the revision of the rules of the college.

14. The thanks of Government are due to the Members of the Committee for the labour they have already undertaken in connection with this question of reorganization and for the clear and concise report submitted by them. They are requested to submit their remarks on the points referred to them for further consideration as early as may be practicable.

(True Extract.)

H. D. TAYLOR,
Ag. Secretary to Government.

To the Director of Public Instruction.
" Public Works Department.
" J. P. Davidson, Esq.
" F. J. E. Spring, Esq., C.I.E.
" R. L. Jones, Esq.
" M.R.Ry. A. V. Ramalinga Aiyar Avergall
" H. T. Keeling, Esq.
" Capt. W. Carew Smyth, R.E.
" W. H. James, Esq.

Government of Madras.

EDUCATIONAL DEPARTMENT.

Recd.

Regd.

1906.

Enclosures

Spare copies

G.O., No. 657, 10th October 1906.

Reorganization of the College of Engineering.

Passing orders on the remarks of the Committee appointed in connection with the extension and — and requesting the Director of Public Instruction to submit proposals for the introduction of the scheme of reorganization as approved and also proposals for the revision of the rules of the College.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper :—

Letter—from J. P. DAVIDSON, Esq., President of the Committee of the Reorganization of the College of Engineering.

To—the Secretary to Government, Educational Department.

Dated—Madras, the 2nd January 1906.

No.—1-C.

I have the honour to forward reply of the Committee of the Reorganization of the College of Engineering to G.O., No. 655, Educational, dated 3rd October 1905.

ENCLOSURES.

[Reply to G.O., No. 655, Educational, dated 3rd October 1905.]

Preliminary.—The Committee appointed in G.O., No. 723, Educational, received the G.O., No. 655, Educational, dated 3rd October 1905, and proceeded to consider the points referred to them. The Committee has thought it advisable to go beyond the precise terms of the referendum as several misconstructions have been put upon their report and it has been misquoted. The subjects in the Government order have been dealt with seriatim.

2. *Removal of the college.*—The recommendation of the Committee was made after very careful consideration and as the conditions which led to the recommendation still obtain, the Committee sees no reason for altering its views. To keep pace with the times the college must expand and at the present site there is no room for expansion. It should also, if possible, be residential and be so situated that it will afford more varied and efficient training in practical work and surveying. At its present site it cannot be residential nor are the surroundings such as to facilitate training in practical work and surveying. It may be mentioned that Roorkee and Sibpur Colleges are residential.

3. *Recruitment of the college classes.*—The Committee notes the general acceptance of its views regarding the raising of the educational qualifications, but desires to point out that its recommendations have been misunderstood as regards the Engineer class. The Committee recommended that the Engineer class should be recruited from those who had passed the B.A. Degree with Mathematics (Branch I) or Physics (Branch II-A) as their optional subject. For the subjects included in the above, a reference must be made to pages 76–79, volume I, of the Madras University's Calendar. Physical Science—Branches II A and B—have been substituted Chemistry as their optional subject. This was not the recommendation of the committee, and the practical effect of the alteration, if adhered to, would be to keep the standard as hitherto and to admit men who have not had an appropriate preliminary education. In view of the reform of University examinations be modified or abolished, the rules to be framed for the college should be drawn wide enough to embrace the probable changes.

4. *Fees.*—The option to pay slightly enhanced fees by the year or term as at present meets with the approval of the Committee.

5. *College year.*—As regards the alteration in the college year recommended by the Committee, the recommendation was made after mature consideration, and the Committee considers that the proposals of Government are unsuitable, and would point out that the time chosen by Government for inspections is at the commencement of the north-east monsoon in length, it does not consider that they require alteration.

6. *Rules incidental to college reorganization.*—The Government consider that a two-year compulsory practical course for Mechanical Engineering students would deplete the class. If the Government is right in this opinion, then it is evident that the need for properly trained experimental stage and the Committee did not anticipate that it would immediately start as a very full class. If the class meets a demand, it will continue to grow steadily; if, on the other hand, there is no demand, then the class will die out. The Committee is of opinion that the only true test of the need or otherwise for this class is the institution of the shortest course which will turn out a Mechanical Engineer. The abbreviated course suggested by Government will not do

this and it therefore follows that if there exists a demand for such Engineers the Government's proposal will not produce them. The Committee adheres to its original proposals in this matter. With regard to the fifth rule the Committee presumes that the expression "Examiners" in the Government order means the Board of Examiners as amended and provisionally accepted by Government. The Committee lays great stress on the necessity for the professorial staff of the college having a voice in the matter, as from the fact that the staff will have been in constant association with the students for a period of three years, their knowledge of the character and capacities of the several students must necessarily be greater than those of a body of Examiners who probably will not have had any better opportunity of judging the respective merits of the students than that afforded by a mere examination on cut and dried lines. The result may be that the student who in all respects is most suitable may be passed over in favour of another who is less suitable or even unsuitable.

7. *Revision of syllabuses.*—The Committee's opinions on the points referred to them are given below seriatim :—

(1) This has apparently been referred to the Committee owing to a misconception of the expression "lecture week" which has been used by the Committee in dealing with the syllabuses. The 25 hour lecture week may be otherwise expressed as 25 attendances in a week, each of one hour's duration. The Committee do not think it advisable to lay down any hard and fast rules as to how many hours should be spent in lectures pure and simple and how many hours should be spent on practical demonstrations. The proportion between the two must necessarily vary with the needs of the class. It is seldom that two teachers hold absolutely identical ideas regarding the best method of imparting instruction in any particular subject, and the teacher should be given as free a hand as possible.

(2) The Committee considers that, apart from the difficulty of providing adequate instruction on the subject as well as on other considerations, it would be a waste of time (better spent in obtaining more thorough knowledge of legitimate subjects) to include architecture in the course. An architect should primarily be an artist and the development of the artistic faculties to produce an architect requires a special course of training, the expense of which would not be commensurate with the gain (even assuming the existence of artistic faculties to work upon) under existing conditions in the presidency. At present all special designs are made by the specialist (the Consulting Architect) whose services the Government obtain as occasion requires, and the Committee does not think that it is necessary for those who may have to execute those designs to possess more than a knowledge of the principles of construction and stability already provided for in the course.

(3) The Committee is of opinion that it is no use training hybrids and that the training of a Civil Engineer must be considered as quite a distinct and separate matter to the training of students of inferior educational qualifications for the performance of duties which to all intents and purposes follow and will follow, for many years to come, on well defined lines. It therefore considers that the course of training advocated is sufficient for the needs of the present time and of the immediate future.

(4) The courses of the Civil and Mechanical Engineer are identical for the first year of residence and during that time instruction in surveying is given. The Committee is of opinion that it will be possible during that year to teach the Mechanical Engineering student all that he needs to know of surveying.

(5) The reason for this reference is apparently the demand in the late Chief Engineer's note for a more extended electrical course so as to enable the students to take charge of important electrical installations. With all due deference to the opinion of the late Chief Engineer, the Committee would point out that the course is sufficient to achieve the object desired by him and can only assume that his remarks were made in misconception of the meaning of the technical terms used in the syllabus. There is at present no need to make the course more extensive. To attempt to do so now would only end in failure as in the absence of electrical manufacturing works in this country, there is no local means of perfecting the training so as to produce an Electrical Engineer. What is laid down in the syllabus can perfectly well be taught by the Professor of Mechanical Engineering, and should ordinarily speaking fall within his province in the absence of a special Electrical Engineering course. With regard to expanding the Civil Engineering course to include this subject the Committee are of opinion that it would not only be impracticable and diminish the efficiency of the Civil Engineering training proper, but that it is uncalled for. The objective of the Committee has been to recommend courses which will, so far as circumstances permit, produce specialists and not jacks of all trades, and it strongly deprecates any departure from this principle.

The marks allotted by the Committee for the several subjects in the Engineer classes have been rearranged to make the Committee's intentions clearer and one alteration has been made in the marks for the Mechanical class. The marks for the remaining classes call for no alteration.

8. *Reorganization of classes.*—The Committee notes the acceptance of its recommendation.

9. *Military subordinates.*—The Government propose to adopt in their entirety the rules of the Roorkee college with regard to Military students. The Committee presumes that Government have been influenced in arriving at this opinion by the views expressed by the late Chief

Engineer of the Public Works Department. The Committee points out that the late Chief Engineer's recommendation is not consistent with his acceptance of the Committee's recommendation to extend the college course of the Upper Subordinate class from $2\frac{1}{2}$ to 3 years. This he describes as sound, and then proceeds to advocate the adoption of a course for Military subordinates (the so-called leaven of the department be it remembered) which is limited to two years and in every way of a lower standard. At present the Military subordinates start two grades higher than the Civilians on account of the difference in age, but they go through the same training and may be considered to have equal attainments with their Civilian contemporaries. The adoption of Government's proposal would impose a real injustice on the Civilian students because, under that proposal, the Military student would gain a year's service and be admittedly trained to a standard inferior to that of the men he would supersede. On this question of Military subordinates the Committee adheres to the opinions expressed in its report.

10. *Board of Examiners.*—With regard to the provisional acceptance of the Committee's recommendation as regards the composition of the Board of Examiners, the Committee presumes that the Government will not press the point as to the administration of the college; this may be left in the hands of the Educational Department. But with regard to the recruitment of the staff, the Committee points out that a careful perusal of the Chief Engineer's remarks shows that the only source for the recruitment of the staff, whether professorial or subordinate, is the Public Works Department, and yet the Chief Engineer refuses to adopt the only sound course which will meet the position, viz., an increase in the Public Works Department cadre sufficient to provide for the requirements of the college without interference with the work of the Public Works Department.

11. *Staff.*—In the matter of the college staff the Government appear to be inclined to adopt very largely the recommendations of the late Chief Engineer of the Public Works Department. The Committee will not press the point as to the administration of the college; this may be left in the hands of the Educational Department. But with regard to the recruitment of the staff, the Committee points out that a careful perusal of the Chief Engineer's remarks shows that the only source for the recruitment of the staff, whether professorial or subordinate, is the Public Works Department, and yet the Chief Engineer refuses to adopt the only sound course which will meet the position, viz., an increase in the Public Works Department cadre sufficient to provide for the requirements of the college without interference with the work of the Public Works Department.

First with regard to the professorial staff, he proposes to recruit this from home; and the officers so recruited must possess very high attainments; and yet the maximum pay the Chief Engineer proposes is limited to that of an Executive Engineer, First grade; in other words, these officers have practically no career before them, and it must not be wondered at, if they set to work to carve out careers for themselves and get away from the college as quickly as they can. If the cadre of the Engineering staff of the Public Works Department is sufficiently increased, there should be no difficulty, under the new system of recruitment, in obtaining a certain number of officers who would be most competent professors once they had had some practical work in the department, and by the framing of suitable rules (*vide* original report) regarding pay while employed at the college, the question of professorial staff would be satisfactorily settled. The professorial staff might, in a not very satisfactory way, be supplied from England, but the subordinate staff cannot. This the late Chief Engineer distinctly admits and he states that for various reasons "I suppose the Public Works Department will have to provide men, if unobtainable elsewhere". Under these circumstances it is not clear why the late Chief Engineer has opposed the Committee's recommendation to accept the fact that the Public Works Department must be the recruiting ground for this subordinate staff, and to increase the cadre accordingly. The Principal of the College, the Chief Engineer says, should if possible be a Royal Engineer Officer. The Committee is unable to follow the reasons for this recommendation, while it sees every reason for objecting to it, among others the very forcible one that it removes the only inducement a Professor recruited from England might have to remain on at the college. Moreover such a restriction is calculated seriously to narrow the field of choice of a good Principal.

12. *Board of Visitors.*—As regards the Board of Visitors the Committee is of opinion that the necessity for a board obtains under any circumstances. From time to time proposals are made affecting the college and the working of it, which proposals are, judging by the proceedings in the past, referred for opinion to many of the very men of whom it is proposed the Board should be composed. The Committee points out that Boards of Visitors exist for other Indian colleges and perform extremely useful functions. The Board forms a standing consultative body and the establishment of such a body would save much time and correspondence in the future. The volume of work would of course vary as would be natural. The Committee made the proposal after careful consideration and is of opinion that, whether the Educational Department or the Public Works Department administers the college, the Board would be a necessary and useful permanent consultative body.

(Signed). J. P. DAVIDSON.
" FRANCIS J. E. SPRING.
" W. H. JAMES.
" H. T. KEELING.
" R. LL. JONES.
" A. V. RAMALINGAM.
" W. CARREW SMYTH, Capt. R.E.

TABLE OF MARKS FOR ENGINEER CLASSES—*vide* PARAGRAPH 7 (5), PAGE 3.

Mechanical Engineering.			
Branch I.		Branch II.	
Mathematics (first and second years). Pure and Applied .. 900		Engineering.	
		Physical Exercise. (100)	
First year.		Second and third years.	
Geometrical Drawing ..	300 (100)	Applied Mechanics ..	1,000 (200)
Free-hand and Model Drawing ..	100 (100)	Mechanical Engineering ..	1,500 (300)
Building Drawing ..	200 (100)	Drawing ..	1,200 (800)
Machine ..	300 (200)	Engineering Laboratory ..	400 (200)
Surveying ..	1,100 (500)	Total ..	4,100 (1,500)
Total ..	2,000 (1,000)		
		Grand total ..	8,400 (3,400)
</			

Order—No. 657, Educational, dated 10th October 1906.

In Proceedings, No. 655, Educational, dated 3rd October 1905, the Government passed orders on the report of the Committee appointed by their Order, No. 723, Educational, dated 12th December 1904, to advise on the proposed extension and reorganization of the College of Engineering, Madras. The recommendations of the Committee were generally approved, some with and others without modification, but a few points were remitted to the Committee for further consideration. The Committee submit the further remarks called for and in doing so they ask for a reconsideration of the orders passed in regard to certain points in which the Government did not accept their proposals. The Government now proceed to pass orders on the further report of the Committee.

2. *Removal of the College.*—The Committee originally recommended that the College should be removed from its present site at Chepauk, and the Government left the matter over for further consideration. The Committee again express the opinion that the College should be residential, that at the present site there is no room for expansion, and press for the removal of the College to a more suitable site. The Government accept this opinion. They consider that the site of the Agricultural College at Saidapet, which will be available after the completion of the new Agricultural Research Institute at Coimbatore, will be the most suitable place for the College. Orders will issue in the Public Works Department for the deputation of an officer to ascertain what use can be made of the existing buildings at Saidapet, and to prepare plans and estimates for the new buildings.

3. *Recruitment of the College Classes.*—In their original order, the Government, in accepting the proposals of the Committee under this head, approved of the recruitment of the Engineer class from those who had taken the Bachelor of Arts degree with Mathematics or Physical Science as an optional subject. The Committee now explain that by recommending recruitment from graduates in Physical Science they meant that only graduates in Advanced Physics (Branch II-A) should be eligible and not those who had graduated only in Advanced Chemistry. This view is accepted.

4. *The College year.*—The Committee originally recommended that the College year should consist of—

(a) a first term from about the 15th of July to about the 10th of October, the last ten days of it being devoted to inspection tours;

(b) a second term from about the 10th of October to about the end of April with a break of about nine days on account of the Christmas holidays and with a survey camp for about a month after the termination of the holidays; and

(c) the long vacation from about the 1st of May till about the 15th of July.

The Government suggested a more equal distribution of the school year, under which the first term should last from 15th June to 15th October followed by an inspection tour of a fortnight, and the second term from 1st November to 31st March, inclusive of one month's survey camp. In view, however, of the further remarks now offered by the Committee and the practical difficulties likely to be involved, owing to climatic reasons, in an inspection tour during the latter half of October, their original recommendation is accepted.

5. *Rules incidental to College reorganization.*—In their original order the Government accepted the first three rules proposed by the Committee, but as regards the fourth, which fixed the duration of the practical course in the case of students of Civil Engineering at one year and in the case of students of Mechanical Engineering at two years they considered that its practical effect would be, if the additional year were made compulsory, to deplete the class of Mechanical Engineering students. The Government proposed therefore that the additional year should be entirely voluntary. The Committee now state that the abbreviated course will not be sufficient for the adequate training of Mechanical Engineers. In these circumstances the rule as originally drafted by the Committee is approved.

As regards the fifth rule which relates to the award of the *Apprentice Engineership* the Government suggested that the Examiners should propose the name of one Civil Engineering and one Mechanical Engineering student, leaving the final selection to

the Chief Engineer. The Committee however think that the professorial staff should have a voice in the selection. The Government will therefore modify their previous order so as to admit of the selection by the examiners and the professorial staff jointly of one Civil Engineering and one Mechanical Engineering student; the names of both students being submitted to the Chief Engineer for final selection.

6. *Syllabuses.*—In their original report the Committee stated that the syllabuses recommended by them were based on the assumption of a 25-hour lecture week exclusive of out-door workshop and other morning attendances. They were then requested to consider whether more time should not be spent in the workshop. They now state that they did not think it advisable to lay down any hard and fast rule as to the number of hours to be spent at lectures and at practical demonstrations, respectively. This view is accepted. Details will be arranged when the revised rules of the College come up for consideration.

7. The Committee were also requested to consider certain other points:—

(1) As to whether architecture should not be included in the Civil Engineering course, the Committee think it unnecessary.

(2) As to whether Civil Engineering students should not be taught as much Mechanical Engineering as Upper Subordinate students, the Committee are of opinion that the training of these students must be considered as quite a distinct and separate matter from the training of students of inferior educational qualifications for the performance of duties on other well-defined lines and that the training advocated for Civil Engineering students in their original report is sufficient.

(3) As to whether a short survey course should not be prescribed for Mechanical Engineering students, the Committee point out that the courses of Civil and Mechanical Engineering are identical for the first year, and during that year the Mechanical Engineer will be taught all that he needs to know of surveying.

(4) On the question whether the Electrical Engineering course for Mechanical Engineering students should not be more thorough, the Committee think the present course sufficient.

The views of the Committee on the foregoing points are accepted.

8. The Committee have also rearranged the marks originally allotted by them for the several subjects in the Engineer classes and have made one alteration in the marks for the Mechanical class.

The rearrangement and alteration now made are approved.

9. *Military Subordinates.*—The Committee originally recommended that no soldier student should be admitted unless he were British born and bred, knew a trade, and possessed a first-class army school certificate. Such students, they proposed, should be admitted to a probationary class for a period of one year to prepare them for a qualifying College examination which should be passed prior to joining the Upper Subordinate class.

The Government, however, were disposed to regard these recommendations as going too far and, if adopted in practice, as being tantamount to abolishing recruitment from the army, a result by no means to be desired. It was accordingly proposed to adopt in their entirety the rules of the Roorkee College in this respect. The Committee point out that the adoption of the Roorkee rules would be inconsistent with the extension of the College course of the Upper Subordinate class from 2½ to 3 years and that it would confer an unfair advantage of one year's seniority on the part of Military subordinates as compared with the civilian students. They would therefore adhere to their original recommendations, which Government will now accept save as to the requirement that a soldier seeking admission to the college should have been brought up to a trade. As to this it will suffice if preference is given to soldiers who have been so brought up.

10. *Board of Examiners.*—In paragraph 10 of G.O., No. 655, Educational, dated 3rd October 1905, the original recommendation of the Committee that the Board of Examiners as at present composed should be strengthened by the addition of two members of the College professorial staff was accepted provisionally until the University had decided when the University examinations in Engineering were to be held

and whether they would be combined with the College examinations. The Committee now point out that whatever may be decided about the Engineer classes, which alone are affected by the University examinations, the Board of Examiners will still remain for the Upper and Lower Subordinate classes. In regard to this it is observed that the intention was that there should be only one Board of Examiners for the whole College.

* * * * *

12. *Board of visitors.*—The Committee originally proposed that there should be a Board of visitors for the College composed as follows:—

The Director of Public Instruction.
 The two Chief Engineers.
 The Consulting Engineer for Railways.
 The Chief Engineer, Madras Railway.
 The Chief Engineer, South Indian Railway.
 The President, Faculty of Engineering, Madras University.
 The Chairman of the Board of Examiners.
 The Surgeon-General.
 The Secretary to Government, Educational Department.
 Any former Principals, Professors or Officers of the Public Works Department up to four in number with the Principal of the College, *ex-officio* Member and Secretary.

The Government considered that the Board would be unnecessary if the College remained under the Director of Public Instruction. The Committee, however, are of the opinion that a Board is necessary in any case. The Government agree that a Board constituted merely as an Advisory Board might be useful in the case of a specialized institution like the College of Engineering to advise the Director of Public Instruction or the Government. If the College remains under the control of the Educational Department, such a Board may consist of the following:—

President.

The Chief Engineer, Public Works Department.

Members.

The Chief Engineer, Madras Railway.
 The Chief Engineer, Port Trust.
 The President, Faculty of Engineering, Madras University, or other Member nominated by the Syndicate if the President of the Faculty is the Chief Engineer or is the Principal of the College.

Secretary.

The Principal of the College of Engineering.

If the College is removed from the control of the Director of Public Instruction, further orders will issue as to the continuance and constitution of the Board.

13. The Director will be requested to submit proposals for the introduction of the scheme of reorganization as now approved in so far as it can be applied to the College on its present status and also proposals for the revision of the rules of the College.

(True Extract.)

H. D. TAYLOR,
Ag. Secretary to Government.

To the Director of Public Instruction.
 „ Public Works Department.

College of Engineering

Recruitment of staff

28

NOTES.

159 7 20. 3. 07

2038 W 7 26. 10. 06

657 7 10. 10. 06.

37 7 20. 1. 06.

655 7 3. 10. 05

1713 W 7 11. 10. 05

479 7 10. 8. 96

605 7 10. 11. 87

629 7 10. 7. 86

328 7 27. 5. 86

4 min 7 10. 2. 80

3 min 7 27. 1. 80.

451 min 7 11. 12. 79

NOTES CONNECTED WITH G.O., No. , EDUCATIONAL, DATED 1907.

[SUBJECT—*The reorganisation of the Staff of the College of Engineering.*]

Page 108 of the list of Educational Officers for 1906.

Also rule 4 of the rules of the College of Engineering—page 4 of G.O., No. 37, Educational, dated 20th January 1906.

The teaching staff of the College of Engineering now consists of—

- (1) a Principal,
- (2) a Professor of Civil Engineering,
- (3) a Professor of Mechanical Engineering,
- (4) a Professor of Mathematics,
- (5) an Instructor in Surveying and Drawing,
- (6) an Instructor in Civil Engineering,
- (7) an Instructor in Mechanical Engineering,
- (8) a Workshop Instructor,
- (9—16) eight ordinary Assistants,
- (17—19) three Foremen Assistants in the Workshop,
- (20) an Instructor in Gymnastics.

2. Of these, Nos. (2) and (3) are in the Indian Educational Service, Nos. (4), (5) and (6) are in the Provincial Educational Service, and Nos. (8) to (20) are in the Subordinate Educational Service. No. (1) is outside the Indian Service and No. (7) outside the Provincial Service, but the appointments in both cases are gazetted appointments.

3. The Committee appointed to consider the question of reorganising the College recommended that the staff should consist of—

- (1) a Principal,
- (2—3) a Professor of Mathematics with one Assistant,
- (4—9) a Professor of Mechanical Engineering with five Assistants, one of whom should be a Science Assistant,
- (10—17) a Professor of Civil Engineering with seven Assistants,
- (18) a Gymnastic and Drill Instructor.

4. The Committee recommended that the staff should be recruited from the Public Works Department and should be paid allowances of Rs. 200 in the case of Professors, Rs. 100 in the case of Senior Assistants and Rs. 30 in that of Junior Assistants, in addition to the pay and allowances which they would draw if employed on departmental duty in Madras.

5. In paragraph 11 of G.O., No. 657, Educational, dated 10th October 1906, the Government expressed their willingness to recommend that the recruitment of the entire staff—both professorial and subordinate—should be from the Public Works Department. This would involve an increase in the cadre of the Public Works Department and the matter, it is believed, is being considered by the Public Works Establishment Committee that is now sitting.

G. S. F[ORBER].

6. The Director is revising the rules of the College, but meanwhile the details as regards allowances may perhaps be settled. In regard to this matter His Excellency the Governor said :—

“ The pay might be excluded from the regulations and made to be the pay of the rank of the officer concerned *plus* allowances as in the case of the Secretariat.”

Page 27 of the notes with G.O., No. 657, Educational, dated 10th October 1906.

Should not the rank of the officers to be appointed Principal and Professors and Assistants be settled in the first instance? In other words, should it not be settled that only an officer of the rank of, say, Superintending Engineer, should be appointed Principal. Similarly it may be settled that only officers of the rank of, say, Executive Engineers, should be appointed as Professors, officers of the rank of, say, Sub-Engineers, should be appointed Senior Assistants, and officers of the rank of Supervisors or Overseers should be appointed Junior Assistants. The numbers of the Senior and Junior Assistants have also to be settled. In regard to allowances, may the amounts recommended by the Committee, which considered the question of reorganising the College, be accepted? Before, however, anything further is done the remarks of the Public Works Department may perhaps be invited on these points. That department may also be asked what recommendations, if any, have been made by the Establishment Committee in regard to the increase in the cadre of the department.

That would make the pay of the Principal very high. Why bind ourselves by rules that it may not be convenient to keep?

H.D.T.

C.G.M.

I agree that it is undesirable to restrict the appointments to any special grade or rank. This might be productive of great practical inconvenience.

H.D.T.—6-1-07.

Public Works Department probably will not know until the Committee issues its report.

H.D.T.

C.G.M.

H.D.T.

7. A reminder has already been sent to the Director for the revised rules of the College. He may be again reminded separately.

P. T. THARYAN—2-1-07.

The remarks of the Public Works Department may be invited, I submit.

C. G. MACKAY—5-1-07.

With reference to His Excellency's remarks quoted at A in paragraph 6 of the office-note, is any information available as to the “ allowances as in the case of the Secretariat”. So far as I am aware there are no special allowances outside the Public Works Department. Officers of that department stationed in Madras receive as it is special allowances in the way of house-rent, etc. What exactly would be the difference between the recommendations of the Committee (paragraph 4 of the office-note) and His Excellency's suggestion as quoted in paragraph 6?

H. D. TAYLOR—6-1-07.

As observed by the Secretary, it does not appear that any special allowances are granted to officers of the Secretariat except in the Public Works Department.

- * 1. Secretary, Public Works Department (Works).
- 2. Do. do. (Irrigation).
- 3. Do. do. (Railway).

† *Vide* page 4 of the Quarterly Civil List for October 1906. The authority for the grant of this allowance is not traceable.

‡ *Vide* page 4 of the Quarterly Civil List put up.

Pages 16 and 17 of Volume I of the Code.

In the Public Works Secretariat, the Secretaries* are granted a special local allowance of Rs. 250† each; but the Under Secretaries seem to draw only the Presidency allowances, and the Presidency‡ house-rent allowances admissible under paragraphs 33 and 35 of the Public Works Code.

2. Under the above paragraphs of the Public Works Code and Appendix * 19 to that Code, the members of the Public Works Department of the classes specified below, while serving at the Presidency town, receive Presidency house-rent and Presidency allowances at the following rates:—

Class of officer.		Presidency	
		house-rent.	allowance.
		RS.	RS.
(1) Chief Engineer, 2nd and 3rd grades ..	..	60	..
(2) Superintending Engineer, 1st and 2nd classes ..	..	60	..
(3) Do. 3rd class ..	..	60	..
(4) Executive Engineer, 1st grade ..	..	45	..
(5) Do. 2nd and 3rd grades ..	..	45	100
(6) Assistant Engineer, 1st grade ..	..	45	100
(7) Do. 2nd do. ..	..	30	50
(8) Do. 3rd do. ..	..	20	50
(9) Sub-Engineers, 1st, 2nd and 3rd grades ..	..	20	50
(10) Supervisors, 1st and 2nd grades ..	..	10	30
(11) Overseers, 1st, 2nd and 3rd grades ..	..	10	15

3. The Committee's proposal appears to be to grant allowances of Rs. 200 in the case of Professors, Rs. 100 in the case of Senior Assistants, and Rs. 30 in that of Junior Assistants in addition to the pay and allowances which they, as officers of the Public Works Department, would draw if employed on departmental duty in Madras. It is not clear what is exactly meant by His Excellency's remarks at A quoted in paragraph 6 of the office-note on page 2. As pointed out in paragraph 1 above, while the Secretaries in the Public Works Department appear to get a special local allowance of Rs. 250 per mensem and no Presidency house-rent or Presidency allowances, the Under Secretaries seem to get only Presidency house-rent and Presidency allowances† but no special allowances.

C.G.M.

C.G.M.

K. RANGASWAMI AIYANGAR—10-1-07.

C. G. MACKAY—12-1-07.

I take His Excellency's remark to mean merely the ordinary Presidency allowances admissible under paragraphs 33 and 35, Public Works Department Code, in addition to grade pay.

H. D. TAYLOR—13-1-07.

To the Public Works Department for remarks.

PUBLIC WORKS DEPARTMENT.

The following are the allowances, in addition to grade pay, drawn by Public Works Department officers of the Secretariat:—

	Local.	Presidency.	House-rent.
	RS.	RS.	RS.
Secretary, Public Works Department ..	250	..	..
Joint Secretary do. (Irrigation) ..	250	..	..
Under Secretary, Public Works Department ..	100	+ 100	45
Do. do. (Irrigation) ..	100	+ 100	45

† Forfeited when an officer attains the rank of Executive Engineer, 1st grade.

Public Works Department officers outside the Secretariat, stationed in the Presidency town, draw the allowances specified on page 3.

It is for consideration whether allowances on these scales should be applied *mutatis mutandis* to Public Works Department officers on the College staff.

R. PARSONS—18-1-07.

For orders. I take His Excellency's remark to mean that officers would draw ordinary Presidency allowance and house-rent in addition to grade pay.

A. G. ROMILLY—19-1-07.

I take His Excellency to mean that the officers should draw something more than officers of the same rank in the Presidency town outside the Secretariat as do the officers of the Public Works Department Secretariat, that is, "local allowance" in addition to the Presidency allowance and house-rent which all officers below the rank of Executive Engineer, 1st grade, draw when stationed in the Presidency town. I take it that His Excellency's intention was that the officers should then draw the pay of their rank. Presidency allowance, if below the rank of Executive Engineer, 1st grade, and house-rent, plus a local allowance, the amount of which might be fixed according to the importance of the office concerned.

F. J. WILSON—1-2-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

I submit that if local allowances, *in addition* to Presidency and house-rent allowances ordinarily admissible to officers of the Public Works Department stationed at the Presidency are to be allowed in the case of Public Works Department officers brought on to the staff of the Engineering College, there will be a howl for the grant of similar allowances on the part of all other Educational officers stationed at the Presidency. Public Works Department officers *in the Secretariat* appear to be especially well favoured in the matter of allowances; it may be that the object is to compensate for the cost of the move to the Hills, but this argument could not apply to Professors on the College staff who reside permanently in Madras, and whose position is similar to that of other Public Works Department officers outside the Secretariat who are stationed at the Presidency. If an additional allowance is to be given, it should be given as a "teaching allowance" not as a "local allowance", or there would be an outcry on the part of other members of the Educational Service.

H. D. TAYLOR—6-2-07.

I voted against the general recruitment of the Engineering College professoriate from the Public Works Department instead of from the Educational Service, **that** service being strengthened by the appointment of suitably qualified men specially chosen for the work in England. But it has been decided to recommend the former scheme to the Government of India and to the Secretary of State—in my opinion I fear with little chance of success.

Two questions arise in connection with the working out of the scheme—

(1) Should the appointments of Principal and Professors be restricted to specified grades in the Public Works Department, or be open to any officer selected irrespective of grade and pay?

(2) Should special allowances be given to officers appointed to these posts?

As to (1), the restriction of appointments to stated grades I am inclined to think that if this is not done the interests of the College may suffer. We know from experience elsewhere that a departmental officer who has not proved himself very satisfactory in the discharge of departmental duties proper is apt to be foisted, under pressure brought to bear by his departmental head, into situations where he is likely to do "less harm", as the phrase goes, without full consideration of the interests of the post into which he is so transferred. Departmental thorns can thus be transplanted without being eradicated. Even in the case of the Engineering College, I rather think that the appointment of Principal has not always been made with the best educational consequences.

If there is no limitation the cost of the College may become unreasonably high by the appointment of too senior men. The College will still remain under the Educational Department and its actual cost in any year must be shown in the Educational budget. If the Engineering College is staffed from Public Works Department, what will be the consequences financially, as between Provincial and Imperial, of heavy charges for Professors, etc., resulting from the appointment of very senior officers of the Public Works Department?

G. S. F[ORBES]—6-2-07.

It does not appear that any portion of the cost of the Public Works establishment is directly chargeable to Imperial funds.

2. Article 2119 of the Public Works Code prescribes rules to regulate the mode of charging for establishment and tools and plant, when one fund or branch of the department executes works for another. According to these rules, a portion of the Public Works establishment of this Presidency is being debited to Imperial, but the amount so debited varies directly with the value of works executed and is calculated at the

What has this got to do with the question!

G.S.F.

rate of 23 per cent. on their value—please compare Appendix E on pages 130 to 133 of the Budget Estimate of the Public Works Department for 1906-07.

3. If the College of Engineering is to be staffed by the officers of the Public Works Department, it does not appear that the amount annually debited to Imperial will in any way be affected. It will no doubt be necessary to increase the cadre of the Public Works Department, but the additional staff will not be employed on the works, and the salary and allowances paid to such of the members of the staff as do duty in the College, will be debited to the Educational Department and will, it is submitted, be a purely Provincial charge.

4. It has taken time to get the information from Public Works Department.

K.R.—26-2-07.

Will Financial please say if the above view is correct?

C. A. SOUTER—27-2-07.

To the Financial Department.

FINANCIAL DEPARTMENT.

The view set forth in the foregoing note is, it is submitted, correct.

T. HARI RAO—1-3-07.

C. M. SCHMIDT—2-3-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

Re-submitted.

H. D. TAYLOR—3-3-07.

For the moment, in writing my query of 6th February, I had it in my mind that the Public Works Department establishment was Imperial, which of course it is not. However that makes little difference to my point. What I wanted to get at was how the *Educational* budget would be affected by recruiting the staff of the Engineering College from Public Works Department? Will it be more costly than the present staff? Or practically the same?

G. S. F[ORBES]—5-3-07.

The present cost of staff of the College of Engineering is as shown below:—

	Pay. RS.	Average pay		
		RS.	A.	P.
1. Principal	1,000—50—1,250	1,166	10	8
2. Professor of Civil Engineering.	500—50—1,000	805	8	11
3. Professor of Mechanical Engineering	500—50—1,000	805	8	11
4. Professor of Mathematics ..	200—700	416	10	8
5. Instructor in Engineering ..	200—700	416	10	8
6. Instructor in Surveying and Drawing	200—700	416	10	8
7. Instructor in Mechanical Engineering	450	450	0	0
8. Assistant Instructor in Surveying and Drawing	150—10—200	183	5	4
9. Assistant Instructor in Surveying	100—10—150	133	5	4
10. Assistant Instructor in Drawing	100—10—150	133	5	4
11. Second Assistant Instructor in Surveying	75—2½—100	90	4	5
12. Second Assistant Instructor in Drawing	75—2½—100	90	4	5
13. Additional Assistant Instructor	75—2½—100	90	4	5
14. Assistant in Vernacular ..	60—2—80	72	3	7
15. Do. ..	60—2—80	72	3	7
16. Workshop Instructor	200	200	0	0
17. Foreman Fitter	50—5—75	66	10	8
18. Foreman Carpenter	45—3—60	55	0	0
19. Gymnastic Instructor ..	20—2—40	32	3	7
Total ..		5,696	15	2

2. It is not possible to arrive at an accurate forecast of the expenditure which the revised staff of the College would entail unless it is decided what classes of officers are to be appointed as Principal, Professors and Assistant Professors, but assuming that the Principal is an officer of the grade of Superintending Engineer,

the Professors are Executive Engineers, the Senior Assistants are Assistant Engineers and the Junior Assistants, Supervisors or Overseers, the cost of the revised staff will work out as follows:—

	Pay.	Average pay.
	Rs.	Rs.
1. Principal (Superintending Engineer) ..	1,500—2,000	1,750
Staff allowance	..	200
House-rent	..	60
2. Three Professors (Executive Engineers) ..	700—1,000	2,550
Staff allowance at Rs. 200 each	..	600
Presidency allowance and house-rent at Rs. 145 each.	..	435
3. Three Senior Assistant Professors (Assistant Engineers - Provincial Service).	250—400	1,000
Staff allowance at Rs. 800 each	..	300
Presidency allowance and house-rent at Rs. 100 each.	..	300
4. Ten Junior Assistants (Supervisors and Overseers).	60—200	1,180
Allowance at Rs. 30 each	..	300
Presidency allowance and house-rent at Rs. 32-8-0 each.	..	325
5. Gymnastic Instructor	20—40	32
		9,032
		5,697
		3,335
	Increase ..	

K.R.—12-3-07.

C. A. SOUTER—13-3-07.

Will Chief Engineer (Works) please note whether the scale of establishment suggested would meet the requirements of the College, and whether the scale of salary and allowances as noted above is in accordance with the standard scale of the Public Works Department?

H. D. TAYLOR—14-3-07.

To Chief Engineer (Works).

PUBLIC WORKS DEPARTMENT.

The rates given are correct, except that under *item 2*, if an Executive Engineer of the first grade is appointed he would not be entitled to Presidency allowance. *Item 3* also requires slight correction. Provincial Engineers are not entitled to Presidency allowance. It remains to consider whether the suggested scale is suitable.

R. PARSONS—18-3-07.

As regards scale of salary, the rates are correct (with the exceptions noted above).

As regards the suitability of the scale of establishment, Educational would, I think, be in a better position to judge than Public Works Department.

A. G. ROMILLY—18-3-07.

I think the scale for the purposes of the enquiry may assume a Superintending Engineer for the Principal.

For the three Professors one Executive Engineer of each grade thus—

	RS.
1 First grade	1,000
1 Second grade	850
1 Third grade	700
Staff allowance	600
Presidency allowance for second and third grades	200
House-rent for three at Rs. 45	135
Total ..	3,485

I am not sufficiently acquainted with the requirements of the other members of the staff to say whether the proposed classes are suitable.

F. J. WILSON—20-3-07.

To the Educational Department.

EDUCATIONAL DEPARTMENT.

The remarks of the Director of Public Instruction will be invited u.o. as to the suitability of the scale suggested on page 3 *supra*, more especially with reference to the sufficiency or otherwise of the staff of Senior and Junior Assistant Professors suggested.

H. D. TAYLOR—23-3-07.

To the Director of Public Instruction.

I consulted Colonel Love and subjoined is a copy of his reply. I have nothing to add.

"Subject to the minor modifications suggested below, I think that the Public Works scale of staff given in your letter will suffice for the College of Engineering in regard to both numbers and emoluments. It is presumed that leave vacancies will be promptly filled from the Public Works Department.

"The following remarks are offered on the scheme:—

"(a) No provision has been made for Workshop Instructor, Workshop Foreman and Laboratory Assistants. In a Public Works establishment these persons would probably be 'charged to works'.

"(b) The 'staff allowances' are no doubt provided to render service in the College attractive and to ensure our securing the best men available. The staff allowance is additional to the ordinary Presidency allowance and house-rent which are drawn by the majority of Public Works officers serving at the Presidency. The 'staff allowance' is therefore a purely College allowance.

"(c) The salary of the three Professors is entered at Rs. 700 to Rs. 1,000, average Rs. 850. The pay of a Third-grade Executive Engineer is Rs. 700, of a second grade Rs. 850, and of a first grade Rs. 1,000. The scheme apparently contemplates one of each in the College as a rule. Now a First-grade Executive Engineer is not eligible for Presidency allowance. The last entry under 'Professors' might therefore read Presidency and house-rent for two Professors at Rs. 145 each, and house-rent for one Professor at Rs. 45—335.

"(d) The scheme contemplates three Provincial Service Assistant Engineers as Senior Assistant Professors. One at least of these should be an ex-soldier if he is to serve as Superintendent of Military Students. But see (e) on page 5.

"(e) Instead of a Gymnastic Instructor (native) on Rs. 20 to 40, it would be preferable to have a Sergeant Instructor of Gymnastics and Drill transferred from the Military Department. He should reside in free quarters at the College and should also hold the office of Superintendent of Military Students. This arrangement will be the more desirable if the Principal should be a civilian.

"(f) As a free house valued at Rs. 150 per month is attached to the office of Principal, no house-rent need be entered under 'Principal', and his staff allowance might be reduced to Rs. 100 or Rs. 150.

"(g) If the College is transferred to Saidapet and becomes a residential one, the members of the staff should all be resident, *i.e.*, quarters will be built for them. Allowances for house-rent will then become unnecessary if the quarters are made free.

Yes.

G. S. F[ORBES].

"(h) While the staff of Principal, Professors and Senior and Junior Assistant Professors is considered sufficient for present requirements, experience alone can show whether additional lecturers and assistants may not become necessary as the institution develops under the new rules and the residential system".

T. T. LOGAN—2-4-07.

EDUCATIONAL DEPARTMENT.

Page 6 *supra*.

* 3,500
12
42,000 a year.

Re-submitted with reference to the Honourable Member's note of 5th March 1907.

2. The increase in cost under the proposed arrangements (if staff allowances are approved) would be about Rs. 3,500 per mensem, or a corresponding * increase in cost of building should separate house-rent allowance not be given.

3. The Director of Public Instruction's suggestion in clause (a) of his note may be adopted.

4. It is not likely that sanction to the scheme, if finally adopted, is likely to be received before April 1909, or it is doubtful even then whether Public Works Department will be able to supply the requisite men. It is presumed that the present staff will have to be absorbed

But Secretary of State has not sanctioned the scheme and I much doubt if he will! in Public Works Department, *e.g.*, Mr. James would have to be transferred to the cadre of the Public Works Department.

G.S.F.

5. Temporary arrangements must however be made for carrying on the work on present lines and, as Colonel Love retires on 25th October 1907, it is about time to consider the question of appointing his successor.

H. D. TAYLOR—3-4-07.

Please re-submit after the Budget meeting at Ootacamund.

G. S. F[ORBES]—4-4-07.

A draft may now be prepared for Government of India in order that the Secretary of State's sanction (if India approves) may be obtained to a professorial staff drawn from the Public Works Department for the Engineering College.

As I have already noted on the reorganisation scheme, I am personally most strongly opposed to depending upon the Public Works Department for Professors and teachers for the College. The qualities required for teaching are not at all necessarily connected with those required in a practical Executive Engineer. Moreover now that the mode of appointment to the Public Works Department has been entirely altered, I do not see how the Government can have even the

assurance (whatever its value was) that was available when the department was recruited from Cooper's Hill, which at any rate secured theoretical training. Assuming that the Secretary of State sanctions the strengthening of the cadre to supply Professors and teachers, it is clear he would have in making his nominations to have in view, for a certain proportion, tutorial qualifications; and that proportion would have to be sufficiently large to supply not only the actual professorial strength, but also a margin for absentees, etc.

The Civil Engineering College, though primarily instituted to supply the State with trained subordinates, is not wholly a departmental institution. It is one of our technical colleges in the Educational Department; and year after year we have been looking forward to the larger influx of private students to engage on industrial pursuits not connected with the State.

I will however put these views into form at a later stage.

G. S. F[ORBES]—24-4-07.

These papers have been sent to me, but they are incomplete. In the short time that remains of my present office, I don't think it worth while to call for full papers. On the point of recruiting the professorial staff from the Public Works Department, I have always been of Mr. deWinton's opinion—which is apparently that of my Honourable Colleague—I do not think the College can be efficiently supplied with Professors from the Public Works Department. I consider the College should remain under the Educational Department and that the English Professors should be recruited from England.

M. H[AMMICK]—29-4-07.

I have asked Mr. Wilson for an expression of his views on this question.

They are set out in the accompanying note which I should like to be attached to the file.

I have again gone fully into this question and, after further deliberation, am disposed to modify my original opinion.

I should like the notes to be printed (including Mr. Wilson's note) before Mr. Stokes' return, whereupon we may discuss the question in Council.

A. L[AWLEY]—15-5-07.

Proposals for the recruitment of the Staff of the Engineering College.

As requested by His Excellency, I have read the papers in the file on this subject, and had a conversation with Colonel Love regarding it this morning. The question on which I am to express an opinion is, I understand, whether, as recommended in G.O., No. 657, Educational, dated 10th October 1906, the recruitment of the entire staff—both professorial and subordinate—should be from the Public Works Department. The entire staff included in the proposals consists of—

- (1) a Principal and three Professors;
- (2) three Senior Assistant Professors of the standing of Provincial Assistant Engineers;
- (3) Junior Assistants of the standing of Public Works Department Subordinates.

It seems to be generally admitted that the third item or subordinate staff can only be drawn from the Public Works Department. I think then in justice to the department the fact should be recognised and the cadre increased accordingly.

With regard to the first two items, viz., the Professors, the proposal as described in G.O., No. 657, is that these appointments are to be held for periods, limited to three or four years at a time, by Engineers on the regular staff of the Public Works Department, and that to enable the department to supply suitable Professors, the Public Works Department cadre should be increased, and the Secretary of State asked to bear in mind specially the requirements of the College when selecting candidates for the Engineering staff of the Public Works Department.

2. In the notes which follow the Government Order quoted above, it is further proposed that the appointments of Principal and Professors of the College should be filled by Public Works Department officers of certain specified grades,

and that special allowances should be given to the officers selected so that their emoluments as Professors would exceed those they would draw for carrying on their ordinary departmental duties.

3. I think it must be recognised that an Engineer may be a very good Executive Engineer and yet fail to have the best qualifications for professorial work, and *vice versa*—what with the extra pay, head-quarters at Madras and a two months' summer recess the effect of the proposals would be to put a premium on professorial work, and I am very doubtful whether this is desirable, in the interests of the proper work of the department, viz., actual practical work.

4. It is the case that the services of our best Engineers are often required in outlandish and possibly unhealthy places, and that less competent Engineers can be more suitably employed in more comfortable places where the work to be done is possibly less important and where they are more under the eye of their superiors. It is one of the difficulties of Public Works Administration under service rules to make it clear that the Engineer of the first category who throws to the winds all ideas of personal comfort and devotes himself wholeheartedly to the work on which he is engaged, will in the end reap his reward and step over the heads of his less zealous or less competent brethren. It is to my mind the Engineer who acts as described, who faces practical difficulties of his profession and overcomes them, who is most likely to make the best Administrative officer or Chief later on, and I cannot help thinking that four years' experience of this sort of thing is incomparably superior in value, to what he might gain by acting for a like period as a Professor at the College. To institute four well-paid sedentary Public Works Department appointments, open to all the executive grades, and to a Superintending Engineer would be, I fear to institute a further temptation to good officers to turn their attention away from what I submit is most important, viz., practical experience of and zeal for the actual execution of work.

5. Considering the interests of the College on the other hand, I doubt if Public Works service is the best training ground for a Professor, and although the Secretary of State be asked to take account of the requirements of the College in making Public Works appointments, he would have, under the scheme, to consider that the Engineers he selected were only going to be liable to serve three or four years of their total service as Professors. As I submit that special qualities are required for professorial work, I am inclined to think that these could best be secured by the authorities reserving to themselves a free hand to select the most suitable men from England or elsewhere. The advantages of improved status and prospects might be secured to a great extent by increasing the pay of the appointments as proposed. If the appointments were non-pensionable appointments the value of the pensions of the grades of Public Works Department officers proposed should be added to the rates of pay proposed. Taking the pension of an Executive Engineer to be worth Rs. 300 per mensem and that of a Superintending Engineer Rs. 400, the equivalent non-pensionable rates of pay for the Principal and Professors would amount to about Rs. 2,350 per mensem *and quarters* and Rs. 1,495 for the average Professor respectively.

In the event of a Public Works Department officer being lent he would only draw the rate of pay laid down.

6. I conclude, then, that it may not be in the best interests of the College, and I doubt whether it is, in the interests of the legitimate work of the department, that the College professorial staff should be entirely recruited from the Public Works Department.

F. J. WILSON--9-5-07.

The note, including Hon'ble Mr. Wilson's opinion, will be sent down to Madras to be printed urgently. Send up 6 copies.

H.D. Taylor--16-5-1907.

Print in fruit

Educational Department.

41 40

12

It is regretted very much that the proof in this case was unfortunately mislaid in the office with spare copies of other proofs etc., and was discovered by me during the periodical examination of confidential records, when I found that they had not been submitted to the Secretary as they should have been. The notes were sent to the Press at Madras on the 16th May 1907, when I was at Madras in charge of Local and Municipal Department. They were received back on the 24th May and appear to have been mislaid. I am unable to account how they came to be mixed up with the other spare copies of proofs. As the paper, not being a current, was not shown in the arrear list, the pendency of the subject came to be overlooked.

K.R.
7-8-07.

Lee
Res
7-8-7.

Lee. 42 41 138

Please see separate note below slip N

Better circulation. After the lapse of time - of the subject in the discussion in Council, as a letter in fact matter, the Hon. Member would see the papers again. Revised proof was obtained from the printer, under the order.

The proofs were apparently lost sight of in the office. They seem to have been mixed up with other papers, spare copies etc like, & to have been overlooked.

The papers may be sent to H. E.

Chas
1.8.7.

1802

HM. and circ.

248.07

I have already expressed my views

8/8/07

I gather from these papers that the ~~cost of the~~ ^{recruitment} ~~work~~ ^{of the} ~~staff~~ ^{from} ~~the~~ ^{the} D.O.W. will add 42,000 £ to the cost of the College. I do not think that the advantages of the annual examination are worth that amount. and under the circumstances I am prepared to ~~accept~~ ^{agree} that the existing system of recruitment from beyond the 3rd continue.

9/8/07

We are now agreed that the present system of recruitment sh^d. continue

14.8.07

See

The draft was apparently lost
left of in the office. The same
have been taken up with the
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The draft was apparently lost
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have been overlooked.
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148

Please draft into reference to serial of

86 637 21 243 104 301 1906.

407
18. 8. 07

The draft order placed below is sub-
mitted for approval. If approved, it
may be sent to P.W.D. for acceptance.

22.8.07

lec
24.8.7.

441.

403
26.8.07

Does the "present system" (as in
draft) include the Principal.
We are now to make the whole
recruitment in Educ. Dept.

27/8

Is the appointment of Principal included in the
case of recruitment for the India Ed. Service?

Under 202.

207

The appointment of Principal of the
College of Engineering is not included in the
Cadre of the Indian Ed. Service - vide
G.O. No. 479 Ed., dated 10th August 1896. In para.
graph 4 of G.O. No. 328 Ed., dated 27th May 1886,
it was decided that the Principal should be an

vide page 10 of K

slip 7

an Engineer, Civil or military

RD
29.8.07

Sec.

Though the ~~appointment~~ post of Principal is not included in the Ed. service, the Principal ~~is~~ is appointed by the Ed. Dept.

Col. Rogers & Col. Lowe were both so appointed (please see dockets flaps 7, VIII + II). There is to be no alteration, so far as I understand, in this method of recruitment. The 'present system' will therefore continue.

Chd

29.8.7.

Where PWD Officers are recruited the appointments will be made in the Ed. Dept. with the concurrence of PWD

HM.

20.8.07

~~the appointments of PWD Officers will be made in the Ed. Dept. with the concurrence of PWD~~
~~the appointments of PWD Officers will be made in the Ed. Dept. with the concurrence of PWD~~
~~the appointments of PWD Officers will be made in the Ed. Dept. with the concurrence of PWD~~
~~the appointments of PWD Officers will be made in the Ed. Dept. with the concurrence of PWD~~

For the future the Principal as well as the Professors will normally be recruited in the Indian Educ. Service. Of course Govt. can always make an app't outside, if it is desirable to

45 13 24 16 P
 do so for very special reasons.

I have revised the draft somewhat.

S.F.
 29/8

P.W. U.O. for acceptance

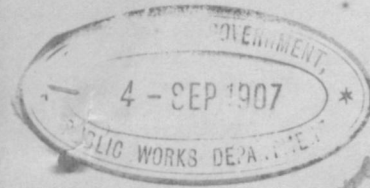
1701
 31-07

Accepted in C.O.

1701
 31/8/07

Edl. U.O.

Issue 1701
 7-9-07



Eduo 2175-1

4-9-07
 3-9-07

P.W. U.O. RNO 1008
 4-9-07

27

Read --

Again G.O. No. 655, Edl., dated 3-10-1905. - A

" " " 657, " " 10-10-1906. - D

ORDER:--
P.S.

586 d 7- 9- 07

Vide paragraph 11 of G.O. 655 Edl. - A
3-10-05

do do

Vide para. 11 of G.O. 657 Edl. - D
10-10-06

The Committee appointed to advise on the question of the extension and re-organization of the College of Engineering ^{Madras} at first recommended that the entire staff of the College should be recruited from the Public Works Department and that the administration of the College should be in the hands of the Chief Engineer. Mr. deWinton, then Chief Engineer, was however strongly opposed to these proposals and considered that the College should remain under the Educational Department and that the superior staff should be recruited from ^{Europe} ~~home~~ and from the Educational Department, the Public Works Department being indented upon only to supply temporary vacancies. The Government concurred generally with the Chief Engineer and requested the Committee to reconsider the question. ^{The Com. ~~then~~ ~~thereupon~~ ~~re-acted~~} The Committee then stated that they would not press the point as to the administration of the College which might be left in the hands of the Educational Department, but that as regards the recruitment of the staff from the P.W.D., they considered it to be the only source from

from which the staff could be drawn and that, if necessary, the cadre of that Department should be increased to provide for it.

2. The Governor in Council was then disposed to accept the above recommendation of the Committee, but on further ^{fuller} consideration, he is unable to agree that it would be either expedient or desirable to make any change in the present system of recruitment of the staff. ~~The Public Works service does not appear to be the best training ground for a Professor and although the Secretary of State may be asked to take account of the requirements of the College in making Public Works appointments, he would have under the scheme to consider that the Engineers he selected were only going to serve three or four years of their total service as Professors. Special qualities are required for professorial work and the Government are of opinion that these could best be secured by reserving to themselves a free hand to select the most suitable men from England and elsewhere and that it may not be in the best interests of the College or of the legitimate work of the Department, that the College professorial staff should be entirely recruited from the P.W.D. In these circumstances the Governor in Council resolves to direct that the present system of recruitment of the professorial staff~~

Para. 11 of go. by Est. - D
10.10.06

appeal from the financial
aspect of the resolution

draws the ^{teaching} staff of the
College from the Dept. of
P. Works

For professorial work
special qualities & training
are required which cannot
be always secured in men
selected for a department whose
duties are primarily of
an executive character. To
supply suitable men from the
P.W.D. is to entail interference
with its proper recruitment.
If the S. of S. were asked to take
account of the requirements of
the College in making P.W. appointments
he would have to consider that the Engineers selected for this purpose of
would be liable to serve only for three or four years of their

shall be
of the College should continue and that
the College should continue under the
Educational Department.

total service as professors.
This course w^d not be

conduce in the interests of ^{no} _{21.8.07}
the legitimate work of
the dept. nor w^d it

conduce to the best interests
of the College. For these ~~other~~

reasons the Furl. is unable to
accept the Committee's proposal

on this point. For the future the
recruitment for the College will

be in the Educat. Dept. and ^{its administration} ~~be continued~~
under the
the control of which that dept.

G.H.
20/8

To Messrs. D. V. Desai 29.8.07
Public works Dept.

copy sent to Press.
returned for signature.
despatched in print.

NUMBER OF COPIES
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Letter only.
Order complete with Letter.

4

AD AGAIN G.O., No.
190

DATED

49

4 P.
not 1-16 P

RECENT No.

Press
Proof please
12/9/07

ENCLOSURES TO G. No.

MINISTER OF GOVERNMENT.

A
no as A

MINISTER TO GOVERNMENT.

STATEMENT WITH DITTO.

PAPERS TO BE FILED UP, BEING MEANT FOR DISPATCH
ORIGINAL.

N.B.—

A = Print in full.
B = Not to be printed.
P = Print abstract only.
Q = Print heading only.