(1) பக்கங்களின் எண்ணிக்கை 67

(2) புதுக்கித் திருப்பிய நாள் 7.90

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம்

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

துறை

அரசாணை எண்.
மு. கோப்புத் தாள் எண். 1829 W

அச்சகம்
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நாள் : 12 - 7 - 1893 198 .

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1823/1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

READ—the following paper :—

G.O., dated 10th June 1893, No 385, Educational.

Read—the following paper :—

From D. DUNCAN, Esq., M.A., D.Sc., Director of Public Instruction, Madras, to the Chief Secretary to Government, dated Madras, 15th May 1893, No. 5292.

I have the honour to submit, for the information of Government, a copy of my Proceedings No. 5287, dated 13th instant, reviewing the report on the Madras College of Engineering for the calendar year 1892, and to solicit the attention of Government particularly to the concluding portion of paragraphs 9 and 12 of the review, in which the questions of substituting quarterly for the half-yearly reports now furnished by the Superintendent of the Public Works Workshops to the Principal and of referring to the latter officer all vacancies in the Public Works Department of local bodies which it may be found difficult to fill have been dealt with.

ENCLOSURES.

PROCEEDINGS of the Director of Public Instruction, dated 13th May 1893, No. 5287.

Read the following letter from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated 25th January 1893 :—

We have the honour to forward the reports of the examiners on the recent examination of the College of Engineering and to submit a statement of marks awarded.

2. The individual examiners having reported separately on each subject, it is unnecessary for us to do more than refer briefly to those classes which have completed their course at the College.

Engineer Class, First Division.—The class consists of four students, all of whom passed in the second class. Two independent candidates also presented themselves for examination, but both failed. On the whole, the class may be considered fully up to the average, the first man obtaining just over two-thirds of full marks and the last just qualifying for a certificate by three marks.

Engineer Subordinates' Class, First Division.—The class comprises 18 men, of whom five have failed and the remainder passed in the second class. One independent candidate was examined and passed in the second class. This batch of students cannot be considered otherwise than below the average and on the whole are a decidedly poor lot. Of the 13 students who have passed, three have only qualified by the narrow margin of from one to two marks. The *forte* of the class lies in Surveying, but they are without exception inferior in Mathematics.

Draftsmen's Class, First Division.—It will be remembered that these men did very badly last year in the examination in Building Drawing, and it was anticipated that many would in consequence fail. However, as the class appear to have done well in their session work and obtained high marks from the College authorities, only six out of 24 men have failed. This class is a very bad one, only four obtaining even a second-class certificate, while five have qualified by from one to three marks.

Only one independent candidate out of six has passed.

Surveyors' Class, First Division.—The Surveyors' class calls for but little comment. No first-class certificates have been obtained, and only two men have failed. Eleven students passed in the third and five in the second class.

3. We beg to offer the following general remarks on points which have presented themselves to our notice, and hope that in so doing it will not be considered that we have gone beyond our province:—

(1) It was found that but for the printed list of names supplied by Major Love, it would have, in many cases, been impossible to decipher the names written on the answer papers. It is suggested that the practice of giving each student an examination number might with advantage be introduced; if not, it is hoped students will be directed to write their names legibly.

(2) It is hoped that instructions may be issued to the students to invariably execute their drawings to the scales specified by the examiners. Much additional trouble in marking is caused by drawings being made to scales different from those laid down in the questions.

(3) We would suggest that occasional paper examinations be given to the students by the College authorities if this is not already done. At present candidates write lengthy and irrelevant answers, and it would be good practice to set the students the previous examination papers and then to go over the answers with each man separately, pointing out mistakes and useless matter.

(4) As the surveyors appear to be recruited from an uneducated class of men, the advisability of only examining them at the end of their course is worthy of consideration. The students evidently learn a good deal of English while at the College and are much more able at the end than at the beginning of their term at the College to answer papers. That there are objections to this proposal is obvious, as students would in many cases postpone serious work till the final examinations, but we still think the question one for serious consideration.

(5) At present all draftsmen, both College students and independent candidates, have to pass in drill and gymnastics. As a draftsman's occupation is a sedentary one and his qualifications as an athlete are of no use to him in his profession, we consider that the examination in drills and exercises should be dispensed with. The marks obtained in this subject may qualify or disqualify a man or may determine his class of merit, and this appears to us very undesirable. Some of the independent candidates who presented themselves for examination in gymnastics were corpulent persons totally unfitted by age and habit for athletic exercises and their performances attracted the ridicule of on-lookers and must have been mortifying to themselves.

(6) As we understand that a revision of the College rules will probably be necessary before long, we venture to record our opinion that the syllabus of instruction might with advantage be cut down. It is obvious that the present course of instruction is too comprehensive for the time allowed at the College, and that consequently the thoroughness of knowledge acquired must suffer. It would in our opinion be far more satisfactory for the students to receive a good grounding in fewer subjects than to acquire a general smattering of the large number of subjects they now study. The subjects selected should be those having reference to problems and work likely to fall to the lot of each class of students in their ordinary daily work. The higher branches of applied mechanics, &c., could, if ever needed, be studied in after-life, as what is learned of such matters at College will generally have been forgotten by the time any occasion for its use occurs.

(Signed) A. D. G. SHELLEY, Captain, R.E.,
President.
(,,) E. W. STONEY, M.E., M. INST. C.E., } *Members.*
(,,) R. Ll. JONES, B.A., }

[I do not concur in suggestion (3) 1.]
(Intld.) R. Ll. J.

From Major H. D. LOVE, R.E., Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 27th January 1893, No. 1505.

I have the honour to submit the following review of the working of the College of Engineering during the year 1892. A supplemental report will be forwarded in April next so as to complete the review for the official year. The matter contained in the supplemental report of April 1892 is included in the present report.

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2. *Establishment.*—On 26th January 1892, I returned from a course of instruction at the School of Military Engineering, Chatham, and resumed charge of the College from the Acting Principal, Major Smart, R.E. On 30th January Mr. Chatterton, the Professor of Engineering, left the institution temporarily on transfer to the Public Works Department for two years with the object of gaining practical experience of engineering work in this country. He was relieved by Mr. J. J. Whiteley, Executive Engineer, Public Works Department. On 1st February 1892, Mr. W. C. H. Littlewood, Second Assistant Instructor in Drawing, resigned his post in order to take up an appointment elsewhere, but he was re-appointed to the College on 1st April. In the interim the duties of the instructorship were performed by Mr. R. Everard, a recently qualified Engineer. On 29th June M.R.Ry. T. Bhavaniswami Rau, B.A., L.T., was confirmed in his appointment as Vernacular Assistant. On 20th December Mr. J. E. A. D'Cruz, B.C.E., Assistant Instructor in Surveying, was granted three months' leave without pay to enable him to take up a Local Fund Assistant Engineership. Mr. E. W. Middlemast, M.A., Professor of Mathematics, proceeded on sick leave to England on 21st December for six months. The vacancies caused by the temporary absence of Messrs. Middlemast and D'Cruz will be filled early in 1893. During the second term of 1892 the services of M.R.Ry. C. Krishnan, Assistant Chemical Examiner, were made available on one afternoon in each week for the instruction in Practical Chemistry of the senior division of the Engineer class.

I have to acknowledge the good work done by all the members of the staff, and especially the assistance rendered me by Mr. Whiteley, the Officiating Professor of Engineering, who has performed his educational duties with conspicuous ability and success. There is one matter which must be referred to although it does not pertain to the year under review. During the Christmas vacation Conductor Cames, the Instructor in Engineering and Superintendent of Military students, who had been ailing for some time, became seriously ill, and I regret to announce that he succumbed on 20th January 1893, the day following that on which the College re-opened, after a service in the institution of upwards of twenty-one years. He was a man of ability and uprightness, zealous in the performance of duty, and neat and accurate in all his work. Appreciative references to that work will be found in the history of the College and in many of the annual reports. His loss is a serious one, and it will not be easy to adequately fill his place.

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

Class.	Practical course.		In College.			Total.
	Second year.	First year.	First Division.	Second Division.	Third Division.	
Engineer Classes	4	4	4	2	4	18
Engineer Subordinate Class	6	9	18	28	31	92
Military Probationers	...	...	...	...	...	5
Draftsman Class	...	...	25	26	...	51
Surveyor Class	...	...	18	19	...	37
Artisan Class	...	...	...	...	...	34
Special Students	...	...	...	...	...	3
Grand Total ...	...	...	...	...	...	240

Excluding the students going through the practical courses in workshops and on works, the total number actually in the College on 31st December 1892 was 217. The numbers arranged by classes of the community were—

Europeans and Eurasians	17
Brahmans	113
Other Hindus	64
Native Christians	14
Mussalmans	8
Others	1
Total ...	217

The corresponding totals of the four previous years were 1891, 189; 1890, 136; 1889, 109; 1888, 102. The numbers applying for admission in 1892 were unusually large. In July 66 candidates qualified for admission to the Engineer Subordinate class and 28 were admitted, furnishing, with four Military students, a full class of 32. In December thirteen candidates, most of whom have completed the B.A. degree curriculum, presented themselves for the Engineer class entrance examination and twelve qualified for admission. The majority of these will join early in 1893. The number of applications for the Draftsman, Surveyor and Artisan classes was unprecedented, viz., 143, 85 and 147 respectively. The selections for admission numbered 45, 35 and 40 respectively. By the middle of 1893, when another batch of Engineer subordinate students will join, the numbers will probably reach 260, a total which will tax the College accommodation to the utmost. The increased demand for the highest class of training which the institution affords is gratifying, and is partly due to the removal of the restriction regarding the employment of Engineers in the Upper Subordinate grades of the Public Works Department. Endeavours will be made during the coming year to improve the lighting and accommodation in the old portion of the building so as to meet the wants of larger classes.

4. *Examinations.*—The Board of Examiners appointed by Government conducted the final and term examinations of all the classes in December 1892 and the entrance examinations of April and December. A brief abstract of the results is given below, and a synopsis of the final examination marks forms an appendix * to this report. Hitherto the entrance examinations have been confined to Mathematics, credit for general education being given by the award of a proportion of the marks gained by the candidates in their University examinations. The University has lately resolved that its marks cannot be communicated, and the entrance examinations have accordingly been modified so as to include English composition and Handwriting. The system of paying the Board of Examiners a lump sum not having been found to work satisfactorily, Government have ordered that the Board shall be remunerated by *pro ratâ* payment on the principle adopted by the University. It is in contemplation to transfer the entrance examinations to the College staff. The question of holding entrance examinations for the Draftsman and Surveyor classes has also been considered; and in view of the large numbers applying for admission, it will probably be necessary to introduce a measure of this nature during 1893. In drawing up the question papers for the final and term examinations, it is hoped that the Board will, in future, meet in conference. Several of the questions set for the examinations of December 1892 were outside the syllabuses, a few contained insufficient data, while certain papers were, in my opinion, too long for the time allotted; but it is proper to add that the President hastened to modify the papers when errors were pointed out. Nevertheless, much inconvenience would be avoided if the papers were prepared in proper form in the first instance. Acting on the Board's recommendation last year that there should be a practical examination in Levelling, examinations of the Engineer Subordinate and Surveyor classes were held by the College staff in Chain and Compass Surveying, in Levelling and in Theodolite work. The marks allotted were a proportion of those usually assigned to Field work, and both rapidity and accuracy of work were considered in making the award.

* Will follow.

5. *Engineer Class.*—Four students completed their final year's practical course on 31st December 1892, viz., A. V. Ramalinga Aiyar, B.A., B.C.E., K. Gopala Aiyar, A. Rajam Aiyar, and R. Sundaram Aiyar. The senior of these, A. V. Ramalinga Aiyar, has been appointed an Assistant Engineer in the Public Works Department.

The next batch of Engineer students, four in number, has completed one year in workshops. Two of them, L. D. Venkatarama Aiyar, B.A., B.C.E., and V. R. Pranatartihara Aiyar, B.A., B.C.E., have now been drafted to works, while the other two, J. Kuriyan, B.A., and S. Rajagopalasawmi Mudaliyar, who are Mechanical Engineer students, will spend another year in the Madras Railway Locomotive Shops.

Of the three divisions of the Engineer class actually in the College, the senior, consisting of four students, appeared for the final examination in December last

and all passed. The average percentages of marks for the division in the various subject heads were as follow :—

Mathematics	65
Science	44
Engineering	60
Drawing	67
Surveying	63
Vernacular language	53
Drills and exercises	70
Total	60

Compared with the results of the preceding year, there has been a substantial improvement in Mathematics, a moderate falling off in Drawing and Surveying, and a slight improvement on the whole. The class may be regarded as a good one.

The senior student is G. S. Rama Aiyar, B.A., who is easily first with 69 per cent. of the total marks and receives the gold medal awarded to the most distinguished pupil. He will, on the satisfactory completion of his two years' practical course, provided he passes the B.C.E. degree examination, be appointed to the Engineer establishment of the Public Works Department. Rama Aiyar wins a prize for *Mathematics* and *Surveying* consisting of a field glass, and he also gains the Narayana Oonythan prize, a copy of Molesworth's pocket book. The second student is P. Ranganayukulu Nayudu with 62 per cent. of the total marks. He is awarded a prize for *Engineering* and *Drawing* consisting of a copy of Mullins' "Hydraulic Manual." A Sir Madhava Rau prize for *Workshop practice*, viz., a set of Architect's scales, is assigned to V. S. Ramakrishna Aiyar.

Two independent candidates presented themselves for examination, but both were unsuccessful.

The second division of the Engineer class, containing two students, has undergone a term examination, the marks of which count towards the final total. The average of the division was 64 per cent., showing that the class, though small, is good. The scholarship of Rs. 30 per mensem is gained by R. Arogyaswami Mudaliyar.

The third division, consisting of four students, made an average of 62 per cent. of the total marks at the late term examination. Two students, S. A. Jagadisa Aiyar, B.A., and K. V. Natesa Aiyar, B.A., have done exceedingly well. The scholarship of Rs. 30 is won by the former.

Twelve candidates passed the entrance examination for the Engineer class and should join the College early in 1893.

6. *Engineer Subordinate Class.*—Six students completed their final year's course on works on 31st December 1892, and five of them have been appointed to the Upper Subordinate establishment of the Public Works Department, viz., Sergeant G. E. Brand, Sergeant C. J. Smith, W. T. J. Scanlon, M. S. Venkatarama Aiyar, and T. A. Kuppuswami Aiyar.

The next batch of Engineer Subordinate students, nine in number, spent the year 1892 in the Public Works Workshops. Their work will be referred to later. The batch originally consisted of twelve students who passed the final examination of December 1891, but three of these elected to seek employment without going through the practical course. These three will not of course receive diplomas.

Of the three divisions of the Engineer Subordinate class in the College proper, the senior, consisting of eighteen students, joined in August 1890 and underwent final examination in December last. Thirteen of these were successful. The average percentages of marks gained by the divisions were—

Mathematics	43
Engineering	49
Drawing	52
Surveying	61
Vernacular language	43
Drills and exercises	67
Total	52

Compared with the results of the preceding year, there has been some improvement in Engineering and Surveying and a moderate falling off in the remaining subjects and the total marks. The class is below the average.

The senior student is N. Tiruvambala Pillai, who is easily first with 72 per cent. of the total marks. He gains the silver medal awarded to the most distinguished student, and prizes for *Mathematics*, an aneroid barometer, and for *Engineering* and *Surveying*, a lever watch. He also gains the Roger's prize consisting of books. To the second student M. V. Venkatarama Aiyar, who secures 64 per cent. of the total marks, is awarded a prize of a pillar compass for *Drawing* and a Sir Madhava Rau prize of a colour box for *Workshop Practice*. The third and fourth places are taken by S. Chittambala Pillai and K. Srinivasa Aiyar. The latter is awarded a prize consisting of an ivory rule for *Gymnastics and Drill* and a parallel rule is given to D. V. Venkatarama Aiyar for *Vernacular Language*.

One independent candidate appeared for the final examination and was successful.

The second division of the Engineer Subordinate Class contains twenty-eight students, who scored an average of 49 per cent. of the total marks at the term examination of December 1892. Gunner Power heads the list with 64 per cent. The two scholarships of Rs. 12-8-0 are awarded to M. R. Natesa Aiyar and N. Kandaswami Pillai, who occupy the second and third places respectively. A Sir Madhava Rau prize, consisting of an optical square, is awarded to Corporal H. A. Furnell for *Workshop Practice*.

The third division of the Engineer Subordinate Class, which contains thirty-one students, obtained 60 per cent. of the marks at their first term examination in December last. This result indicates the existence of good material. The two scholarships of Rs. 12-8-0 are won by J. S. Muthayya and M. Krishnaswami Aiyangar who occupy the first and second places respectively. The Walker scholar, K. Narayana Hebbar, takes the fourth place in the class.

7. *Draftsman Class.*—The senior division, consisting of twenty-four regular students, appeared for the final examination in December last. Eighteen were successful in gaining certificates, four in the second class, and fourteen in the third class. The failures occurred principally in *Building Drawing*, *Estimating*, and *Total Marks*.

The average percentages gained by the division under the various subject heads were—

Practical Geometry	53
Freehand, Perspective, and Model Drawing	53
Building Drawing	49
Machine Drawing	54
Estimating	50
Topographical Drawing	51
Gymnastics and Drill	64
Total	43

Compared with the results of the preceding year, there has been a substantial falling off in all subjects except *Machine Drawing*. The class is below the average.

The student occupying the first place is S. Rama Aiyar, who with 68 per cent. of the total marks gains the College bronze medal and a prize of a colour box for general proficiency. The second student S. Rangaswami Nayudu secures 67 per cent. of the marks and receives a prize consisting of a set of Architect's scales. In common with those two students, T. C. Anantha Aiyar and M. S. Tambuswami Pillai qualify for second-class certificates.

Six independent candidates presented themselves for examination for certificates. One of these secured a certificate in the third class.

The second division of the Draftsman Class contained twenty-six students. The mean percentage of marks gained by the division at the term examination was 52. Fair results were obtained in *Geometrical Drawing*, but very poor ones in *Building Drawing*. The two scholarships of Rs. 8 are won by N. L. Ramachandra Rau and A. Muthusami Pillai.

Forty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1893.

8. *Surveyor Class.*—In the senior division of 1892, there were eighteen students. Five of these gain certificates in the second class and eleven in the third class, while two fail.

The average percentages obtained under the different subject heads were—

Chain, Compass and Plane Table Surveying	61
Levelling	54
Theodolite Surveying	66
Topographical Drawing	59
Gymnastics and Drill	50
Total	59

The results are not so high as those of the preceding year, but the class is a good one.

The senior student is M. Sivasubrahmanya Aiyar with 71 per cent. of the total marks. He wins the College bronze medal and a prize consisting of an optical square for general proficiency. To K. Kulothunga Pillai, who is only one mark below the first man, is awarded a prize of a clinometer rule. The remaining winners of second-class certificates are C. N. Ramaswami Aiyar, D. Francis, and K. Rajagopala Chari.

The second division of the Surveyor Class, containing nineteen students, secured an average of 52 per cent. of the marks at the December term examination. The two scholarships of Rs. 8 are awarded to T. R. Jivanna Rau and G. Somayya Sastri.

Thirty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1893.

9. *Artisan Class.*—At the commencement of the year forty out of one-hundred and two candidates were admitted. Six students resigned or were dismissed during the session, leaving thirty-four at the close of the year. About six of these are actual artisans or maistries. The class received evening instruction in Mathematics, Building Construction, and Elementary Plan Drawing. During the second half of the year the students were taught Surveying in the field with Chain, Compass, and Plane Table, going out one morning in the week. Surveying is at present extra to the regular course and its continuance depends on the possibility of making an instructor available for the work. M.R.Ry. R. A. Bhakya Mudaliyar took the students on several visits of inspection to engineering works in progress. The class is not examined in the College, but my observation of it indicates that the students of 1892 were earnest in their work and made satisfactory progress. The students are advised to present themselves for the Government Technical Examinations on the first opportunity. In November 147 candidates applied for admission. Of these 40 have been accepted. The following statements of the occupations of the persons selected and of their parents show that the type of student, for whose benefit the class was instituted, is now being fairly well secured.

Classification of students by occupation.

Maistry or Sub-Maistry	13
Blacksmith and Carpenter	1
Contractor or Contractor's Assistant	3
Compositor	1
Artisan, Telegraph Department	1
Kanakapillai	1
Attender	1
Bill Collector	1
Timekeeper, E.C. Railway	1
Sanitary Inspector	1
Teacher	1
Student, or no occupation	15
Total ...	40

Classification of students by parents' occupation.

Bricklayer Maistry or Bricklayer	7
Blacksmith and Carpenter	1
Carpenter	4
Maistry, Road Maistry or P.W. Maistry	12
Maistry and Contractor	3
Contractor	2
Overseer or Sub-Overseer	2
Delta Superintendent	1
Surveyor	1
Compositor	1
Pensioner	2
Peon	1
Landowner	3
No occupation	1
Total	40

10. *Military Students.*—The total number of soldier students on 31st December 1892 was sixteen, viz., two on works, two in the P.W. Workshops, seven in the Engineer Subordinate Class, and five probationers. One was remanded to his regiment in March owing to insufficient progress in his studies and one in July on account of ill-health. Seven non-commissioned officers and men competed for admission in April and five were received into the College in July. The accommodation in the College barracks being insufficient, six of the senior students were drafted to the family quarters. It is hoped that by July 1893, when a fresh batch will join, the rooms now occupied by the temporary workshop will become available as barracks. The conduct of the Military students has been very good. Arrangements for enabling the men to spend the long vacation at the Wellington depôt are under consideration. A proposal was made by the Military authorities to establish a Survey Class at the College for native soldiers, but the project was dropped on account of expense.

11. *Special Students.*—One Victoria Technical Institute scholar has been under training during the year. He will appear next May for the Government Technical Examinations in Surveying, Plan Drawing, and Mensuration. Two special students were allowed during the latter part of the year, on payment of fees, to receive instruction in Surveying and Drawing. They were attached to classes in which there were vacancies. A few applications were received from Europeans desirous of giving their sons an engineering education. The College rules generally bar the favorable entertainment of such applications, but in one case special sanction has been obtained to the reception into the Engineer Class of a student from the Royal Indian Engineering College, Cooper's Hill. The student will have the benefit of the College course of theoretical training, but will be ineligible for the award of appointment, diploma or prizes.

12. *Government Technical Examinations.*—A number of the regular students of the College presented themselves voluntarily for the Government Technical Examinations in Engineering subjects. In the Higher Examinations there were the following passes:—*Applied Mechanics*, one first class; *Building Construction*, two second class; *Plan Drawing and Estimating*, one second class; *Bridge-making*, one second class; *Machine Drawing*, one first class, two second class; *Geometrical Drawing*, two first class, two second class; *Surveying*, one first class, six second class; *Pure Mathematics*, first stage, three first class and three second class; *Mixed Mathematics*, three second class. In the Lower Examinations there were two second class passes in *Building Construction* and one first and three second class in *Mensuration*.

13. *Surveying.*—The outturn of work during the year was as follows, exclusive of that of the Artisan Class:—

No. of squads.	Description of work.	Miles of levelling and traversing.	Acres filled in.
	First Half Year.		
3	Chain Survey	...	112
4	Compass Survey	...	1,320
4	Compass Traverse	11½	...
4	Plane Table Survey	...	1,320
9	Levelling	84	...
8	Theodolite Traverse	62	...
4	Setting out Curves	4½	...
	Second Half Year.		
4	Chain Survey	...	320
10	Compass Survey	...	13,560
6	Compass Traverse	14	...
6	Plane Table Traverse	14	...
10	Plane Table Survey	...	10,180
13	Levelling	43½	...
11	Contouring	28	...
8	Contouring and Hill Sketching	...	6,400
3	Theodolite Traverse	6	...
3	Setting out Curves	8½	...
4	Pocket Sextant Survey	...	1,920
4	Trigonometrical Survey	...	28,900

In February two divisions of the Engineer Class and one of the Engineer Subordinate Class were sent out to Guindy for a fortnight's continuous work in the field, and in July three divisions of the Engineer Class, one of the Engineer Subordinate Class, and one of the Surveyor Class spent the same length of time in camp near Gúduvánchéri, where good work was done under Sergeant Goddard and Mr. D'Cruz.

14. *Inspections of Works.*—Some thirty inspections were made during the year, including Quarries, Brickfields, Limekilns, Cement Works, Buildings in Progress, Masonry and Iron Bridges, the Public Works Workshops, and the Buckingham Mills. Several of the classes spent three days at the Red Hills, inspecting and measuring up works. A building and two bridges were also measured up and detail drawings made of them. The students were exercised in setting out work on the ground.

15. *College Workshop.*—The temporary Workshop has been fully utilized throughout the year. The students have been practised at sawing and planing to given dimensions, at making joints, at turning, and, when sufficiently advanced, they have been employed on the construction of drawing tables, benches and other furniture required for the college. In the Fitters' Shop they have been exercised in chipping and filing cast and wrought iron, in drilling, turning, and screw-cutting. The new Workshop sanctioned in 1891 was designed as a temporary building. Fresh sanction was accorded during the year under review to the erection of a permanent structure and the foundations were commenced in September. The building is expected to be ready for the reception of machinery in May 1893. Indents for a 10 H.P. engine and boiler and for machine tools have been forwarded to England, and it is hoped that students will be able to use the new shops by July. With the increased accommodation, more time can be devoted by the Engineer and Engineer Subordinate Classes to Workshop practice. The theoretical course may require some modification in consequence and opportunity will be taken to revise the syllabuses, which experience shows to be rather too extensive. Instruction in Carpentry will probably be extended to the Draftsman Class.

16. *Laboratory and Experimental Work.*—Work in the Chemical and Engineering Laboratories was conducted as usual. Cement-testing was practised and indicator diagrams were taken at the Buckingham Mills through the courtesy of Messrs. Binny and Company. The apparatus imported consisted chiefly of surveying

instruments, specimens of iron and steel, a model turbine, and models of pieces of mechanism.

17. *Practical Course, Mechanical Engineers.*—The Engineer students of December 1890 all elected to become Civil Engineers, but two of those of December 1891, viz., J. Kuriyan, B.A., and S. Rajagopalaswami Mudaliyar, are studying as Mechanical Engineers. The former was attached for the first half of the year to the Public Works Workshops, where he went through the Foundry and Carpenter's Shop. He was then transferred to the Madras Railway Locomotive Shops where S. Rajagopalaswami spent the whole year. Mr. Pilkington, the Locomotive Superintendent, writes as follows:—"Both students have conducted themselves entirely to my satisfaction. Their attendance has been regular and they have both shown much interest in their work. Rajagopalaswami worked from February to July in the Erecting Shop. He assisted in setting slide valves and fitting boiler mountings and fitted axle boxes, big ends, and eccentric straps. From July to September both students worked in the Fitting Shops, fitting up side rods, connecting rods, link-motions and other engine details. From October to December they worked in the Foundry."

18. *Workshop Course, Civil Engineers and Subordinates.*—Two Engineer and nine Engineer Subordinate students were attached during the year to the Public Works Workshops, Ráyapuram. One of the subordinates, a Military student, was in hospital from August to December, but no report of the circumstance was received from the Workshop Superintendent during the year. Mr. Wickham writes as follows on the conduct and work of the students:—"The attendance has been in most cases regular and the students, who absented themselves beyond the number of days admissible as casual leave, were made to attend the shops on College holidays. The conduct of the students has been generally good. As regards the progress made in the direction of practical course, I regret to say that, owing to the absence of technical supervision in this workshop, I was obliged to leave the students to pick up as much knowledge as they could by themselves." This report must be regarded as far from satisfactory. There is no indication of the students having been passed through the various shops; there appears to have been but little supervision of their work; and the protracted absence of a military student in hospital passed unnoticed. The Superintendent doubtless did his best with the means at his disposal, but his report shows that the course could not have been utilised by the students to full advantage. I suggest that the Superintendent be called on to submit progress reports quarterly in future.

When the new College workshop is in full operation it is probable that a reduction may be effected in the course at the Public Works Workshops, the time saved being devoted to the course on works. Half of the works course may be spent in places where large building works are being executed and the remainder in irrigation districts. This division of work has been to some extent carried out this year.

19. *Works Course, Civil Engineers and Subordinates.*—Four Engineer and six Engineer Subordinate students were attached throughout the year to various circles where important public works are under construction. An abstract of the progress reports received from the Public Works Department is given below. While some of the reports, such as those on Engineer student A. V. Ramalinga Aiyar and Engineer Subordinate student Private G. E. Brand, are very gratifying, it is evident that the opportunities of learning practical work have varied in different divisions. In some the students have been given responsible work, while in others their duties appear to have comprised inspecting, taking notes, and drawing plans. This class of work is done at the College, and, however convenient it may be to employ the students in this manner, the object of the works course is not given effect to. It is indispensable that the students should be given responsible work of construction as early as possible. The objection that they are unpaid employés is not a valid one. They receive subsistence allowances in recognition of the expectation that their work will be remunerative and these allowances can be reduced or withheld if it proves unsatisfactory.

Name.	Abstract of Progress Report.
A. V. Ramalinga Aiyar, B.A., B.C.E.	*Periyar Division, No.* 1.—Mr. deWinton reports:—"Has been engaged during the year on surveying and levelling, on checking alignment of main dam and watershed tunnel, &c. I have nothing but good to say of him and his work. He possesses in a high degree energy, activity and conscientious desire to do his duty, and has been of great assistance to me in all the work I have given him to do. He appears to be constitutionally strong, and is active and punctual in his habits, and I prophesy for him a very useful and honorable career in the department. He is especially careful and accurate in levelling."
G. Gopala Aiyar ...	*Periyar Division, No.* 2.—Mr. Carless states:—"Has been in charge of several works in course of construction, viz., a bridge, two super-passages and two sluices, besides several minor works. Has shown creditable knowledge of practical masonry. He has made a survey of part of the channel, as well as several designs of small works. He can level accurately. The student has worked well, and his conduct has been exemplary."
A. Rajam Aiyar ...	*Periyar Division, No.* 2.—Mr. Carless reports:—"He has had part charge of the 6th reach in which there are under construction two bridges, a super-passage, a culvert and earth-work. He has shown a good knowledge of masonry construction. A map of part of the main channel was made by the student; he levels accurately and draws neatly. Several small designs and estimates have also been prepared by him. The student works well, and his conduct has been exemplary."
R. Sundaram Aiyar ...	*Kistna Eastern Division and Gudivada Division.*—Mr. Jopp writes:—"The student has been employed on earth-work and silt clearances, sundry repairs to regulators, and the construction of a new bridge across Ryves' canal. He has worked well and intelligently, and has acquired such practical experience as he has had opportunity for." In September Sundaram Aiyar proceeded to the Gudivada Division. Mr. Ussher reports:—"He was at first employed in preparing plans. He then assisted in taking observations on the flow of water, and lastly was sent to the lock under construction at Lakshmipuram. He has satisfactorily availed himself of the opportunities afforded him. His conduct has been entirely satisfactory."
Private G. E. Brand ...	*Periyar Division, No.* 1.—Mr. deWinton writes:—"Has been associated with Engineer student A. V. Ramalinga Aiyar in all the work done by the latter, and the remarks made above apply to Private Brand in every particular. He is greatly superior in intelligence and knowledge to the average young overseer, and is a particularly neat draftsman, and the quickest workman I ever had under me. His conduct has been everything that could be desired, and I consider that he will be an acquisition to the department."
Lance' Sergeant C. J. Smith.	*Consulting Architect's Division and Kistna Eastern Division.*—Mr. Irwin writes:—"Sergeant Smith received instruction in building work from the mixing of mortar to the completed wall, as well as in testing and passing wood and stone work at the new High Court. He is capable of laying out and completing building work in all its details." During the second half of the year Sergeant Smith was attached to the II Circle for irrigation work. Mr. Jopp remarks that the Sub-divisional Officer commends Sergeant Smith for his promptness and energy.
W. T. J. Scanlon ...	*Consulting Architect's Division and Tanjore Division.*—Mr. Irwin reports that his remarks regarding Lance-Sergeant Smith are in all respects applicable to this student. During the second-half of the year W. Scanlon was transferred to the Tanjore Division. Mr. Lambert writes:—"He has acquainted himself with the general method of execution of works in progress and has shown that he possesses good abilities. He has done satisfactory work in surveying and levelling and has acquired a knowledge of office work and accounts. His conduct has been good."

Name.	Abstract of Progress Report.
M. S. Venkatarama Aiyar.	*Tanjore Division and Consulting Architect's Division.*—The Tanjore Sub-division Officer reports:—"The student has studied the data for brick manufacture, and the construction of masonry and of the sluices for the Vikramanar and Malur channels. He has also inspected various works and studied accounts." During the latter half of the year the student was attached to the Consulting Architect's Division. Mr. Irwin writes:—"He was employed on the extension of the new High Court building, and had opportunities of learning details of brick and stone work, terrace roofing and flooring, as well as carpentry work for doors, windows, joists, &c. He also assisted in measuring and laying out work. His conduct was generally good. He wants more energy, but will, I trust, improve in this respect when he is made responsible for work."
T. A. Kuppuswami Aiyar.	*Consulting Architect's Division and Chingleput Division.*—Mr. Irwin reports:—"Kuppuswami Aiyar was attached to the Government Brickfields, and appears acquainted with the details of brick-making, bricklaying and building construction." During the second-half of the year he was attached to the Chingleput division. Mr. Foord, and subsequently Mr. Wilson, state that the student was posted to the Uttramallur head-sluice and Mariammur tank-sluice works in progress, and that he was reported to be diligent and attentive.
P. Ramachandra Aiyar ...	*Chingleput Division and Consulting Architect's Division.*—Mr. Burlton writes:—"The student has done very well and taken an interest in his work. He was engaged on the superintendence of the Uttramallur head-sluice construction." During the latter half of the year he was attached to the Consulting Architect's Division. Mr. Irwin reports:—"He was employed on the Victoria Technical Institute and on additions to the School of Arts. He gave entire satisfaction. He is intelligent and painstaking, and performed all the work entrusted to him with diligence and care. He has already obtained a fair knowledge of practical work, and will be found very useful as an Assistant. His conduct was very good."

20. *Revision of Rules.*—The most important change in the rules is that resulting from the institution of a Provincial Service for the Public Works Department. The Government of India Resolution on the subject states that the recruitment for the Engineers of that service shall be (*a*) from students of Indian Colleges who are natives of India, and (*b*) from Upper Subordinates of the Public Works Department. For the Madras list the numbers are to be one annually from the College, and one in alternate years from the Public Works Upper Subordinate establishment. The College students are to be appointed apprentices on probation, and to be promoted to Assistant Engineer, 2nd grade, on proving, within three years, their thorough fitness for service in the department. The appointment from the Public Works Department is to be made as a rule from the Sub-Engineer grade. A subsequent Resolution lays down that the new rules shall not affect students who joined the College before the publication of the regulations. The rules will accordingly not come into operation until 1st January 1898. The effect of the Resolution is to diminish the inducements to enter the Engineer class, inasmuch as the successful student will be appointed an Apprentice instead of an Assistant Engineer in the first instance; while the students of the Engineer Subordinate class receive indirectly additional encouragement. From a College standpoint these results are unsatisfactory, for while there is difficulty in filling the Engineer class there is already abundant competition of the Subordinate class. A reference has been made to Government regarding the time at which the apprenticeship is to be conferred. If the appointment is made at the end of the theoretical course, the practical course being regarded as a period of apprenticeship, the Engineer class will not be worse off than before.

The next important modification of the rules has been the removal of the restriction in the appointment of qualified Engineers to the Upper Subordinate ranks of the Public Works Department. This is a boon, since it gives students who are unsuccessful in securing the guaranteed appointment a prospect of employment under Government, even though it be in a subordinate capacity. From four to five Overseerships are guaranteed annually to the Engineer Subordinate students, and when these appointments have been conferred, the Chief Engineer will, it is presumed, use his discretion in filling further vacancies with qualified Engineers or Subordinates. It has been ruled that the appointment of natives shall not be to a grade higher than that of third-grade Overseer. In view of the higher qualifications which Engineer students undoubtedly possess, I should be glad to see appointments in their case made in the first or second grade. Formerly second-grade Supervisorships were thought suitable, and a few such appointments were made; but by conferring first-grade Overseerships, the Engineers would, at any rate, not be superseded by Military students who were their contemporaries in a junior department of the College. This proposal, with other suggestions for the amelioration of the condition of the Engineer class, are now under the consideration of Government.

The only other changes in the rules have been the modification of the entrance examinations already alluded to, and the institution of a registration fee for applications for the Artisan class.

21. *Walker scholarship.*—With the approval of General Walker, the rules regarding this scholarship have been revised, the vernacular examination in Malayalam or Kanarese being dispensed with, and other modifications made, so as to suit the present course of instruction in the Engineer Subordinate class.

22. *Library and Reading Room.*—The Library, which consists of a lending branch and a consulting branch, contains a total of 2,963 volumes, of which 135 were added during 1892. During the year 4,042 books were issued, viz., 458 to the staff and 3,584 to the students, while 1,202 references were made to the Consulting library.

The history of the College, published in the Calendar, has been revised and brought up to date, and some additional information regarding the constitution of the Survey school in the early part of the present century, derived from records in the Office of the Board of Revenue, has been incorporated.

23. *Physical Training.*—Regular instruction in gymnastics and drill was given to all the students except those of the Artisan class, the drills being conducted by the Military students. The Cricket Club, which was revived last year, is well supported, and though no match of importance has yet been won, it is hoped that the improvement which practice will bring will soon result in occasional success. Tennis was played as usual.

24. *Attendance and Conduct.*—The percentage of numbers present to numbers on the rolls was 96 both for the Engineer class and for the junior classes. There was a good deal of sickness during the year, caused principally by fever; and one promising student died of cholera on his journey home to Malabar for the long vacation.

The conduct of the students has been generally very good. During the examination, however, two cases were detected of attempts to bring printed papers into the hall. The guilty students were at once sent out, but as the examination paper was subsequently cancelled by the Board of Examiners, they did not suffer as heavy a punishment as they deserved. A late student of the Artisan class made a false representation to the Chief Engineer, Burma, and was consequently declared by Government to be ineligible for the public service.

The standing orders for students have been revised, and a further check placed on absence without leave.

25. *B.C.E. Degree Examination.*—The five students who comprised in 1891 the senior division of the Engineer class presented themselves for examination in

January 1892, and four passed, viz., three in the second class and one in the third. Nine independent candidates, former students of the College, also presented themselves and two passed in the third class.

For the examination of January 1893 eleven candidates appeared. The results will be communicated in my supplemental report.

The rules for the new B.E. Degree examinations will come into operation in January 1894.

26. *Employment of Passed Students.*—The passed men of 1891 have had no difficulty in obtaining early employment. Of the nine Engineers, one is an Assistant in the Public Works Department, and one (a Mechanical Engineer) is a temporary Assistant on the East Coast Railway, Kistna Bridge, one is a permanent Supervisor, and two are temporary Supervisors in the Public Works Department, two are temporary Overseers; while the ninth is a Supervisor under the Travancore Government.

All the three Engineer Subordinate students, who completed their works course in December 1891, were appointed Overseers in the Public Works Department.

Of the ten Draftsmen, one entered the Surveyor class, and all the others have obtained employment on salaries ranging generally from Rs. 30 to Rs. 50. Six are employed in the Public Works Department, one on Railways, and two under Local Boards.

Of the eleven Surveyors, seven are known to be employed, viz., two in the Public Works Department, one in the Revenue Department, one in the Forest Department, one in the Survey, one on Railways, and one under a Local Board. The remaining four have been recommended for employment.

The vacancies notified during the year in the Gazette, the public press, by letter to the Principal, &c., were seventy in number, of which thirty-four were under Government, twenty-eight under Local Boards, and seven under Native States. Thirteen were for Engineers and Assistant Engineers, twenty-nine for Supervisors and Overseers, and twenty-five for Draftsmen, Surveyors and Sub-Overseers. Eight of the appointments were worth upwards of Rs. 250 each, twelve between Rs. 100 and Rs. 250, and twenty-five between Rs. 50 and Rs. 100. The vacancies are classified in the following table:—

	Government.			Local Boards and Municipalities.				Railways.	Native States.		
	100 to 250.	50 to 100.	Under 50.	Above 250.	100 to 250.	50 to 100.	Under 50.	Under 50.	Above 250.	50 to 100.	Total.
Engineer											
Assistant Engineer	3			5	1				1		10
Supervisor				1	1				1		3
Overseer	3				3						6
Draftsman		4	1								
Surveyor	1	3				7	6			5	23
Sub-Overseer		3	10			1	2	1			15
Channel Superintendent			1			1					5
Teacher in Surveying		1	2								2
Forest Officer			1								1
Total	7	11	16	6	5	9	8	1	2	5	70

These figures show that the prospects of early employment of the men now passing out are good, and that the demand for Overseers is not likely to be fully met for two or three years to come. The small batches of Engineer Subordinates which completed the practical course during the last three years are the result of depression five years earlier. Nearly all the qualified men are being absorbed by the Public Works Department, and scarcely any are at present available to meet the requirements of the Local Boards. To assist in the maintenance of the employment register kept at the College, Government ordered that all first appointments to the Public Works Department or to the Engineering establishments of Local Boards, shall be reported to the Principal.

In my supplemental report of April 1892, I suggested that Local Boards and Municipalities should be invited to entertain none but qualified men, when such are available, in their Engineering establishments. With the object of ascertaining the extent to which qualified men, especially ex-students of the College, are employed by those bodies, a circular was sent to the Presidents of the Local Boards and of the larger Municipalities, asking for a return giving the information needed. Returns have been received from seventeen Boards and one Municipality, which show that of the Engineers and Assistant Engineers employed, excluding doubtful cases, eight are qualified and nine unqualified; of the Supervisors and Overseers, fifty are qualified and one hundred and four unqualified; and of the Draftsmen, Surveyors and Sub-Overseers, twenty-nine are qualified and eighteen unqualified. Persons who do not possess the qualifications required by the Public Works Department for the appointments they hold are classed as unqualified. Thus there are cases in which Engineers drawing from Rs. 300 to Rs. 600 have passed only the test required for Overseers, and others in which Supervisors on Rs. 150 or Rs. 200 have qualified only as Draftsmen or Surveyors. These figures indicate that Local Boards do not always secure the best men available, and that there exists a large field for the future employment of men from the College.

27. *Engineer Class.*—The continued weakness of the Engineer class was the subject of animadversion in the last Annual Report and in the supplemental report of April 1892. In August proposals were submitted for the amelioration of the condition of the class, a comparison being drawn between the inducements held out to Engineer students at Madras and those offered at Roorkee, Calcutta and Poona. It was shown that Madras laboured under disadvantages in regard to length of course, cost of training to the student, scholarships and prospects of employment, and proposals were made under the three latter heads. Final orders have not been yet issued; but the disability for employment in the Upper Subordinate establishment of the Public Works Department has been removed, and to this is in great measure due a substantial increase this year in the number of applications for admission to the class. The scholarships granted by the Government of Mysore to its Engineer students have hitherto been tenable in the Madras College for two years, or in the Poona College for three years. The attention of the Mysore Government having been drawn to the fact that the Madras course extends over five years, it has been decided to make the scholarships tenable for four years instead of two. This concession is not, however, likely to attract students as long as a diploma can be obtained at Poona after a three years' course.

28. *Financial position.*—The total expenditure, including scholarships, during the official year 1891–92 amounted approximately to Rs. 56,800, and the income from fees, &c., to Rs. 10,800. The net cost of educating each student, taking the average number at 195, was Rs. 238. The figures for 1892–93 will be furnished in April.

29. *General remarks.*—The year has passed without unusual occurrence. Steady work has been done, though the examination results indicate not only the absence of exceptional talent, but decided weakness in the junior classes in two or three subjects, such as Building, Drawing and Estimating. That weakness is not due to want of attention to those subjects; but special note will be taken during 1893 of the points which the Board's report will doubtless bring forward. On the receipt of that report, remarks on the examination results will be made in detail. The outturn of drawings, estimates, notes, surveys and other practical work affords sufficient evidence that progress has been made. This outturn, combined with the general results of the examination, and with the subsequent training during the practical courses, shows that the successful students are now leaving the College thoroughly well equipped for their work in life.

(Signed) H. D. LOVE, Major, R.E.,
Principal, College of Engineering.

APPENDIX.

ENGINEER CLASS.

Abstract of Marks.

Rank.	Names.	I. Mathematics.	II. Science.	III. Engineering.	IV. Drawing.	V. Surveying.	VI. Language.	VII. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	375	525	775	500	400	300	125	3,000	
	College Students.									
1	G. S. Rama Aiyar ...	290	281	524	365	278	122	106	2,066	Passed Second-class.
2	P. Ranganayakulu Nayudu ...	276	269	553	366	273	102	70	1,849	
3	V. Gopala Aiyar ...	330	286	619	330	231	104	90	1,792	
4	V. S. Ramakrishna Aiyar ...	244	131	406	292	231	96	81	1,503	
	Average per cent ...	65·6	43·8	61·2	67·2	63·3	53·2	71·6	60·0	
	Independent Candidates.									
1	M. Radhakrishna Aiyar ...	244	192	389	249	196	28	74	1,423	Failed in total.
2	P. Ramachandra Aiyar ...	163	145	373	277	258	120	84	1,420	
	Average per cent. ...	42·6	32·1	45·2	53·6	58·7	54·5	63·2	47·4	

ENGINEER SUBORDINATE CLASS.

Abstract of Marks.

Rank.	Names.	I. Mathematics.	II. Engineering.	III. Drawing.	IV. Surveying.	V. Language.	VI. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	370	600	400	350	180	100	2,000	
	College Students.								
1	N. Tiruvambala Pillai ...	256	454	254	292	113	65	1,434	Passed Second-class.
2	M. V. Venkatarama Aiyar ...	226	332	271	258	105	88	1,280	
3	S. Chittamba'a Pillai ...	232	328	251	259	55	85	1,210	
4	K. Srinivasa Aiyar ...	209	336	228	256	98	100	1,206	
5	Lance-Corporal J. O'C. Phelan ...	182	323	243	223	129	77	1,177	
6	K. R. Rama Pillai ...	136	318	243	259	160	69	1,185	
7	P. Chandrasekhara Pillai ...	166	328	226	206	101	85	1,112	
8	C. V. Shanmukha Mudaliyar ...	123	310	252	222	101	70	1,078	
9	V. S. Srinivasa Aiyangar ...	168	257	219	198	107	67	1,056	
10	M. G. Singara Chari ...	145	251	202	198	86	76	1,008	
11	K. P. Vaidyanatha Aiyar ...	144	261	201	225	98	72	1,001	
12	A. Kanjanni Panikar ...	187	268	165	204	78	84	1,001	
13	A. Arunachala Mudaliyar ...	142	260	183	221	114	66	1,000	
14	C. R. Gopalaswami Dikshitar ...	125	258	177	172	160	77	968	Failed in total.
15	L. S. Venkatarama Aiyar ...	110	258	177	172	40	77	877	,, in I and total.
16	A. Arumeianda Pillai ...	92	274	171	170	58	43	808	,, in I and total.
17	C. Tellent	141	209	147	173	56	62	789	,, in total.
		105	188	185	176	34	55	691	,, in I, II, V and total.
	Average per cent ...	43·2	49·5	52·4	61·7	42·7	73·2	52·2	
	Independent Candidate.								
1	P. V. Srinivasa Rao	140	269	210	207	117	55	1,007	Passed Second-class.
	Average per cent ...	37·6	44·8	54·7	59·1	65·0	55·0	50·3	

DRAUGHTSMAN CLASS.

Abstract of Marks.

Rank.	Names.	I. Geometrical Drawing.	II. Free-hand Perspective and Model Drawing.	III. Building Drawing.	IV. Machine Drawing.	V. Estimating.	VI. Topographical Drawing.	VII. Drills and exercises.	Total.	Remarks.
	Maximum Marks ...	100	120	270	200	180	80	50	1,000	
	College Students.									
1	S. Rama Aiyar	75	96	159	134	118	43	45	669	Passed Second-class.
2	S. Rangasawmi Naidu	65	99	183	109	137	53	32	609	
3	T. C. Anantha Aiyar	66	85	195	107	118	55	38	664	
4	M. S. Thambuswami Pillai ...	63	92	163	130	111	54	48	661	
5	G. Malleswara Prasadha Rau ...	42	79	170	109	131	45	27	603	Passed Third-class.
6	S. V. Krishnaswami Aiyangar ...	64	47	144	134	123	50	38	600	
7	A. L. Singaravelu Mudaliyar ...	54	69	166	101	124	45	30	589	
8	S. Purandara Rau	68	84	149	102	114	40	31	588	
9	D. Srinivasa Aiyangar	57	70	138	134	91	41	37	568	
10	V. Arvamutha Chari	57	69	139	111	115	40	27	558	
11	R. Krishna Rau	48	60	134	135	101	40	32	550	
12	P. S. Jambulinga Mudaliyar ...	70	61	161	95	91	39	28	545	
13	S. Subbarama Aiyar	40	56	135	125	77	41	40	514	
14	P. Krishnaswami Mudaliyar ...	55	65	109	107	90	47	29	502	
15	A. Srinivasa Rau	57	58	112	110	85	43	37	502	
16	C. N. Rama Rau	45	53	124	111	176	47	44	501	
17	A. Ratnavelu Mudaliyar ...	36	60	109	103	17	46	30	501	
18	T. Ponnaranga Pillai	42	61	134	114	72	45	32	500	
19	P. Ramaswami Mudaliyar ...	49	47	94	116	59	38	35	438	Failed in III, V and total.
20	P. Duraiswami Mudaliyar ...	41	56	111	100	51	40	37	436	Failed in V and total.
21	T. Gopala Aiyangar	49	39	99	105	45	36	29	402	Failed in II, V and total.
22	C. K. Venkatasubba Rau ...	36	55	91	86	76	38	17	399	Failed in III and total.
23	A. Rangaswami Mudaliar ...	43	49	75	83	19	33	30	332	Failed in III, V and total.
24	G. Seshayya	36	56	78	78	24	33	31	331	Failed in III, V and total.
	Average per cent. ...	52·4	53·7	48·8	55·0	50·0	53·7	67·0	52·6	
	Independent Candidates.									
1	R. Bujanga Rau	53	56	107	110	112	43	20	501	Passed Third-class.
2	V. Subramanya Aiyar	34	49	80	104	102	46	35	450	Failed in I, III and total.
3	T. K. Gopala Chari	50	51	95	84	110	38	8	436	Failed in III and total.
4	W. Chinnasawmi Nayudu ...	53	42	83	63	102	35	45	423	Failed in II, III, IV and total.
5	C. Erusappen	71	51	153	42	65	26	13	421	Failed in IV and total.
6	C. Muttiyalu	54	31	101	83	77	30	14	390	Failed in II and total.
7	P. Jagannayakulu Naidu ...	...	...	...	...	...	...	...	...	Absent from examination.
8	P. Subbarayadu Naidu	...	...	...	...	...	...	...	...	
	Average per cent. ...	52·5	38·8	38·2	40·5	52·5	45·4	45·0	43·6	

SURVEYOR CLASS.

Abstract of Marks.

No.	Names	Maximum Marks	215	215	200	200	50	1,080	Remarks.
	College Students.								
1	M. V. Sivachidambaranatha Aiyar		220	142	161	177	23	723	Passed Second-class.
2	K. Kuhaleswara Pillai		220	145	150	214	28	757	
3	C. N. Rajamanickam Aiyar		180	145	150	214	28	717	
4	D. Francis		168	130	147	188	33	666	
5	K. Rajagopalachari		210	125	128	171	25	659	
6	S. V. Venkatarama Pillai		197	108	120	214	23	662	
7	T. K. Sivaprakasa Aiyar		170	111	123	178	20	602	
8	R. K. Ayyaswami Aiyar		154	120	142	173	25	614	
9	K. Venkatramana Aiyar		135	121	126	183	35	600	
10	M. A. Venkatasami Aiyar		145	141	111	191	28	616	
11	K. S. Venkatarama Aiyar		196	111	141	165	23	637	Passed Third-class.
12	Sayed Abdus Salam		160	105	120	173	27	585	
13	C. Jagga Rao Chetti		156	107	128	169	15	575	
14	T. V. Ramaswamy Rao		154	104	110	162	20	544	
15	K. Sankaranarayana Aiyar		168	118	142	134	18	570	
16	A. Venkataramana Rao		164	119	106	151	26	571	
17	S. M. V. Ramalinga Raja		177	99	120	147	22	565	
18	C. R. Rangachari		116	91	105	169	18	499	Failed in total.
			169	100	90	165	26	550	
	Average pull mark.		207	127	128	180	25	672	

From the Principal, College of Engineering, Madras, to the Director of Public Instruction, dated 17th February 1893, No. 1604-C.

Adverting to your endorsement No. 828, dated 31st January 1893, on the report of the Board of Examiners, herewith returned with enclosures, I have the honour to offer the following remarks. I will first deal with the Board's general report, then make some observations on the conduct of the examinations of December 1892, and finally notice the reports of individual Examiners.

2. *Board's General Report.*—The recommendations made in the third paragraph of this report are dealt with *seriatim* as follows:—

(1) Students will be instructed to write their names legibly.

(2) Students ought invariably to adhere to the specified scales. If they fail to do so, marks may properly be deducted.

(3) Paper examinations are now given in the college, especially to the junior classes, as often as time permits.

(4) I do not concur in this proposal. The examination at the end of the first year encourages the students to work steadily, and regulates the award of scholarships. In the Surveyor class the examination is confined to a single paper on chain, compass and plane table surveying.

(5) As recommended in my No. 1573-C, dated 9th February 1893, para. 5, I suggest that the marks gained in gymnastics and drill at the end of the college course should be credited to independant candidates at subsequent examinations for which they may appear.

(6) I am of opinion that the syllabuses require reduction. A favourable opportunity will present itself when the new workshop becomes available for use.

3. *Conduct of the December examinations.*—As hinted in the fourth paragraph of my Annual Report, No. 1505-C, dated 27th January 1893, I cannot regard the examinations of December 1892 as having been conducted in an altogether satisfactory manner. Some of the papers were too long for the time allotted, and others were of inappropriate character. Several questions contained insufficient data, or were otherwise impossible. The President showed himself very ready to alter objectionable questions, and to modify the marking in the case of lengthy papers, but much trouble and correspondence were involved, and in one case it became necessary to cancel a paper altogether, and to set a fresh one for a day not included in the programme. The various questions objected to are enumerated in an appendix to which are attached the original examination papers. The modifications in these papers agreed to by the President of the Board are shown in red ink. The errors made are for the most part traceable to two causes, viz., (*a*) absence of co-operation between the members of the Board; (*b*) want of knowledge of the nature and extent of the work done by the students. In regard to (*a*), the examination work is divided between the Examiners, who act quite independently, and who do not, it is believed, submit their papers for collective criticism. With regard to (*b*) the Examiners have the syllabuses to guide them, and perhaps the papers of the previous year; but the possibility of setting an unsuitable paper within the limits of an extensive syllabus is well known, and in the absence of acquaintance with the nature of the work done by the students, especially in technical subjects, it is inevitable that improper questions must sometimes be set. The obvious remedy lies in conference and mutual criticism. Before the papers are set, each Examiner should visit the College and ascertain the nature and amount of work done from the commencement of the session. The papers, after being set, should be considered by the Board in conference, when lengthy papers would be reduced, and unsuitable questions modified or struck out. Full solutions of all the examination papers should be before the Board during conference. Finally, when the marks for the answers have been awarded, there should be a further meeting of the members of the Board, who would then act in the capacity of moderators. Even though the members of the Board may not all be professional Engineers, those who are such are quite capable of offering an opinion on the Mathematical, Science and Language papers set, seeing that the papers constitute test suited for persons entering the superior or subordinate ranks of the Engineering profession. Reference is here requested to the appendix to this communication.

4. *Reports of Examiners.*—The faults brought to notice will be corrected, when possible, during the coming year. Some, however, are due to the recognised inferiority of the late senior divisions of the Engineer Subordinate and Draftsman classes, others are the consequence of the inappropriateness of questions enumerated in the appendix, while others again, such as bad writing, irrelevancy, and carelessness, are deeply-rooted errors which are constanfly beiug combated in the college.

As observed by Government in its Order, dated 2nd October 1889, No. 600, Educational, and in accordance with the plan followed in connection with the annual report on the Reformatory School, Chingleput, the report for the past calendar year alone will be dealt with in these Proceedings and submitted to Government. The supplemental report bringing the record of events down to the close of the official year will, however, continue to be submitted to the Director as heretofore for information.

2. *Staff.*—Major Love resumed charge of the office of Principal in January 1892 after completing a course of instruction at the Military School, Chatham, and Mr. J. J. Whiteley, Executive Engineer, was about the same time appointed to act as Professor of Engineering during the deputation of Mr. Chatterton to the Public Works Department. Mr. Middlemast left for England in December last on six months' leave on medical certificate. M.R.Ry. C. Krishnan, Assistant Chemical

Examiner, was temporarily engaged to supervise the work of the Engineer students of the First Division in the Chemical laboratory. There were also a few changes in the personnel of the subordinate staff, but these do not call for any special notice.

3. *Strength.*—Excluding the students in the practical courses and the special students, there were on the rolls at the close of December last 214 against 187, 136 and 109 on the corresponding date in 1891, 1890 and 1889 respectively as per particulars in the margin. The strength of the college during the year is the highest since the re-organization. The number of admissions into the several classes, the Engineer class excepted, reached the maximum number prescribed in the rules and for which accommodation could be found. There was a marked improvement in the average attendance. In a separate communication in reply to para. 4 of the Director's review of the last report on the college, Major Love attributes the small size of the Engineer classes chiefly to the high cost of Engineering education in this Presidency, compared with the rate in other Indian institutions, and to the limited advantages held out. This matter will be dealt with separately. An analysis of the attendance given in para. 3 of the report shows that 53 per cent. of the whole number were Brahmans as against only 45 per cent. in the previous year, and that there were eight Muhammadans against two in 1891. This latter increase is encouraging. Particulars should be given in future reports of the number of students of each class of the community studying in the different classes of the college. It is to be regretted that Europeans and Native Christians were fewer than in 1891.

	Strength on the 31st Dec.			
	1892.	1890.	1891.	1892.
Engineers	17	12	14	10
Engineer Subordinates	37	47	65	77
Draughtsmen ...	18	21	40	51
Surveyors ...	12	23	32	37
Artisans ...	24	28	35	34
Military probationers.	1	5	4	5
Total ...	109	136	187	214

4. *Accommodation.*—The increasing strength of the college has rendered improved accommodation necessary, but the erection of the new buildings approved of by Government must be deferred for want of funds. Estimates for improving the accommodation and lighting in the old portion of the present buildings have been approved. There are practical difficulties in Madras in providing hostels for the accommodation and boarding of students similar to those provided in the Sibpur College of Engineering.

5. *Equipment.*—Full advantage was taken by the students of the temporary workshops and the consulting and general library attached to the college. In view of the inadequate arrangements at the Public Works Workshops for the practical instruction of students, the Director trusts that the permanent workshop will be completed and fully fitted up soon.

6. *Examinations.*—(i) *University Examinations.*—The results of the B.C.E. Degree Examination held at the beginning of 1892, in which four passed out of five entrants, were noticed in the last review.

(ii) *College Board Examinations.—Engineer Class.*—There has been little or no improvement in the results secured by the First division in the examinations conducted by the College Board of Examiners; except in Mathematics. In Science the average marks gained were as poor as in 1891, and those in Drawing and Surveying did not even compare favourably with those of the previous year. The Examiner in Chemistry observes that the subject was badly answered, the best student having gained only three-eighths of the marks. The Second and Third divisions, however, fared much better. Hydromechanics in the former and Mensuration in the latter should have received greater attention.

Engineer Subordinate Class.—The results of the examination of the First division were below the average and worse than in the previous year, except in Engineering and Surveying. Of Mathematics, particularly Statics and Applied Mechanics, the students did not seem to possess more than a superficial knowledge.

They are reported to have had no idea as to how to put down a Drawing on paper, and the Examiner urges the necessity of giving a few special lessons in practical Perspective Drawing in future. It is noteworthy that all the five students that failed to secure a certificate failed for deficiency in the total number of marks, and that none of the successful candidates passed in the first class. The Second division obtained only 49 per cent. on the average, which is less than that secured by the First division. The Third division acquitted itself more satisfactorily on the whole.

Draughtsman Class.—Though 75 per cent. of the students from the Senior division qualified for certificates, the majority passed in the third class and none secured a first class, thus showing that the students were, on the whole, much below the mark. The abstract marks statement appended to the report shows that the results of the final examination were more unfavourable than in 1891, except in Machine Drawing. It is observed that since 1890 the average percentage of marks has fallen from 65 to 53 (not 43 as put down in the report). The majority of failures were in Building, Drawing, and Estimating. The students were reported not to have done well in Model, Perspective, and Topographical Drawing. The results of the term examination of the Junior division were also not very satisfactory.

Surveyor Class.—Neither of the two divisions of this class acquitted itself even as well as in the previous year. The percentage of marks secured in Leveling was poor. The deterioration in Chain, Compass and Planetable Surveying is attributed by Captain Shelley to the scanty knowledge of English possessed by the class. Perhaps, the institution of an entrance test among Lower Secondary candidates might help to remedy the above defect. Government will be addressed shortly on the subject, now that it has been decided to transfer the conduct of the entrance examinations from the Board to the college staff.

The work of the college during the year, as gauged by the results of the several examinations, was not quite satisfactory. The practical knowledge of the students was below the mark, and the paper work was generally wanting in neatness of execution. The answers in general were characterised as irrelevant, vague and unduly long. Mr. Stoney observes that, in this respect, the Native students showed a marked inferiority to their European and Eurasian compeers. This tendency on the part of Native students should be checked very carefully. There is much force in Major Love's remark that the indifferent results obtained in the year were due to the decided inferiority of the students who composed some of the classes, to the inappropriateness of some of the questions, and to the undue length of some of the papers. It must at the same time be admitted that some of the important subjects, such as Mathematics, Bridgework, Estimating, Drawing, did not receive sufficient attention. The vernacular results were also inferior to those obtained during 1891. The earnest attention of the Principal and his staff should be directed to the defects brought to light. The percentages of the marks as given in the body of the report are in several instances not correct, though they are correctly entered in the marks statement appended to it. The Director has had to notice, in connection with the bills of remuneration to the members of the Board of Examiners, that the question papers were not drawn up on any definite principles. The number of question papers set for each class and division, the length of each paper, and the number of identical questions that might advantageously appear in papers on one and the same subject set for more classes than one seem to vary each year at the discretion of the Board or the individual Examiners. The Principal and the President should discuss the matter and come to a definite arrangement, so that there may be no such variations from year to year. In this connection Major Love's suggestion that the Board should meet in conference and submit the draft question papers set to mutual criticism before they are finally accepted fully meets with the Director's approval and should be acted on henceforward.

(iii) *Government Technical Examinations.*—Of the students that appeared voluntarily for the Government Technical Examinations in various subjects, 29 passed the Intermediate and six the Elementary Examinations. Information has not been furnished as to the number of entrances for these examinations.

7. *Independent candidates.*—The results of the independent candidates at the examinations held by the Board of Examiners are compared below with those of 1890 and 1891 :—

Examinations.	1890.		1891.		1892.	
	Appeared.	Passed.	Appeared.	Passed.	Appeared.	Passed.
For Engineers	2	1	1	...	2	...
" Engineer Subordinates	5	1	1	1	1	...
" Draughtsmen	4	6	7	3	8*	1
" Surveyors	3	1	4	2	...	...

* Two were absent from the examination.

As might be expected, the results of the examinations were generally very poor, and those of the draughtsman candidates especially were almost a total failure, being much worse than in the previous year. The fact that the independent candidates, unlike the college students, are subjected to examination in all the subjects of the full course and their careless preparation account for these unfavourable results.

8. *The Maistry and Artisan class.*—This class was popular. Surveying continued to be taught during the year as an extra subject, and it is hoped that the Principal will find it possible to continue the arrangement. The results of the pupils of this class who went up for the Government Technical Examinations of April 1892 should have been adverted to. The question of introducing a final test will be considered with that of instituting admission tests for the Draughtsman and Surveyor classes.

9. *Practical Courses.*—All the classes except the Draughtsman class were taken to Guindy and Guduvancheri to receive instruction in field-work. Many important works were also visited. The practical instruction during these excursions does not seem, however, to have been well directed, if one may judge from the complaint of the Examiners that the practical knowledge of the students in several subjects was but superficial. Two students of the batch of December 1891 have elected to become Mechanical Engineers and their progress at the Madras Railway Locomotive Workshops is favourably reported on. One of the unsatisfactory features of the report is the insufficient progress made by the Civil Engineer and Engineer Subordinate students in the Public Works Workshops, in which their work is reported not to have been sufficiently supervised. The Superintendent will, it is hoped, be good enough to arrange for the students going through the full course of work prescribed in Article V (1) *b* of the College rules. It is not understood why no intimation was given to the Principal of the long absence of a Military Engineer Subordinate student from the workshop owing to ill-health. The workshop course of this student should, the Director considers, be extended by the period of his absence. The suggestion of Major Love that the Superintendent should be requested to furnish quarterly instead of half-yearly reports to the Principal regarding the progress of the students in the Public Works Workshop meets with the approval of the Director and will be commended for the consideration of Government. This would require a slight modification of Article XI (2) of the College rules. The progress reports received from the various Divisional-officers of the Public Works Department were, on the whole, satisfactory. In view, however, of the inequality of work available in the several divisions, Government has approved the suggestion of Major Love that the students during their works course should be given some responsible work. The rules will be revised.

10. *Revision of the Rules.*—Major Love has fully dealt with this subject, and further remarks are unnecessary. He has, however, not alluded to the revision of the rules rendered necessary by the proposed redistribution of the workshop and the works courses. The draft amended rules in this connection returned by Government for further revision, but which the Director has not yet been able to attend to will be resubmitted to Government at an early date.

11. *Physical Education.*—This subject cannot be considered to have received during the year as much attention as in the previous year. There was a clear retrogression in the results in gymnastics of all except the Engineer class (First Division). Seeing how important the possession of a good physique is to the Engineer, physical education should not be left in the background.

12. *Prospects of employment.*—The Director has read with much interest the portion of the Principal's report relating to the employment of passed students. Almost all the students that completed their course in 1891 have obtained remunerative appointments. It is true that the terms under which the award of the guaranteed appointments to the best Engineer student will be made, under the recent resolution of the Government of India, are not so favourable as those in force hitherto; but this cannot affect, as Major Love seems to think, the popularity of the Engineer class, the number of students that will suffer being restricted to one in each batch. The reduction in the initial value of the guaranteed appointment will, the Director thinks, be more than counterbalanced by the wholesome order throwing open the Overseer ranks of the Public Works Department to qualified Engineer students. It has been remarked that the supply of Engineer Subordinates has not hitherto been equal to the demand, but the Director trusts that the number of Engineer Subordinate and Engineer students will rise to meet the requirements of the service. The table in para. 26 of the report shows that the Railway Departments offered the least prospect of employment to the students of the college. It is hoped that the several Railway Companies will see their way to employ in larger numbers the indigenous talent available at a comparatively cheap rate. The fact that Local Boards do not always employ qualified candidates on their Engineering establishments has been statistically demonstrated by Major Love at the concluding portion of the paragraph above referred to. In the interest of the college and of the Local Boards themselves, the Government will be requested to impress on the latter that all vacancies under them, for which qualified men cannot be found, should be invariably filled up after reference to the Principal of the College of Engineering.

13. *Finance.*—The figures appearing under this head in the report are merely a repetition of those furnished in the supplementary report for 1891–92. The financial transactions of each month being separately available, the Principal will furnish the receipts and charges for the calendar year in future reports.

14. *General Remarks.*—In para. 3 of its report, read in these Proceedings, the Board offers certain suggestions which are considered below *seriatim* :—

(1) The first suggestion is approved. In future the Principal will see that the students write legibly their name as well as their number at the head of each answer paper, the register number of each candidate being marked on his desk in the examination hall.

(2) The importance of all drawings being executed to the scales specified should be impressed on the students. As suggested by Major Love, some deduction in marks may be made for failure or neglect on the part of students to observe these instructions; also marks may be deducted for bad writing.

(3) The Principal's remark that paper examinations are already being carried on in the college is noted.

(4) Major Love's reasons for not adopting the fourth suggestion are sound. The institution of an entrance test for the junior classes would perhaps mend matters.

(5) The Director is not prepared to accept the Board's proposal in its entirety. The importance of a good physique in any branch of service cannot be overrated. As recommended by Major Love, the Director would exempt all independent candidates from the examination in Gymnastics and Drill, crediting to them the marks gained by them while at college in the examination on this subject.

(6) It is noted that the question of revising the syllabuses is engaging the attention of the Principal.

15. In conclusion the Director is glad to note that the college has been making steady advance in various directions under the able management of Major Love.

(A true Extract.)

(Signed) D. DUNCAN,
Director of Public Instruction.

To the Principal, College of Engineering.
" Principals of other Government Colleges.
" Inspectors of Schools.
" the Superintendent, School of Arts.
" the Honorary Secretary, Anjuman, Muhdi-Ah-Islam.
" the Secretary, Victoria Technical Institute.
" the Editor, *Indian Journal of Education, Madras.*
" Government, with covering letter.

Order—dated 10th June 1893, No. 385, Educational.

Recorded with the following remarks :—

(1) The preparation of estimates for improving lighting and accommodation was authorized in G.O., dated 6th February 1893, No. 87, Educational, but the estimates themselves have not yet been sanctioned as stated in paragraph 4 of the Director's Proceedings. The reference to "the new buildings approved of by Government," which occurs in the same paragraph, is not clearly understood.

(2) The report upon the proposal to institute an admission test for the draughtsman and surveyor classes and a final test for the artizan class, which was promised in the Director's letter, dated 26th July 1892, No. 10134, should be submitted as soon as possible and no further delay should be permitted to occur in carrying out the revision of the rules ordered in G.O., dated 28th July 1892, No. 560, Educational.

(3) The attention of the Public Works Department will be invited to the remarks in paragraph 9 of the Director's review and in paragraph 18 of Major Love's report, dated the 27th January 1893. It seems obvious that the supervision exercised over the students under instruction in the Public Works Workshop has been very lax. The proposal that the Superintendent of that institution should be required to submit quarterly instead of half-yearly progress reports to the Principal of the College is approved and the necessary amendment will be made in the rules when the revised draft referred to in the preceding clause is prepared by the Director.

(4) The Director's remarks on the subject of the employment of unqualified men by railway companies and local bodies in paragraph 12 of his review will be considered in the Public Works and Local and Municipal Departments, respectively.

(5) The Government concurs generally with the views expressed in para. 14 of Dr. Duncan's review.

(6) With respect to the remarks in paragraph 20 of Major Love's report, dated the 27th January 1893, regarding the appointment of engineer students to first and second grade overseerships, it is understood from paragraph 3 of his review that the Director intends to address Government separately on the subject. A copy of the revised calendar referred to in paragraph 22 of the same report should be submitted for the information of Government.

(7) On the whole the report for 1892 is satisfactory. The educational qualifications of the students, as tested by the college examinations, leave indeed much to be desired, but the institution is obviously increasing rapidly in popularity. The conspicuous ill-success of independent candidates for draughtsmen certificates may be due in part to the causes referred to in G.O., dated 16th May 1893, No. 330, Educational.

[Here enter letter No 386, dated 10th June 1893.]

(True Extract.)

(Signed) J. F. PRICE,
Chief Secretary.

93

Order—dated 12th July 1893, No. 1829 W., Public Works.

Communicated to officers of the Public Works Department for information.

2. The Consulting Architect will expedite the submission of the estimate called for in G.O., No. 364 W., dated 9th February 1893, for improving the lighting and providing extra accommodation in the old building of the College of Engineering.

3. With reference to para. 3 of the order in the Educational Department, the General Superintendent, Public Works Workshops, will report whether the practical instruction of students in the workshops cannot now be more closely supervised, the appointment of a European foreman to the workshops having been sanctioned. The General Superintendent will see that he should in future submit to the Principal of the College quarterly instead of half-yearly reports on the progress of the students. The General Superintendent has already been called upon* for an explanation with respect to his failure to report to the Principal the prolonged absence from sickness of a military student and his reply should be expedited. The appointment to the Public Works Department of the military student in question (Corporal G. Blake) as an apprentice overseer has been cancelled, and the Director's suggestion that his practical instruction should be extended need not now be considered.

* Public Works Department memo. No. 451 C., dated 1st February 1893.

4. The subject of para. 4 of the order in the Educational Department will be considered in the Railway Branch.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Chief Engineer for Irrigation.
" the Consulting Engineer for Railways.
" Superintending Engineers.
" the Consulting Architect to Government.
" the Superintendent of Works, Periyár Project.
" the Educational Department.

Exd. A. D. Xavier.
Spare Copies

GENERAL.
ESTABLISHMENT.

Govt. of {1893} Madras.

PUBLIC WORKS.

Dated July, 12th.

Recd.

Encl.

G.O., 12th July 1893, No. 1829 W.

JULY.

College of Engineering

Issuing certain orders in connection with
he Proceedings in the Educational Depart-
ent reviewing the report of the working
the — for the year 1892.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper :—

From D. DUNCAN, Esq., M.A., D.Sc., Director of Public Instruction, Madras, to the Chief Secretary to Government, dated Madras, 15th May 1893, No. 5292.

I have the honour to submit, for the information of Government, a copy of my proceedings No. 5287, dated 13th instant, reviewing the report on the Madras College of Engineering for the calendar year 1892, and to solicit the attention of Government particularly to the concluding portion of paragraphs 9 and 12 of the review, in which the questions of substituting quarterly for the half-yearly reports now furnished by the Superintendent of the Public Works Workshops to the Principal and of referring to the latter officer all vacancies in the Public Works Department of local bodies which it may be found difficult to fill have been dealt with.

ENCLOSURES.

Proceedings of the Director of Public Instruction, dated 13th May 1893, No. 5287.

Read the following letter from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated 25th January 1893 :—

We have the honour to forward the reports of the examiners on the recent examination of the College of Engineering and to submit a statement of marks awarded.

2. The individual examiners having reported separately on each subject, it is unnecessary for us to do more than refer briefly to those classes which have completed their course at the College.

Engineer Class, First Division.—The class consists of four students, all of whom passed in the second class. Two independent candidates also presented themselves for examination, but both failed. On the whole, the class may be considered fully up to the average, the first man obtaining just over two-thirds of full marks and the last just qualifying for a certificate by three marks.

Engineer Subordinates' Class, First Division.—The class comprises 18 men, of whom five have failed and the remainder passed in the second class. One independent candidate was examined and passed in the second class. This batch of students cannot be considered otherwise than below the average and on the whole are a decidedly poor lot. Of the 13 students who have passed, three have only qualified by the narrow margin of from one to two marks. The *forte* of the class lies in Surveying, but they are without exception inferior in Mathematics.

Draftsmen's Class, First Division.—It will be remembered that these men did very badly last year in the examination in Building Drawing, and it was anticipated that many would in consequence fail. However, as the class appear to have done well in their session work and obtained high marks from the College authorities, only six out of 24 men have failed. This class is a very bad one, only four obtaining even a second-class certificate, while five have qualified by from one to three marks. Only one independent candidate out of six has passed.

Surveyors' Class, First Division.—The Surveyors' class calls for but little comment. No first-class certificates have been obtained, and only two men have failed. Eleven students passed in the third and five in the second class.

3. We beg to offer the following general remarks on points which have presented themselves to our notice, and hope that in so doing it will not be considered that we have gone beyond our province:—

(1) It was found that but for the printed list of names supplied by Major Love, it would have, in many cases, been impossible to decipher the names written on the answer papers. It is suggested that the practice of giving each student an examination number might with advantage be introduced; if not, it is hoped students will be directed to write their names legibly.

(2) It is hoped that instructions may be issued to the students to invariably execute their drawings to the scales specified by the examiners. Much additional trouble in marking is caused by drawings being made to scales different from those laid down in the questions.

(3) We would suggest that occasional paper examinations be given to the students by the College authorities if this is not already done. At present candidates write lengthy and irrelevant answers, and it would be good practice to set the students the previous examination papers and then to go over the answers with each man separately, pointing out mistakes and useless matter.

(4) As the surveyors appear to be recruited from an uneducated class of men, the advisability of only examining them at the end of their course is worthy of consideration. The students evidently learn a good deal of English while at the College and are much more able at the end than at the beginning of their term at the College to answer papers. That there are objections to this proposal is obvious, as students would in many cases postpone serious work till the final examinations, but we still think the question one for serious consideration.

(5) At present all draftsmen, both College students and independent candidates, have to pass in drill and gymnastics. As a draftsman's occupation is a sedentary one and his qualifications as an athlete are of no use to him in his profession, we consider that the examination in drills and exercises should be dispensed with. The marks obtained in this subject may qualify or disqualify a man or may determine his class of ... Some of the independent candidates who presented themselves for examination in gymnastics were corpulent persons totally unfitted by age and habit for athletic exercises and their performances attracted the ridicule of on-lookers and must have been mortifying to themselves.

(6) As we understand that a revision of the College rules will probably be necessary before long, we venture to record our opinion that the syllabus of instruction might with advantage be cut down. It is obvious that the present course of instruction is too comprehensive for the time allowed at the College, and that consequently the thoroughness of knowledge acquired must suffer. It would in our opinion be far more satisfactory for the students to receive a good grounding in fewer subjects than to acquire a general smattering of the large number of subjects they now study. The subjects selected should be those having reference to problems and work likely to fall to the lot of each class of students in their ordinary daily work. The higher branches of applied mechanics, &c., could, if ever needed, be studied in after-life, as what is learned of such matters at College will generally have been forgotten by the time any occasion for its use occurs.

(Signed) A. D. G. SHELLEY, Captain, R.E.,
President.
(„) E. W. STONEY, M.E., M. INST. C.E.,
(„) R. Ll. JONES, B.A.,
Members.

[I do not concur in suggestion (3) I.]
(Intld.) R. Ll. J.

From Major H. D. LOVE, R.E., Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 27th January 1893, No. 1505.

I have the honour to submit the following review of the working of the College of Engineering during the year 1892. A supplemental report will be forwarded in April next so as to complete the review for the official year. The matter contained in the supplemental report of April 1892 is included in the present report.

2. *Establishment.*—On 26th January 1892, I returned from a course of instruction at the School of Military Engineering, Chatham, and resumed charge of the College from the Acting Principal, Major Smart, R.E. On 30th January Mr. Chatterton, the Professor of Engineering, left the institution temporarily on transfer to the Public Works Department for two years with the object of gaining practical experience of engineering work in this country. He was relieved by Mr. J. J. Whiteley, Executive Engineer, Public Works Department. On 1st February 1892, Mr. W. C. H. Littlewood, Second Assistant Instructor in Drawing, resigned his post in order to take up an appointment elsewhere, but he was re-appointed to the College on 1st April. In the interim the duties of the instructorship were performed by Mr. R. Everard, a recently qualified Engineer. On 29th June M.R.Ry. T. Bhavaniswami Rau, B.A., L.T., was confirmed in his appointment as Vernacular Assistant. On 20th December Mr. J. E. A. D'Cruz, B.C.E., Assistant Instructor in Surveying, was granted three months' leave without pay to enable him to take up a Local Fund Assistant Engineership. Mr. E. W. Middlemast, M.A., Professor of Mathematics, proceeded on sick leave to England on 21st December for six months. The vacancies caused by the temporary absence of Messrs. Middlemast and D'Cruz will be filled early in 1893. During the second term of 1892 the services of M.R.Ry. C. Krishnan, Assistant Chemical Examiner, were made available on one afternoon in each week for the instruction in Practical Chemistry of the senior division of the Engineer class.

I have to acknowledge the good work done by all the members of the staff, and especially the assistance rendered me by Mr. Whiteley, the Officiating Professor of Engineering, who has performed his educational duties with conspicuous ability and success. There is one matter which must be referred to although it does not pertain to the year under review. During the Christmas vacation Conductor Cames, the Instructor in Engineering and Superintendent of Military students, who had been ailing for some time, became seriously ill, and I regret to announce that he succumbed on 20th January 1893, the day following that on which the College re-opened, after a service in the institution of upwards of twenty-one years. He was a man of ability and uprightness, zealous in the performance of duty, and neat and accurate in all his work. Appreciative references to that work will be found in the history of the College and in many of the annual reports. His loss is a serious one, and it will not be easy to adequately fill his place.

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

Class.	Practical course.		In College.			Total.
	Second year.	First year.	First Division.	Second Division.	Third Division.	
Engineer Classes	4	4	4	2	4	18
Engineer Subordinate Class	6	9	18	28	31	92
Military Probationers	...	...	...	...	...	5
Draftsman Class	...	...	25	26	...	51
Surveyor Class	...	...	18	19	...	37
Artisan Class	...	...	...	...	...	34
Special Students	...	...	...	...	...	3
Grand Total ...	...	...	...	...	...	240

Excluding the students going through the practical courses in workshops and on works, the total number actually in the College on 31st December 1892 was 217. The numbers arranged by classes of the community were—

Europeans and Eurasians	17
Brahmans	113
Other Hindus	64
Native Christians	14
Mussalmans	8
Others	1
Total ...	217

The corresponding totals of the four previous years were 1891, 189; 1890, 136; 1889, 109; 1888, 102. The numbers applying for admission in 1892 were unusually large. In July 66 candidates qualified for admission to the Engineer Subordinate class and 28 were admitted, furnishing, with four Military students, a full class of 32. In December thirteen candidates, most of whom have completed the B.A. degree curriculum, presented themselves for the Engineer class entrance examination and twelve qualified for admission. The majority of these will join early in 1893. The number of applications for the Draftsman, Surveyor and Artisan classes was unprecedented, viz., 143, 85 and 147 respectively. The selections for admission numbered 45, 35 and 40 respectively. By the middle of 1893, when another batch of Engineer subordinate students will join, the numbers will probably reach 260, a total which will tax the College accommodation to the utmost. The increased demand for the highest class of training which the institution affords is gratifying, and is partly due to the removal of the restriction regarding the employment of Engineers in the Upper Subordinate grades of the Public Works Department. Endeavours will be made during the coming year to improve the lighting and accommodation in the old portion of the building so as to meet the wants of larger classes.

4. *Examinations.*—The Board of Examiners appointed by Government conducted the final and term examinations of all the classes in December 1892 and the entrance examinations of April and December. A brief abstract of the results is given below, and a synopsis of the final examination marks forms an appendix* to this report. Hitherto the entrance examinations have been confined to Mathematics, credit for general education being given by the award of a proportion of the marks gained by the candidates in their University examinations. The University has lately resolved that its marks cannot be communicated, and the entrance examinations have accordingly been modified so as to include English composition and Handwriting. The system of paying the Board of Examiners a lump sum not having been found to work satisfactorily, Government have ordered that the Board shall be remunerated by *pro rata* payment on the principle adopted by the University. It is in contemplation to transfer the entrance examinations to the College staff. The question of holding entrance examinations for the Draftsman and Surveyor classes has also been considered; and in view of the large numbers applying for admission, it will probably be necessary to introduce a measure of this nature during 1893. In drawing up the question papers for the final and term examinations, it is hoped that the Board will, in future, meet in conference. Several of the questions set for the examinations of December 1892 were outside the syllabuses, a few contained insufficient data, while certain papers were, in my opinion, too long for the time allotted; but it is proper to add that the President hastened to modify the papers when errors were pointed out. Nevertheless, much inconvenience would be avoided if the papers were prepared in proper form in the first instance. Acting on the Board's recommendation last year that there should be a practical examination in Levelling, examinations of the Engineer Subordinate and Surveyor classes were held by the College staff in Chain and Compass Surveying, in Levelling and in Theodolite work. The marks allotted were a proportion of those usually assigned to Field work, and both rapidity and accuracy of work were considered in making the award.

5. *Engineer Class.*—Four students completed their final year's practical course on 31st December 1892, viz., A. V. Ramalinga Aiyar, B.A., B.C.E., K. Gopala Aiyar, A. Rajam Aiyar, and R. Sundaram Aiyar. The senior of these, A. V. Ramalinga Aiyar, has been appointed an Assistant Engineer in the Public Works Department.

The next batch of Engineer students, four in number, has completed one year in workshops. Two of them, L. D. Venkatarama Aiyar, B.A., B.C.E., and V. R. Pranatartihara Aiyar, B.A., B.C.E., have now been drafted to works, while the other two, J. Kuriyan, B.A., and S. Rajagopalasawmi Mudaliyar, who are Mechanical Engineer students, will spend another year in the Madras Railway Locomotive Shops.

Of the three divisions of the Engineer class actually in the College, the senior, consisting of four students, appeared for the final examination in December last

* Will follow.

and all passed. The average percentages of marks for the division in the various subject heads were as follow:—

Mathematics	65
Science	44
Engineering	60
Drawing	67
Surveying	63
Vernacular language	53
Drills and exercises	70
Total	60

Compared with the results of the preceding year, there has been a substantial improvement in Mathematics, a moderate falling off in Drawing and Surveying, and a slight improvement on the whole. The class may be regarded as a good one.

The senior student is G. S. Rama Aiyar, B.A., who is easily first with 69 per cent. of the total marks and receives the gold medal awarded to the most distinguished pupil. He will, on the satisfactory completion of his two years' practical course, provided he passes the B.C.E. degree examination, be appointed to the Engineer establishment of the Public Works Department. Rama Aiyar wins a prize for *Mathematics* and *Surveying* consisting of a field glass, and he also gains the Narayana Oonythan prize, a copy of Molesworth's pocket book. The second student is P. Ranganayukulu Nayudu with 62 per cent. of the total marks. He is awarded a prize for *Engineering* and *Drawing* consisting of a copy of Mullins' "Hydraulic Manual." A Sir Madhava Rau prize for *Workshop practice*, viz., a set of Architect's scales, is assigned to V. S. Ramakrishna Aiyar.

Two independent candidates presented themselves for examination, but both were unsuccessful.

The second division of the Engineer class, containing two students, has undergone a term examination, the marks of which count towards the final total. The average of the division was 64 per cent., showing that the class, though small, is good. The scholarship of Rs. 30 per mensem is gained by R. Arogyaswami Mudaliyar.

The third division, consisting of four students, made an average of 62 per cent. of the total marks at the late term examination. Two students, S. A. Jagadisa Aiyar, B.A., and K. V. Natesa Aiyar, B.A., have done exceedingly well. The scholarship of Rs. 30 is won by the former.

Twelve candidates passed the entrance examination for the Engineer class and should join the College early in 1893.

6. *Engineer Subordinate Class.*—Six students completed their final year's course on works on 31st December 1892, and five of them have been appointed to the Upper Subordinate establishment of the Public Works Department, viz., Sergeant G. E. Brand, Sergeant C. J. Smith, W. T. J. Scanlon, M. S. Venkatarama Aiyar, and T. A. Kuppuswami Aiyar.

The next batch of Engineer Subordinate students, nine in number, spent the year 1892 in the Public Works Workshops. Their work will be referred to later. The batch originally consisted of twelve students who passed the final examination of December 1891, but three of these elected to seek employment without going through the practical course. These three will not of course receive diplomas.

Of the three divisions of the Engineer Subordinate class in the College proper, the senior, consisting of eighteen students, joined in August 1890 and underwent final examination in December last. Thirteen of these were successful. The average percentages of marks gained by the divisions were—

Mathematics	43
Engineering	49
Drawing	52
Surveying	61
Vernacular language	43
Drills and exercises	67
Total	52

Compared with the results of the preceding year, there has been some improvement in Engineering and Surveying and a moderate falling off in the remaining subjects and the total marks. The class is below the average.

The senior student is N. Tiruvambala Pillai, who is easily first with 72 per cent. of the total marks. He gains the silver medal awarded to the most distinguished student, and prizes for *Mathematics*, an aneroid barometer, and for *Engineering* and *Surveying*, a lever watch. He also gains the Roger's prize consisting of books. To the second student M. V. Venkatarama Aiyar, who secures 64 per cent. of the total marks, is awarded a prize of a pillar compass for *Drawing* and a Sir Madhava Rau prize of a colour box for *Workshop Practice*. The third and fourth places are taken by S. Chittambala Pillai and K. Srinivasa Aiyar. The latter is awarded a prize consisting of an ivory rule for *Gymnastics and Drill* and a parallel rule is given to D. V. Venkatarama Aiyar for *Vernacular Language*.

One independent candidate appeared for the final examination and was successful.

The second division of the Engineer Subordinate Class contains twenty-eight students, who scored an average of 49 per cent. of the total marks at the term examination of December 1892. Gunner Power heads the list with 64 per cent. The two scholarships of Rs. 12-8-0 are awarded to M. R. Natesa Aiyar and N. Kandaswami Pillai, who occupy the second and third places respectively. A Sir Madhava Rau prize, consisting of an optical square, is awarded to Corporal H. A. Furnell for *Workshop Practice*.

The third division of the Engineer Subordinate Class, which contains thirty-one students, obtained 60 per cent. of the marks at their first term examination in December last. This result indicates the existence of good material. The two scholarships of Rs. 12-8-0 are won by J. S. Muthayya and M. Krishnaswami Aiyangar who occupy the first and second places respectively. The Walker scholar, R. Narayana Hebbar, takes the fourth place in the class.

7. *Draftsman Class.*—The senior division, consisting of twenty-four regular students, appeared for the final examination in December last. Eighteen were successful in gaining certificates, four in the second class, and fourteen in the third class. The failures occurred principally in *Building Drawing*, *Estimating*, and *Total Marks*.

The average percentages gained by the division under the various subject heads were—

Practical Geometry	52
Freehand, Perspective, and Model Drawing	53
Building Drawing	49
Machine Drawing	54
Estimating	50
Topographical Drawing	51
Gymnastics and Drill	64
Total	48

Compared with the results of the preceding year, there has been a substantial falling off in all subjects except *Machine Drawing*. The class is below the average.

The student occupying the first place is S. Rama Aiyar, who with 68 per cent. of the total marks gains the College bronze medal and a prize of a colour box for general proficiency. The second student S. Rangaswami Nayudu secures 67 per cent. of the marks and receives a prize consisting of a set of Architect's scales. In common with those two students, T. C. Anantha Aiyar and M. S. Tamburswami Pillai qualify for second-class certificates.

Six independent candidates presented themselves for examination for certificates. One of these secured a certificate in the third class.

The second division of the Draftsman Class contained twenty-six students. The mean percentage of marks gained by the division at the term examination was 52. Fair results were obtained in *Geometrical Drawing*, but very poor ones in *Building Drawing*. The two scholarships of Rs. 8 are won by N. L. Ramachandra Rau and A. Mariasusai Pillai.

Forty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1893.

8. *Surveyor Class.*—In the senior division of 1892, there were eighteen students. Five of these gain certificates in the second class and eleven in the third class, while two fail.

The average percentages obtained under the different subject heads were—

Chain, Compass and Plane Table Surveying	61
Levelling	54
Theodolite Surveying	66
Topographical Drawing	59
Gymnastics and Drill	50
Total	59

The results are not so high as those of the preceding year, but the class is a good one.

The senior student is M. Sivasubrahmanya Aiyar with 71 per cent. of the total marks. He wins the College bronze medal and a prize consisting of an optical square for general proficiency. To K. Kulothunga Pillai, who is only one mark below the first man, is awarded a prize of a clinometer rule. The remaining winners of second-class certificates are C. N. Ramaswami Aiyar, D. Francis, and K. Rajagopala Chari.

The second division of the Surveyor Class, containing nineteen students, secured an average of 52 per cent. of the marks at the December term examination. The two scholarships of Rs. 8 are awarded to T. R. Jivanna Rau and G. Somayya Sastri.

Thirty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1893.

9. *Artisan Class.*—At the commencement of the year forty out of one-hundred and two candidates were admitted. Six students resigned or were dismissed during the session, leaving thirty-four at the close of the year. About six of these are actual artisans or maistries. The class received evening instruction in Mathematics, Building Construction, and Elementary Plan Drawing. During the second half of the year the students were taught Surveying in the field with Chain, Compass, and Plane Table, going out one morning in the week. Surveying is at present extra to the regular course and its continuance depends on the possibility of making an instructor available for the work. M.R.Ry. R. A. Bhakya Mudaliyar took the students on several visits of inspection to engineering works in progress. The class is not examined in the College, but my observation of it indicates that the students of 1892 were earnest in their work and made satisfactory progress. The students are advised to present themselves for the Government Technical Examinations on the first opportunity. In November 147 candidates applied for admission. Of these 40 have been accepted. The following statements of the occupations of the persons selected and of their parents show that the type of student, for whose benefit the class was instituted, is now being fairly well secured.

Classification of students by occupation.

Maistry or Sub-Maistry	13
Blacksmith and Carpenter	1
Contractor or Contractor's Assistant	3
Compositor	1
Artisan, Telegraph Department	1
Kanakapillai	1
Attender	1
Bill Collector	1
Timekeeper, E.C. Railway	1
Sanitary Inspector	15
Teacher	—
Student, or no occupation	40
	Total ... —

Classification of students by parents' occupation.

Bricklayer Maistry or Bricklayer	7
Blacksmith and Carpenter	1
Carpenter	4
Maistry, Road Maistry or P.W. Maistry	12
Maistry and Contractor	3
Contractor	2
Overseer or Sub-Overseer	2
Delta Superintendent	1
Surveyor	1
Compositor	1
Pensioner	2
Peon	1
Landowner	2
No occupation	1
Total	40

10. *Military Students.*—The total number of soldier students on 31st December 1892 was sixteen, viz., two on works, two in the P.W. Workshops, seven in the Engineer Subordinate Class, and five probationers. One was remanded to his regiment in March owing to insufficient progress in his studies and one in July on account of ill-health. Seven non-commissioned officers and men competed for admission in April and five were received into the College in July. The accommodation in the College barracks being insufficient, six of the senior students were drafted to the family quarters. It is hoped that by July 1893, when a fresh batch will join, the rooms now occupied by the temporary workshop will become available as barracks. The conduct of the Military students has been very good. Arrangements for enabling the men to spend the long vacation at the Wellington depôt are under consideration. A proposal was made by the Military authorities to establish a Survey Class at the College for native soldiers, but the project was dropped on account of expense.

11. *Special Students.*—One Victoria Technical Institute scholar has been under training during the year. He will appear next May for the Government Technical Examinations in Surveying, Plan Drawing, and Mensuration. Two special students were allowed during the latter part of the year, on payment of fees, to receive instruction in Surveying and Drawing. They were attached to classes in which there were vacancies. A few applications were received from Europeans desirous of giving their sons an engineering education. The College rules generally bar the favorable entertainment of such applications, but in one case special sanction has been obtained to the reception into the Engineer Class of a student from the Royal Indian Engineering College, Cooper's Hill. The student will have the benefit of the College course of theoretical training, but will be ineligible for the award of appointment, diploma or prizes.

12. *Government Technical Examinations.*—A number of the regular students of the College presented themselves voluntarily for the Government Technical Examinations in Engineering subjects. In the Higher Examinations there were the following passes:—*Applied Mechanics*, one first class; *Building Construction*, two second class; *Plan Drawing and Estimating*, one second class; *Bridge-making*, one second class; *Machine Drawing*, one first class, two second class; *Geometrical Drawing*, two first class, two second class; *Surveying*, one first class, six second class; *Pure Mathematics*, first stage, three first class and three second class; *Mixed Mathematics*, three second class. In the Lower Examinations there were two second class passes in *Building Construction* and one first and three second class in *Mensuration*.

13. *Surveying.*—The outturn of work during the year was as follows, exclusive of that of the Artisan Class:—

No. of squads.	Description of work.	Miles of levelling and traversing.	Acres filled in.
	First Half Year.		
3	Chain Survey		
4	Compass Survey		113
4	Compass Traverse		1,320
4	Plane Table Survey	11¼	
9	Levelling		1,320
8	Theodolite Traverse	64	
4	Setting out Curves	62	
		4½	
	Second Half Year.		
4	Chain Survey		330
10	Compass Survey		13,565
6	Compass Traverse	14	
6	Plane Table Traverse	14	
10	Plane Table Survey		10,180
13	Levelling	43¼	
11	Contouring	28	
8	Contouring and Hill Sketching		6,400
3	Theodolite Traverse	6	
3	Setting out Curves	3¼	
4	Pocket Sextant Survey		1,920
4	Trigonometrical Survey		28,800

In February two divisions of the Engineer Class and one of the Engineer Subordinate Class were sent out to Guindy for a fortnight's continuous work in the field, and in July three divisions of the Engineer Class, one of the Engineer Subordinate Class, and one of the Surveyor Class spent the same length of time in camp near Gúduvánchéri, where good work was done under Sergeant Goddard and Mr. D'Cruz.

14. *Inspections of Works.*—Some thirty inspections were made during the year, including Quarries, Brickfields, Limekilns, Cement Works, Buildings in Progress, Masonry and Iron Bridges, the Public Works Workshops, and the Buckingham Mills. Several of the classes spent three days at the Red Hills, inspecting and measuring up works. A building and two bridges were also measured up and detail drawings made of them. The students were exercised in setting out work on the ground.

15. *College Workshop.*—The temporary Workshop has been fully utilized throughout the year. The students have been practised at sawing and plaining to given dimensions, at making joints, at turning, and, when sufficiently advanced, they have been employed on the construction of drawing tables, benches and other furniture required for the college. In the Fitters' Shop they have been exercised in chipping and filing cast and wrought iron, in drilling, turning, and screw-cutting. The new Workshop sanctioned in 1891 was designed as a temporary building. Fresh sanction was accorded during the year under review to the erection of a permanent structure and the foundations were commenced in September. The building is expected to be ready for the reception of machinery in May 1893. Indents for a 10 H.P. engine and boiler and for machine tools have been forwarded to England, and it is hoped that students will be able to use the new shops by July. With the increased accommodation, more time can be devoted by the Engineer and Engineer Subordinate Classes to Workshop practice. The theoretical course may require some modification in consequence and opportunity will be taken to revise the syllabuses, which experience shows to be rather too extensive. Instruction in Carpentry will probably be extended to the Draftsman Class.

16. *Laboratory and Experimental Work.*—Work in the Chemical and Engineering Laboratories was conducted as usual. Cement-testing was practised and indicator diagrams were taken at the Buckingham Mills through the courtesy of Messrs. Binny and Company. The apparatus imported consisted chiefly of surveying

instruments, specimens of iron and steel, a model turbine, and models of pieces of mechanism.

17. *Practical Course, Mechanical Engineers.*—The Engineer students of December 1890 all elected to become Civil Engineers, but two of those of December 1891, viz., J. Kuriyan, B.A., and S. Rajagopalaswami Mudaliyar, are studying as Mechanical Engineers. The former was attached for the first half of the year to the Public Works Workshops, where he went through the Foundry and Carpenter's Shop. He was then transferred to the Madras Railway Locomotive Shops where S. Rajagopalaswami spent the whole year. Mr. Pilkington, the Locomotive Superintendent, writes as follows:—"Both students have conducted themselves entirely to my satisfaction. Their attendance has been regular and they have both shown much interest in their work. Rajagopalaswami worked from February to July in the Erecting Shop. He assisted in setting slide valves and fitting boiler mountings and fitted axle boxes, big ends, and eccentric straps. From July to September both students worked in the Fitting Shops, fitting up side rods, connecting rods, link-motions and other engine details. From October to December they worked in the Foundry."

18. *Workshop Course, Civil Engineers and Subordinates.*—Two Engineer and nine Engineer Subordinate students were attached during the year to the Public Works Workshops, Rayapuram. One of the subordinates, a Military student, was in hospital from August to December, but no report of the circumstance was received from the Workshop Superintendent during the year. Mr. Wickham writes as follows on the conduct and work of the students:—"The attendance has been in most cases regular and the students, who absented themselves beyond the number of days admissible as casual leave, were made to attend the shops on College holidays. The conduct of the students has been generally good. As regards the progress made in the direction of practical course, I regret to say that, owing to the absence of technical supervision in this workshop, I was obliged to leave the students to pick up as much knowledge as they could by themselves." This report must be regarded as far from satisfactory. There is no indication of the students having been passed through the various shops; there appears to have been but little supervision of their work; and the protracted absence of a military student in hospital passed unnoticed. The Superintendent doubtless did his best with the means at his disposal, but his report shows that the course could not have been utilised by the students to full advantage. I suggest that the Superintendent be called on to submit progress reports quarterly in future.

When the new College workshop is in full operation it is probable that a reduction may be effected in the course at the Public Works Workshops, the time saved being devoted to the course on works. Half of the works course may be spent in places where large building works are being executed and the remainder in irrigation districts. This division of work has been to some extent carried out this year.

Name.	Abstract of Progress Report.
A. V. Ramalinga Aiyar, B.A., E.C.E.	*Periyar Division, No.* 1.—Mr. deWinton reports:—"Has been engaged during the year on surveying and levelling, on checking alignment of main dam and watershed tunnel, &c. I have nothing but good to say of him and his work. He possesses in a high degree energy, activity and conscientious desire to do his duty, and has been of great assistance to me in all the work I have given him to do. He appears to be constitutionally strong, and is active and punctual in his habits, and I prophesy for him a very useful and honorable career in the department. He is especially careful and accurate in levelling."
G. Gopala Aiyar ...	*Periyar Division, No.* 2.—Mr. Carless states:—"Has been in charge of several works in course of construction, viz., a bridge, two super-passages and two sluices, besides several minor works. Has shown creditable knowledge of practical masonry. He has made a survey of part of the channel, as well as several designs of small works. He can level accurately. The student has worked well, and his conduct has been exemplary."
A. Rajam Aiyar ...	*Periyar Division, No.* 2.—Mr. Carless reports:—"He has had part charge of the 6th reach in which there are under construction two bridges, a super-passage, a culvert and earth-work. He has shown a good knowledge of masonry construction. A map of part of the main channel was made by the student; he levels accurately and draws neatly. Several small designs and estimates have also been prepared by him. The student works well, and his conduct has been exemplary."
R. Sundaram Aiyar ...	*Kistna Eastern Division and Gudivada Division.*—Mr. Jopp writes:—"The student has been employed on earth-work and silt clearances, sundry repairs to regulators, and the construction of a new bridge across Ryves' canal. He has worked well and intelligently, and has acquired such practical experience as he has had opportunity for." In September Sundaram Aiyar proceeded to the Gudivada Division. Mr. Ussher reports:—"He was at first employed in preparing plans. He then assisted in taking observations on the flow of water, and lastly was sent to the lock under construction at Lakshmiparam. He has satisfactorily availed himself of the opportunities afforded him. His conduct has been entirely satisfactory."
Private G. E. Brand ...	*Periyar Division, No.* 1.—Mr. deWinton writes:—"Has been associated with Engineer student A. V. Ramalinga Aiyar in all the work done by the latter, and the remarks made above apply to Private Brand in every particular. He is greatly superior in intelligence and knowledge to the average young overseer, and is a particularly neat draftsman, and the quickest workman I ever had under me. His conduct has been everything that could be desired, and I consider that he will be an acquisition to the department."
Lance Sergeant C. J. Smith.	*Consulting Architect's Division and Kistna Eastern Division.*—Mr. Irwin writes:—"Sergeant Smith received instruction in building work from the mixing of mortar to the completed wall, as well as in testing and passing wood and stone work at the new High Court. He is capable of laying out and completing building work in all its details." During the second half of the year Sergeant Smith was attached to the II Circle for irrigation work. Mr. Jopp remarks that the Sub-divisional Officer commends Sergeant Smith for his promptness and energy.
W. T. J. Scanlon ...	*Consulting Architect's Division and Tanjore Division.*—Mr. Irwin reports that his remarks regarding Lance-Sergeant Smith are in all respects applicable to this student. During the second-half of the year W. Scanlon was transferred to the Tanjore Division. Mr. Lambert writes:—"He has acquainted himself with the general method of execution of works in progress and has shown that he possesses good abilities. He has done satisfactory work in surveying and levelling and has acquired a knowledge of office work and accounts. His conduct has been good."

Name.	Abstract of Progress Report.
M. S. Venkatarama Aiyar.	*Tanjore Division and Consulting Architect's Division.*—The Tanjore Sub-division Officer reports:—"The student has studied the data for brick manufacture, and the construction of masonry and of the sluices for the Vikramanar and Malur channels. He has also inspected various works and studied accounts." During the latter half of the year the student was attached to the Consulting Architect's Division. Mr. Irwin writes:—"He was employed on the extension of the new High Court building, and had opportunities of learning details of brick and stone work, terrace roofing and flooring, as well as carpentry work for doors, windows, joists, &c. He also assisted in measuring and laying out work. His conduct was generally good. He wants more energy, but will, I trust, improve in this respect when he is made responsible for work."
T. A. Kuppuswami Aiyar.	*Consulting Architect's Division and Chingleput Division.*—Mr. Irwin reports:—"Kuppuswami Aiyar was attached to the Government Brickfields, and appears acquainted with the details of brick-making, bricklaying and building construction." During the second-half of the year he was attached to the Chingleput division. Mr. Foord, and subsequently Mr. Wilson, state that the student was posted to the Uttramallur head-sluice and Mariammur tank-sluice works in progress, and that he was reported to be diligent and attentive.
P. Ramachandra Aiyar ...	*Chingleput Division and Consulting Architect's Division.*—Mr. Burlton writes:—"The student has done very well and taken an interest in his work. He was engaged on the superintendence of the Uttramallur head-sluice construction." During the latter half of the year he was attached to the Consulting Architect's Division. Mr. Irwin reports:—"He was employed on the Victoria Technical Institute and on additions to the School of Arts. He gave entire satisfaction. He is intelligent and painstaking, and performed all the work entrusted to him with diligence and care. He has already obtained a fair knowledge of practical work, and will be found very useful as an Assistant. His conduct was very good."

20. *Revision of Rules.*—The most important change in the rules is that resulting from the institution of a Provincial Service for the Public Works Department. The Government of India Resolution on the subject states that the recruitment for the Engineers of that service shall be (*a*) from students of Indian Colleges who are natives of India, and (*b*) from Upper Subordinates of the Public Works Department. For the Madras list the numbers are to be one annually from the College, and one in alternate years from the Public Works Upper Subordinate establishment. The College students are to be appointed apprentices on probation, and to be promoted to Assistant Engineer, 2nd grade, on proving, within three years, their thorough fitness for service in the department. The appointment from the Public Works Department is to be made as a rule from the Sub-Engineer grade. A subsequent Resolution lays down that the new rules shall not affect students who joined the College before the publication of the regulations. The rules will accordingly not come into operation until 1st January 1898. The effect of the Resolution is to diminish the inducements to enter the Engineer class, inasmuch as the successful student will be appointed an Apprentice instead of an Assistant Engineer in the first instance; while the students of the Engineer Subordinate class receive indirectly additional encouragement. From a College standpoint these results are unsatisfactory, for while there is difficulty in filling the Engineer class there is already abundant competition of the Subordinate class. A reference has been made to Government regarding the time at which the apprenticeship is to be conferred. If the appointment is made at the end of the theoretical course, the practical course being regarded as a period of apprenticeship, the Engineer class will not be worse off than before.

The next important modification of the rules has been the removal of the restriction in the appointment of qualified Engineers to the Upper Subordinate ranks of the Public Works Department. This is a boon, since it gives students who are unsuccessful in securing the guaranteed appointment a prospect of employment under Government, even though it be in a subordinate capacity. From four to five Overseerships are guaranteed annually to the Engineer Subordinate students, and when these appointments have been conferred, the Chief Engineer will, it is presumed, use his discretion in filling further vacancies with qualified Engineers or Subordinates. It has been ruled that the appointment of natives shall not be to a grade higher than that of third-grade Overseer. In view of the higher qualifications which Engineer students undoubtedly possess, I should be glad to see appointments in their case made in the first or second grade. Formerly second-grade Supervisorships were thought suitable, and a few such appointments were made; but by conferring first-grade Overseerships, the Engineers would, at any rate, not be superseded by Military students who were their contemporaries in a junior department of the College. This proposal, with other suggestions for the amelioration of the condition of the Engineer class, are now under the consideration of Government.

The only other changes in the rules have been the modification of the entrance examinations already alluded to, and the institution of a registration fee for applications for the Artisan class.

21. *Walker scholarship.*—With the approval of General Walker, the rules regarding this scholarship have been revised, the vernacular examination in Malayalam or Kanarese being dispensed with, and other modifications made, so as to suit the present course of instruction in the Engineer Subordinate class.

22. *Library and Reading Room.*—The Library, which consists of a lending branch and a consulting branch, contains a total of 2,963 volumes, of which 135 were added during 1892. During the year 4,042 books were issued, viz., 458 to the staff and 3,584 to the students, while 1,202 references were made to the Consulting library.

The history of the College, published in the Calendar, has been revised and brought up to date, and some additional information regarding the constitution of the Survey school in the early part of the present century, derived from records in the Office of the Board of Revenue, has been incorporated.

23. *Physical Training.*—Regular instruction in gymnastics and drill was given to all the students except those of the Artisan class, the drills being conducted by the Military students. The Cricket Club, which was revived last year, is well supported, and though no match of importance has yet been won, it is hoped that the improvement which practice will bring will soon result in occasional success. Tennis was played as usual.

24. *Attendance and Conduct.*—The percentage of numbers present to numbers on the rolls was 96 both for the Engineer class and for the junior classes. There was a good deal of sickness during the year, caused principally by fever; and one promising student died of cholera on his journey home to Malabar for the long vacation.

The conduct of the students has been generally very good. During the examination, however, two cases were detected of attempts to bring printed papers into the hall. The guilty students were at once sent out, but as the examination paper was subsequently cancelled by the Board of Examiners, they did not suffer as heavy a punishment as they deserved. A late student of the Artisan class made a false representation to the Chief Engineer, Burma, and was consequently declared by Government to be ineligible for the public service.

The standing orders for students have been revised, and a further check placed on absence without leave.

25. *B.C.E. Degree Examination.*—The five students who comprised in 1891 the senior division of the Engineer class presented themselves for examination in

January 1892, and four passed, viz., three in the second class and one in the third. Nine independent candidates, former students of the College, also presented themselves and two passed in the third class.

For the examination of January 1893 eleven candidates appeared. The results will be communicated in my supplemental report.

The rules for the new B.E. Degree examinations will come into operation in January 1894.

26. *Employment of Passed Students.*—The passed men of 1891 have had no difficulty in obtaining early employment. Of the nine Engineers, one is an Assistant in the Public Works Department, and one (a Mechanical Engineer) is a temporary Assistant on the East Coast Railway, Kistna Bridge, one is a permanent Supervisor, and two are temporary Supervisors in the Public Works Department, two are temporary Overseers; while the ninth is a Supervisor under the Travancore Government.

All the three Engineer Subordinate students, who completed their works course in December 1891, were appointed Overseers in the Public Works Department.

Of the ten Draftsmen, one entered the Surveyor class, and all the others have obtained employment on salaries ranging generally from Rs. 30 to Rs. 50. Six are employed in the Public Works Department, one on Railways, and two under Local Boards.

Of the eleven Surveyors, seven are known to be employed, viz., two in the Public Works Department, one in the Revenue Department, one in the Survey, one on Railways, and one under a Local Board. The remaining four have been recommended for employment.

The vacancies notified during the year in the Gazette, the public press, by letter to the Principal, &c., were seventy in number, of which thirty-four were under Government, twenty-eight under Local Boards, and seven under Native States. Thirteen were for Engineers, and Assistant Engineers, twenty-nine for Supervisors and Overseers, and twenty-five for Draftsmen, Surveyors and Sub-Overseers. Eight of the appointments were worth upwards of Rs. 250 each, twelve between Rs. 100 and Rs. 250, and twenty-five between Rs. 50 and Rs. 100. The vacancies are classified in the following table:—

—	Government.			Local Boards and Municipalities.				Railways.	Native States.		Total
	100 to 250.	50 to 100.	Under 50.	Above 250.	100 to 250.	50 to 100.	Under 50.	Under 50.	Above 250.	50 to 100.	
Engineer	...	...	...	...	...	...	...	...	...	...	...
Assistant Engineer	3	...	...	5	1	...	...	...	1	...	10
Supervisor	...	...	...	1	1	...	...	...	1	...	3
Overseer	3	...	...	...	3	...	...	...	...	...	6
Draftsman	...	4	1	...	...	7	6	...	...	...	23
Surveyor	1	3	10	...	...	1	2	1	...	5	18
Sub-Overseer	...	3	1	...	...	1	...	...	...	...	5
Channel Superintendent	...	...	2	...	...	...	...	...	...	...	2
Teacher in Surveying	...	...	1	...	...	...	...	...	...	...	1
Forest Officer	...	1	...	...	...	...	...	...	...	...	1
	...	...	1	...	...	...	...	...	...	...	1
Total ...	7	11	16	6	5	9	8	1	2	5	70

These figures show that the prospects of early employment of the men now passing out are good, and that the demand for Overseers is not likely to be fully met for two or three years to come. The small batches of Engineer Subordinates which completed the practical course during the last three years are the result of depression five years earlier. Nearly all the qualified men are being absorbed by the Public Works Department, and scarcely any are at present available to meet the requirements of the Local Boards. To assist in the maintenance of the employment register kept at the College, Government ordered that all first appointments to the Public Works Department or to the Engineering establishments of Local Boards, shall be reported to the Principal.

In my supplemental report of April 1892, I suggested that Local Boards and Municipalities should be invited to entertain none but qualified men, when such are available, in their Engineering establishments. With the object of ascertaining the extent to which qualified men, especially ex-students of the College, are employed by those bodies, a circular was sent to the Presidents of the Local Boards and of the larger Municipalities, asking for a return giving the information needed. Returns have been received from seventeen Boards and one Municipality, which show that of the Engineers and Assistant Engineers employed, excluding doubtful cases, eight are qualified and nine unqualified; of the Supervisors and Overseers, fifty are qualified and one hundred and four unqualified; and of the Draftsmen, Surveyors and Sub-Overseers, twenty-nine are qualified and eighteen unqualified. Persons who do not possess the qualifications required by the Public Works Department for the appointments they hold are classed as unqualified. Thus there are cases in which Engineers drawing from Rs. 300 to Rs. 600 have passed only the test required for Overseers, and others in which Supervisors on Rs. 150 or Rs. 200 have qualified only as Draftsmen or Surveyors. These figures indicate that Local Boards do not always secure the best men available, and that there exists a large field for the future employment of men from the College.

27. *Engineer Class.*—The continued weakness of the Engineer class was the subject of animadversion in the last Annual Report and in the supplemental report of April 1892. In August proposals were submitted for the amelioration of the condition of the class, a comparison being drawn between the inducements held out to Engineer students at Madras and those offered at Roorkee, Calcutta and Poona. It was shown that Madras laboured under disadvantages in regard to length of course, cost of training to the student, scholarships and prospects of employment, and proposals were made under the three latter heads. Final orders have not been yet issued; but the disability for employment in the Upper Subordinate establishment of the Public Works Department has been removed, and to this is in great measure due a substantial increase this year in the number of applications for admission to the class. The scholarships granted by the Government of Mysore to its Engineer students have hitherto been tenable in the Madras College for two years, or in the Poona College for three years. The attention of the Mysore Government having been drawn to the fact that the Madras course extends over five years, it has been decided to make the scholarships tenable for four years instead of two. This concession is not, however, likely to attract students as long as a diploma can be obtained at Poona after a three years' course.

28. *Financial position.*—The total expenditure, including scholarships, during the official year 1891–92 amounted approximately to Rs. 56,800, and the income from fees, &c., to Rs. 10,300. The net cost of educating each student, taking the average number at 195, was Rs. 238. The figures for 1892–93 will be furnished in April.

29. *General remarks.*—The year has passed without unusual occurrence. Steady work has been done, though the examination results indicate not only the absence of exceptional talent, but decided weakness in the junior classes in two or three subjects, such as Building, Drawing and Estimating. That weakness is not due to want of attention to those subjects; but special note will be taken during 1893 of the points which the Board's report will doubtless bring forward. On the receipt of that report, remarks on the examination results will be made in detail. The outturn of drawings, estimates, notes, surveys and other practical work affords sufficient evidence that progress has been made. This outturn, combined with the general results of the examination, and with the subsequent training during the practical courses, shows that the successful students are now leaving the College thoroughly well equipped for their work in life.

(Signed) H. D. LOVE, Major, R.E.,
Principal, College of Engineering.

APPENDIX.

ENGINEER CLASS.

Abstract of Marks.

Rank.	Names.	I. Mathematics.	II. Engineering.	III. Drawing.	IV. Surveying.	V. Language.	VI. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	475	525	775	900	450	200	125	3,000	
	College Students.									
1	C. S. Rama Aiyar ...	390	281	524	363	275	125	105	2,063	Passed Second-class.
2	P. Rangasawmi Naydu ...	370	263	523	356	272	112	73	1,869	
3	V. Gopala Aiyar ...	326	286	419	320	231	104	55	1,742	
4	V. S. Ramakrishna Aiyar ...	284	151	470	292	231	99	81	1,608	
	Average per cent ...	69·5	43·8	61·3	47·4	49·5	53·2	71·6	69·0	
	Independent Candidates.									
1	M. Radhakrishna Aiyar ...	344	199	369	340	196	28	74	1,452	Failed in total.
2	V. Ramachandra Aiyar ...	163	145	379	277	253	120	84	1,426	
	Average per cent. ...	42·6	32·1	49·2	53·6	59·7	84·5	69·2	47·4	

ENGINEER SUBORDINATE CLASS.

Abstract of Marks.

Rank.	Names.	I. Mathematics.	II. Engineering.	III. Drawing.	IV. Surveying.	V. Language.	VI. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	370	600	400	350	180	100	2,000	
	College Students.								
1	N. Tiruvambala Pillai ...	256	454	254	202	113	65	1,424	Passed Second-class.
2	M. V. Venkatarama Aiyar ...	226	332	271	253	105	88	1,280	
3	S. Chittambala Pillai ...	222	328	261	269	55	85	1,210	
4	K. Srinivasa Aiyar ...	206	336	225	238	96	100	1,209	
5	Lance-Corporal J. O'C. Phelan ...	182	323	243	223	129	77	1,177	
6	D. V. Venkatarama Aiyar ...	166	318	243	259	130	60	1,155	
7	K. R. Raman Pillai ...	136	328	226	200	101	86	1,112	
8	P. Chandrasekhara Pillai ...	123	316	252	232	101	70	1,078	
9	C. V. Shunmukha Mudaliyar ...	168	297	219	198	107	67	1,056	
10	V. S. Srinivasa Aiyangar ...	145	331	202	198	87	76	1,038	
11	M. G. Singara Chari ...	144	301	201	226	98	72	1,001	
12	K. P. Vaidyanatha Aiyar ...	143	208	185	204	78	84	1,001	
13	A. Kunjunni Panikar ...	187	269	188	221	114	66	1,000	
14	A. Arumachala Mudaliyar ...	125	232	177	172	109	77	903	Failed in total.
15	C. R. Gopalaswami Dikshatar ...	110	274	185	182	49	77	877	" in I and total.
16	L. S. Venkatarama Aiyar ...	92	274	171	170	58	43	808	" in I and total.
17	A. Arumeinada Pillai ...	141	209	147	175	55	62	789	" in total.
18	C. Tallent	105	188	188	126	34	55	691	" in I, II, V and total.
	Average per cent ...	43·2	49·5	62·4	61·7	49·7	73·2	52·2	
	Independent Candidate.								
1	P. V. Srinivasa Rao	140	289	219	207	117	55	1,007	Passed Second-class.
	Average per cent ...	37·6	44·8	54·7	59·1	65·0	55·0	50·3	

DRAUGHTSMAN CLASS.

Abstract of Marks.

Rank.	Names.	I. Geometrical Drawing.	II. Free-hand Perspective and Model Drawing.	III. Building Drawing.	IV. Machine Drawing.	V. Estimating.	VI. Topographical Drawing.	VII. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	100	120	270	200	180	80	50	1,000	
	College Students.									
1	S. Rama Aiyar	75	96	159	144	118	43	45	680	Passed Second-class.
2	S. Rangasawmi Naidu	65	90	183	109	137	53	32	669	
3	T. C. Anantha Aiyar	66	85	195	107	118	55	38	664	
4	M. S. Thambuswami Pillai ...	63	92	163	130	111	54	48	661	
5	G. Malleswara Prasadha Rau ...	42	79	170	109	131	45	27	603	Passed Third-class.
6	S. V. Krishnaswami Aiyangar ...	64	47	144	134	123	50	38	600	
7	A. L. Singaravelu Mudaliyar ...	54	69	166	101	124	45	30	589	
8	S. Purandara Rau	68	84	149	102	114	40	31	588	
9	D. Srinivasa Aiyangar	57	70	138	134	91	41	37	568	
10	V. Arvamutha Chari	57	69	139	111	115	40	27	558	
11	R. Krishna Rau	48	60	134	135	101	40	32	550	
12	P. S. Jambulinga Mudaliyar ...	70	61	161	95	91	39	28	545	
13	S. Subharama Aiyar	40	56	135	125	77	41	40	514	
14	P. Krishnaswami Mudaliyar ...	55	65	109	107	90	47	29	502	
15	A. Srinivasa Rau	57	58	112	110	85	43	37	502	
16	C. N. Rama Rau	45	53	124	111	176	47	44	501	
17	A. Ratnavelu Mudaliyar ...	36	60	109	103	17	46	30	501	
18	T. Ponnaranga Pillai	42	61	134	114	72	45	32	500	
19	P. Ramaswami Mudaliyar ...	49	47	94	116	59	38	35	438	Failed in III, V and total.
20	P. Duraisvami Mudaliyar ...	41	56	111	100	51	40	37	436	Failed in V and total.
21	T. Gopala Aiyangar	49	39	99	105	45	36	29	402	Failed in II, V and total.
22	C. K. Venkatasubba Rau ...	36	55	91	86	76	38	17	399	Failed in III and total.
23	A. Rangaswami Mudaliar ...	43	49	75	83	19	33	30	332	Failed in III, V and total.
24	G. Seshayya	36	56	78	78	24	33	31	331	Failed in III, V and total.
	Average per cent. ...	52·4	53·7	48·8	55·0	50·0	53·7	67·0	52·6	
	Independent Candidates.									
1	R. Bujanga Rau	53	56	107	110	112	43	20	501	Passed Third-class.
2	V. Subramanya Aiyar	34	49	80	104	102	46	35	450	Failed in I, III and total.
3	T. K. Gopala Chari	50	51	95	84	110	38	8	436	Failed in III and total.
4	W. Chinnasawmi Nayudu ...	53	42	83	63	102	35	45	423	Failed in II, III, IV, and total.
5	C. Erusappen	71	51	153	42	65	26	13	421	Failed in IV and total.
6	C. Muttiyalu	54	31	101	83	77	30	14	390	Failed in II and total.
7	P. Jagannayakulu Naidu ...	...	...	...	...	...	...	...	...	Absent from examination.
8	P. Subbarayudu Naidu	...	...	...	...	...	...	...	...	
	Average per cent. ...	52·5	38·8	38·2	40·5	52·5	45·4	45·0	43·6	

SURVEYOR CLASS.

Abstract of Marks.

Rank.	Names.	I. Chain, Compass and Plane Table.	II. Levelling.	III. Theodolite Surveying.	IV. Topographical Drawing.	V. Drills and Exercises.	Total.	Remarks.
	Maximum Marks ...	255	215	200	280	50	1,000	
	College Students.							
1	M. V. Sivasubrahmanya Aiyar ...							
2	K. Kalothunga Pillai ...							
3	G. N. Ramaswami Aiyar ...	179	142	165	177	33	706	
4	D. Francis ...	190	175	150	213	28	705	
5	K. Rajagopalachari ...	153	130	147	188	33	681	Passed Second-class.
6	E. V. Venkataramma Dikshatar ...	210	122	124	171	53	663	
7	T. R. Swaminatha Aiyar ...	187	108	129	213	23	660	
8	E. R. Aiyaswami Aiyar ...	179	111	133	176	30	629	
9	K. Venkataramana Aiyar ...	154	126	140	175	25	614	
10	M. A. Vaidyanatha Aiyar ...	145	121	126	183	35	610	
11	E. S. Venkataramma Aiyar ...	141	141	151	151	25	609	
12	Saiyid Abdus Salam ...	166	111	141	166	23	607	
13	C. Jagga Rau Chetti ...	160	110	132	173	27	602	Passed Third-class.
14	T. V. Ramachendra Rau ...	186	107	118	169	16	545	
15	R. Sankaranarayana Aiyar ...	134	104	110	166	30	544	
16	A. Venkataramana Rau ...	120	118	142	134	16	530	
17	S. N. V. Ramabhadra Raju ...	126	112	106	151	26	521	
18	C. R. Rangachari ...	127	92	126	147	23	513	
		116	91	125	109	18	461	Failed in total.
	Average per cent. ...	108	105	96	125	26	460	
		60·7	53·7	65·8	59·1	50·0	59·2	

From the Principal, College of Engineering, Madras, to the Director of Public Instruction, dated 17th February 1893, No. 1604-C.

Adverting to your endorsement No. 828, dated 31st January 1893, on the report of the Board of Examiners, herewith returned with enclosures, I have the honour to offer the following remarks. I will first deal with the Board's general report, then make some observations on the conduct of the examinations of December 1892, and finally notice the reports of individual Examiners.

2. *Board's General Report.*—The recommendations made in the third paragraph of this report are dealt with *seriatim* as follows :—

(1) Students will be instructed to write their names legibly.

(2) Students ought invariably to adhere to the specified scales. If they fail to do so, marks may properly be deducted.

(3) Paper examinations are now given in the college, especially to the junior classes, as often as time permits.

(4) I do not concur in this proposal. The examination at the end of the first year encourages the students to work steadily, and regulates the award of scholarships. In the Surveyor class the examination is confined to a single paper on chain, compass and plane table surveying.

(5) As recommended in my No. 1573-C, dated 9th February 1893, para. 5, I suggest that the marks gained in gymnastics and drill at the end of the college course should be credited to independent candidates at subsequent examinations for which they may appear.

(6) I am of opinion that the syllabuses require reduction. A favourable opportunity will present itself when the new workshop becomes available for use.

3. *Conduct of the December examinations.*—As hinted in the fourth paragraph of my Annual Report, No. 1505-C, dated 27th January 1893, I cannot regard the

examinations of December 1892 as having been conducted in an altogether satisfactory manner. Some of the papers were too long for the time allotted, and others were of inappropriate character. Several questions contained insufficient data, or were otherwise impossible. The President showed himself very ready to alter objectionable questions, and to modify the marking in the case of lengthy papers, but much trouble and correspondence were involved, and in one case it became necessary to cancel a paper altogether, and to set a fresh one for a day not included in the programme. The various questions objected to are enumerated in an appendix to which are attached the original examination papers. The modifications in these papers agreed to by the President of the Board are shown in red ink. The errors made are for the most part traceable to two causes, viz., (*a*) absence of co-operation between the members of the Board; (*b*) want of knowledge of the nature and extent of the work done by the students. In regard to (*a*), the examination work is divided between the Examiners, who act quite independently, and who do not, it is believed, submit their papers for collective criticism. With regard to (*b*) the Examiners have the syllabuses to guide them, and perhaps the papers of the previous year; but the possibility of setting an unsuitable paper within the limits of an extensive syllabus is well known, and in the absence of acquaintance with the nature of the work done by the students, especially in technical subjects, it is inevitable that improper questions must sometimes be set. The obvious remedy lies in conference and mutual criticism. Before the papers are set, each Examiner should visit the College and ascertain the nature and amount of work done from the commencement of the session. The papers, after being set, should be considered by the Board in conference, when lengthy papers would be reduced, and unsuitable questions modified or struck out. Full solutions of all the examination papers should be before the Board during conference. Finally, when the marks for the answers have been awarded, there should be a further meeting of the members of the Board, who would then act in the capacity of moderators. Even though the members of the Board may not all be professional Engineers, those who are such are quite capable of offering an opinion on the Mathematical, Science and Language papers set, seeing that the papers constitute test suited for persons entering the superior or subordinate ranks of the Engineering profession. Reference is here requested to the appendix to this communication.

4. *Reports of Examiners.*—The faults brought to notice will be corrected, when possible, during the coming year. Some, however, are due to the recognised inferiority of the late senior divisions of the Engineer Subordinate and Draftsman classes, others are the consequence of the inappropriateness of questions enumerated in the appendix, while others again, such as bad writing, irrelevancy, and carelessness, are deeply-rooted errors which are constantly being combated in the college.

As observed by Government in its Order, dated 2nd October 1889, No. 600, Educational, and in accordance with the plan followed in connection with the annual report on the Reformatory School, Chingleput, the report for the past calendar year alone will be dealt with in these Proceedings and submitted to Government. The supplemental report bringing the record of events down to the close of the official year will, however, continue to be submitted to the Director as heretofore for information.

2. *Staff.*—Major Love resumed charge of the office of Principal in January 1892 after completing a course of instruction at the Military School, Chatham, and Mr. J. J. Whiteley, Executive Engineer, was about the same time appointed to act as Professor of Engineering during the deputation of Mr. Chatterton to the Public Works Department. Mr. Middlemast left for England in December last on six months' leave on medical certificate. M.R.Ry. C. Krishnan, Assistant Chemical Examiner, was temporarily engaged to supervise the work of the Engineer students

of the First Division in the Chemical laboratory. There were also a few changes in the *personnel* of the subordinate staff, but these do not call for any special notice.

3. *Strength.*—Excluding the students in the practical courses and the special students, there were on the rolls at the close of December last 214 against 187, 136 and 109 on the corresponding date in 1891, 1890 and 1889 respectively as per particulars in the margin. The strength of the college during the year is the highest since the re-organization. The number of admissions into the several classes, the Engineer class excepted, reached the maximum number prescribed in the rules and for which accommodation could be found. There was a marked improvement in the average attendance. In a separate communication in reply to para. 4 of the Director's review of the last report on the college, Major Love attributes the small size of the Engineer classes chiefly to the high cost of Engineering education in this Presidency, compared with the rate in other Indian institutions, and to the limited advantages held out. This matter will be dealt with separately. An analysis of the attendance given in para. 3 of the report shows that 53 per cent. of the whole number were Brahmans as against only 45 per cent. in the previous year, and that there were eight Muhammadans against two in 1891. This latter increase is encouraging. Particulars should be given in future reports of the number of students of each class of the community studying in the different classes of the college. It is to be regretted that Europeans and Native Christians were fewer than in 1891.

	Strength on the 31st Dec.			
	1889.	1890.	1891.	1892.
Engineers	17	12	11	10
Engineer Subordinates	37	47	65	77
Draughtsmen ...	18	21	40	51
Surveyors ...	12	23	32	37
Artisans ...	24	28	35	34
Military probationers.	1	5	4	5
Total ...	109	136	187	214

4. *Accommodation.*—The increasing strength of the college has rendered improved accommodation necessary, but the erection of the new buildings approved of by Government must be deferred for want of funds. Estimates for improving the accommodation and lighting in the old portion of the present buildings have been approved. There are practical difficulties in Madras in providing hostels for the accommodation and boarding of students similar to those provided in the Sibpur College of Engineering.

5. *Equipment.*—Full advantage was taken by the students of the temporary workshops and the consulting and general library attached to the college. In view of the inadequate arrangements at the Public Works Workshops for the practical instruction of students, the Director trusts that the permanent workshop will be completed and fully fitted up soon.

6. *Examinations*—(i) *University Examinations.*—The results of the B.C.E. Degree Examination held at the beginning of 1892, in which four passed out of five entrants, were noticed in the last review.

(ii) *College Board Examinations—Engineer Class.*—There has been little or no improvement in the results secured by the First division in the examinations conducted by the College Board of Examiners, except in Mathematics. In Science the average marks gained were as poor as in 1891, and those in Drawing and Surveying did not even compare favourably with those of the previous year. The Examiner in Chemistry observes that the subject was badly answered, the best student having gained only three-eighths of the marks. The Second and Third divisions, however, fared much better. Hydromechanics in the former and Mensuration in the latter should have received greater attention.

Engineer Subordinate Class.—The results of the examination of the First division were below the average and worse than in the previous year, except in Engineering and Surveying. Of Mathematics, particularly Statics and Applied Mechanics, the students did not seem to possess more than a superficial knowledge.

They are reported to have had no idea as to how to put down a Drawing on paper, and the Examiner urges the necessity of giving a few special lessons in practical Perspective Drawing in future. It is noteworthy that all the five students that failed to secure a certificate failed for deficiency in the total number of marks, and that none of the successful candidates passed in the first class. The Second division obtained only 49 per cent. on the average, which is less than that secured by the First division. The Third division acquitted itself more satisfactorily on the whole.

Draughtsman Class.—Though 75 per cent. of the students from the Senior division qualified for certificates, the majority passed in the third class and none secured a first class, thus showing that the students were, on the whole, much below the mark. The abstract marks statement appended to the report shows that the results of the final examination were more unfavourable than in 1891, except in Machine Drawing. It is observed that since 1890 the average percentage of marks has fallen from 65 to 53 (not 43 as put down in the report). The majority of failures were in Building, Drawing, and Estimating. The students were reported not to have done well in Model, Perspective, and Topographical Drawing. The results of the term examination of the Junior division were also not very satisfactory.

Surveyor Class.—Neither of the two divisions of this class acquitted itself even as well as in the previous year. The percentage of marks secured in Levelling was poor. The deterioration in Chain, Compass and Planetable Surveying is attributed by Captain Shelley to the scanty knowledge of English possessed by the class. Perhaps, the institution of an entrance test among Lower Secondary candidates might help to remedy the above defect. Government will be addressed shortly on the subject, now that it has been decided to transfer the conduct of the entrance examinations from the Board to the college staff.

The work of the college during the year, as gauged by the results of the several examinations, was not quite satisfactory. The practical knowledge of the students was below the mark, and the paper work was generally wanting in neatness of execution. The answers in general were characterised as irrelevant, vague and unduly long. Mr. Stoney observes that, in this respect, the Native students showed a marked inferiority to their European and Eurasian compeers. This tendency on the part of Native students should be checked very carefully. There is much force in Major Love's remark that the indifferent results obtained in the year were due to the decided inferiority of the students who composed some of the classes, to the inappropriateness of some of the questions, and to the undue length of some of the papers. It must at the same time be admitted that some of the important subjects, such as Mathematics, Bridgework, Estimating, Drawing, did not receive sufficient attention. The vernacular results were also inferior to those obtained during 1891. The earnest attention of the Principal and his staff should be directed to the defects brought to light. The percentages of the marks, as given in the body of the report are in several instances not correct, though they are correctly entered in the marks statement appended to it. The Director has had to notice, in connection with the bills of remuneration to the members of the Board of Examiners, that the question papers were not drawn up on any definite principles. The number of question papers set for each class and division, the length of each paper, and the number of identical questions that might advantageously appear in papers on one and the same subject set for more classes than one seem to vary each year at the discretion of the Board or the individual Examiners. The Principal and the President should discuss the matter and come to a definite arrangement, so that there may be no such variations from year to year. In this connection Major Love's suggestion that the Board should meet in conference and submit the draft question papers set to mutual criticism before they are finally accepted fully meets with the Director's approval and should be acted on henceforward.

(iii) *Government Technical Examinations.*—Of the students that appeared voluntarily for the Government Technical Examinations in various subjects, 28 passed the Intermediate and six the Elementary Examinations. Information has not been furnished as to the number of entrances for these examinations.

7. *Independent candidates.*—The results of the independent candidates at the examinations held by the Board of Examiners are compared below with those of 1890 and 1891 :—

Examinations.	1890.		1891.		1892.	
	Number registered.	Number passed.	Number registered.	Number passed.	Number registered.	Number passed.
For Engineers	2	1	1	...	2	...
„ Engineer Subordinates	5	1	1	1	1	1
„ Draughtsmen	6	6	7	3	8*	1
„ Surveyors	3	1	4	2	...	...

* Two were absent from the examination.

As might be expected, the results of the examinations were generally very poor, and those of the draughtsman candidates especially were almost a total failure, being much worse than in the previous year. The fact that the independent candidates, unlike the college students, are subjected to examination in all the subjects of the full course and their careless preparation account for these unfavourable results.

8. *The Maistry and Artisan class.*—This class was popular. Surveying continued to be taught during the year as an extra subject, and it is hoped that the Principal will find it possible to continue the arrangement. The results of the pupils of this class who went up for the Government Technical Examinations of April 1892 should have been adverted to. The question of introducing a final test will be considered with that of instituting admission tests for the Draughtsman and Surveyor classes.

9. *Practical Courses.*—All the classes except the Draughtsman class were taken to Guindy and Guduvancheri to receive instruction in field-work. Many important works were also visited. The practical instruction during these excursions does not seem, however, to have been well directed, if one may judge from the complaint of the Examiners that the practical knowledge of the students in several subjects was but superficial. Two students of the batch of December 1891 have elected to become Mechanical Engineers and their progress at the Madras Railway Locomotive Workshops is favourably reported on. One of the unsatisfactory features of the report is the insufficient progress made by the Civil Engineer and Engineer Subordinate students in the Public Works Workshops, in which their work is reported not to have been sufficiently supervised. The Superintendent will, it is hoped, be good enough to arrange for the students going through the full course of work prescribed in Article V (1) *b* of the College rules. It is not understood why no intimation was given to the Principal of the long absence of a Military Engineer Subordinate student from the workshop owing to ill-health. The workshop course of this student should, the Director considers, be extended by the period of his absence. The suggestion of Major Love that the Superintendent should be requested to furnish quarterly instead of half-yearly reports to the Principal regarding the progress of the students in the Public Works Workshop meets with the approval of the Director and will be commended for the consideration of Government. This would require a slight modification of Article XI (2) of the College rules. The progress reports received from the various Divisional-officers of the Public Works Department were, on the whole, satisfactory. In view, however, of the inequality of work available in the several divisions, Government has approved the suggestion of Major Love that the students during their works course should be given some responsible work. The rules will be revised.

10. *Revision of the Rules.*—Major Love has fully dealt with this subject, and further remarks are unnecessary. He has, however, not alluded to the revision of the rules rendered necessary by the proposed redistribution of the workshop and the works courses. The draft amended rules in this connection returned by Government for further revision, but which the Director has not yet been able to attend to will be resubmitted to Government at an early date.

11. *Physical Education.*—This subject cannot be considered to have received during the year as much attention as in the previous year. There was a clear retrogression in the results in gymnastics of all except the Engineer class (First Division). Seeing how important the possession of a good physique is to the Engineer, physical education should not be left in the background.

12. *Prospects of employment.*—The Director has read with much interest the portion of the Principal's report relating to the employment of passed students. Almost all the students that completed their course in 1891 have obtained remunerative appointments. It is true that the terms under which the award of the guaranteed appointments to the best Engineer student will be made, under the recent resolution of the Government of India, are not so favourable as those in force hitherto ; but this cannot affect, as Major Love seems to think, the popularity of the Engineer class, the number of students that will suffer being restricted to one in each batch. The reduction in the initial value of the guaranteed appointment will, the Director thinks, be more than counterbalanced by the wholesome order throwing open the Overseer ranks of the Public Works Department to qualified Engineer students. It has been remarked that the supply of Engineer Subordinates has not hitherto been equal to the demand, but the Director trusts that the number of Engineer Subordinate and Engineer students will rise to meet the requirements of the service. The table in para. 26 of the report shows that the Railway Departments offered the least prospect of employment to the students of the college. It is hoped that the several Railway Companies will see their way to employ in larger numbers the indigenous talent available at a comparatively cheap rate. The fact that Local Boards do not always employ qualified candidates on their Engineering establishments has been statistically demonstrated by Major Love at the concluding portion of the paragraph above referred to. In the interest of the college and of the Local Boards themselves, the Government will be requested to impress on the latter that all vacancies under them, for which qualified men cannot be found, should be invariably filled up after reference to the Principal of the College of Engineering.

13. *Finance.*—The figures appearing under this head in the report are merely a repetition of those furnished in the supplementary report for 1891–92. The financial transactions of each month being separately available, the Principal will furnish the receipts and charges for the calendar year in future reports.

14. *General Remarks.*—In para. 3 of its report, read in these Proceedings, the Board offers certain suggestions which are considered below *seriatim* :—

(1) The first suggestion is approved. In future the Principal will see that the students write legibly their name as well as their number at the head of each answer paper, the register number of each candidate being marked on his desk in the examination hall.

(2) The importance of all drawings being executed to the scales specified should be impressed on the students As suggested by Major Love, some deduction in marks may be made for failure or neglect on the part of students to observe these instructions ; also marks may be deducted for bad writing.

(3) The Principal's remark that paper examinations are already being carried on in the college is noted.

(4) Major Love's reasons for not adopting the fourth suggestion are sound. The institution of an entrance test for the junior classes would perhaps mend matters.

(5) The Director is not prepared to accept the Board's proposal in its entirety. The importance of a good physique in any branch of service cannot be overrated. As recommended by Major Love, the Director would exempt all independent candidates from the examination in Gymnastics and Drill, crediting to them the marks gained by them while at college in the examination on this subject.

(6) It is noted that the question of revising the syllabuses is engaging the attention of the Principal.

15. In conclusion the Director is glad to note that the college has been making steady advance in various directions under the able management of Major Love.

(A true Extract.)

(Signed) D. DUNCAN,
Director of Public Instruction.

To the Principal, College of Engineering.
" Principals of other Government Colleges.
" Inspectors of Schools.
" the Superintendent, School of Arts.
" the Honorary Secretary, Anjuman, Mufidi-Ali-Islam.
" the Secretary, Victoria Technical Institute.
" the Editor, *Indian Journal of Education, Madras.*
" Government, with covering letter.

Order—dated 10th June 1893, No. 385, Educational.

Recorded with the following remarks:—

(1) The preparation of estimates for improving lighting and accommodation was authorized in G.O., dated 6th February 1893, No. 87, Educational, but the estimates themselves have not yet been sanctioned as stated in paragraph 4 of the Director's Proceedings. The reference to "the new buildings approved of by Government" which occurs in the same paragraph is not clearly understood.

(2) The report upon the proposal to institute an admission test for the draughtsman and surveyor classes and a final test for the artizan class which was promised in the Director's letter dated 26th July 1892, No. 10134, should be submitted as soon as possible and no further delay should be permitted to occur in carrying out the revision of the rules ordered in G.O., dated 28th July 1892, No. 560, Educational.

(3) The attention of the Public Works Department will be invited to the remarks in paragraph 9 of the Director's review and in paragraph 18 of Major Love's report dated the 27th January 1893. It seems obvious that the supervision exercised over the students under instruction in the Public Works Workshop has been very lax. The proposal that the Superintendent of that institution should be required to submit quarterly instead of half-yearly progress reports to the Principal of the College is approved and the necessary amendment will be made in the rules when the revised draft referred to in the preceding clause is prepared by the Director.

(4) The Director's remarks on the subject of the employment of unqualified men by Railway Companies and local bodies in paragraph 12 of his review will be considered in the Public Works and Local and Municipal Departments, respectively.

(5) The Government concurs generally with the views expressed in para. 14 of Dr. Duncan's review.

(6) With respect to the remarks in paragraph 20 of Major Love's report dated the 27th January 1893, regarding the appointment of Engineer students to first and second-grade overseerships, it is understood from paragraph 3 of his review that the Director intends to address Government separately on the subject. A copy of the revised calendar referred to in paragraph 22 of the same report should be submitted for the information of Government.

(7) On the whole the report for 1892 is satisfactory. The Educational qualifications of the students as tested by the College examinations leave indeed much to be desired, but the institution is obviously increasing rapidly in popularity. The

conspicuous ill-success of independent candidates for draughtsmen certificates may be due in part to the causes referred to in G.O., dated 16th May 1893, No. 330, Educational.

[Here enter letter No. 386, dated 10th June 1893].

(True Extract.)

for Chief Secretary.

To the Director of Public Instruction.
" Public Works Department.
" Local and Municipal Department.
Editor's Table.

Exd. W. H. French.

P. W. CURRENT No. 5687

Govt. of [1893] Madras.

EDUCATIONAL.

Issued 10.5.93

Recd. 23.6.53 Encl.

G.O., 10th June 1893, No. 385.

JUNE.

College of Engineering.

Reviewing the report on the — for the year 1892.

PUBLIC WORKS DEPARTMENT.

No. 1829 W. dated 12th July 1893.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

READ the following

(Direct (with Typo: of Dept. of Govt. Educational septt (H.E. No. 385 dated 10th June 1893)

Communicated to officers of the P. W. Department for information.

2. The consulting Architect will expedite the submission of the estimate called for in G.O. No. 3644 W dated 9th February 1893 for improving the lighting and providing extra accommodation in the old building of the College of Engineering.

3. With reference to para 3 of the order in the Educational deptt: the General Superintendent P. W. Workshops will report whether the practical

practical instruction of students in the workshops cannot now be more closely supervised, the appointment of a European foreman to the Workshops having been sanctioned. The General Superintendent will see that he should in future submit to the Principal of the College quarterly instead of half yearly reports on the progress of the students. The General Superintendent has already been called upon for an explanation with respect to his failure to report to the Principal the prolonged absence from sickness of a military student, and his reply should be expedited. The appointment to the P.W. deptt. of the Military student in question (Corporal G. Blake) as

× P. W. d memo 2p. 451 of 31.2.93.

as an apprentice overseer has been cancelled, and the Director's suggestion that his practical instruction should be extended ~~prolonged~~ need not now be considered. (8?)

4. The subject of para 4 of the order in the Educational department will be considered in the Railway branch.

27

4-7

9.45
6.7.93

2
7.7.93

Chief Engr: for Irrigation
Consg. Engr: for Rly
Suptg. Engrs.
C. A. to Govt
S. of W. P. Project.
Educational Dept

C.No 3857

Govt. of 1893 Madras.
PUBLIC WORKS.

1317 D

Read

Read

G.O. 12th July 1893 & 1892 &c.

College of Engineering

Forwarding certain orders in connection with the Proceedings in the Edl dept covering the report of the working of the — for the year 1892

25 &c.
14

J.C. 13/VII

13/7