(1) பக்கங்களின் எண்ணிக்கை 18

(2) புதுக்கித் திருப்பிய நாள் 1/90

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம்

தமிழ்நாடு ஆவணக் காப்பகம்.

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2323/1

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

Read—the following paper :—

From H. B. GRIGG, Esq., M.A., Director of Public Instruction, Madras, to the Chief Secretary to Government, dated Ootacamund, 9th June 1890, No. O-42.

I have the honor to submit, for the information of Government, a copy of my Proceedings, No. 5439, dated 30th May 1890, reviewing report on the College of Engineering for 1889-90.

No. 5439.

Proceedings of the Director of Public Instruction, dated 30th May 1890.

Read the following papers :—

From the Principal, College of Engineering, to the Acting Director of Public Instruction, dated Madras, 31st January 1890, No. 1211.

I have the honor to submit the following review of the working of the college during the year 1889. Under the authority of Government, this and future reports will deal with the sessional (which coincides with the calendar year) instead of with the official year. A supplemental report will, however, be submitted to you in April, so as to complete the review for the official year.

2. *Changes in Establishment.*—On 5th February I returned from furlough and took charge of the college from Captain C. B. Henderson. On 10th June the temporary Second Assistant Instructor in Surveying, Mr. S. Gopalachari, B.C.E., resigned in order to take up an appointment in the Madras Survey. His place was not filled up during the year. On 1st July Mr. Tims, Assistant Instructor in Surveying, resigned, and was succeeded on 1st August by Mr. J. E. A. D'Cruz, B.C.E., from the Madras Survey. On the latter date the Bricklaying Instructor, P. Nadamuni Mudaliyar, was pensioned, and T. N. Govindaswami Rau, from the South Indian Railway workshops, was appointed Instructor in Carpentry and Fitting. The Librarian and Storekeeper, C. K. Subrahmanya Aiyar, B.A., resigned on 18th November, and was succeeded by C. Varadaraja Aiyangar, Second Clerk, who had been acting for him during the previous six months. Mr. Pope, the Assistant Instructor in Drawing, was in hospital from 1st November, and Mr. Hamilton, Instructor in Surveying, from 5th December, both until the commencement of the Christmas vacation.

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

—	First Division.	Second Division.	Third Division.	Total.
Engineer class	9	3	5	17
Engineer Subordinate class ...	9	7	21	37
Military Probationer	1	...	...	1
Draftsman class	10	8	...	18
Surveyor class	3	9	...	12
Artizan class	24	...	...	24
			Total ...	109

The numbers arranged by classes of the community were—

Europeans and Eurasians	15
Brahmans	37
Hindus, other than Brahmans	47
Native Christians	10
Mussalmans	...
Total ...	109

The diminution in the numbers, which took place after my departure on furlough in 1887, was referred to in my previous report, where the causes of the decrease were explained. Signs are not wanting that the cycle of depression is now at an end. In August 1889 a division of Engineer Subordinates joined, twenty-one in number, or more than double the strength of each of the divisions of the two preceding years. In November a large number of applications was received from qualified candidates for the Draftsman and Surveyor classes, and the strength of the new divisions will be about twenty in the Draftsman class and as many in the Surveyor class. The new division of the Engineer class will be, I fear, but small. The total numbers in the college on this date are 125, including the Artizan class; and I expect that by August next, when a new division of the Engineer Subordinate class will join, the numbers will have risen to 145. The effects of the depression are, however, visible this year in the smallness of the classes passing out, and they will continue to be noticeable during 1890. The conduct of the students has been uniformly good.

4. *Examinations.*—The Board of Examiners conducted the final and term examinations of all the classes in December 1889. A brief abstract of the results is given below:—

5. *Engineer class.*—The four students who passed out in December 1888 joined the Public Works Workshops, and served throughout the year in the carpenter's, smith's and fitting shops. At the end of 1889 three of them were posted to works for their final year's practical course. The remaining student, who elects to become a mechanical engineer, will undergo his fifth year's training in workshops. It is hoped that arrangements may be made for him to join the Madras Railway shops at Perambúr.

Of the three divisions of the Engineer class actually at the college, the first, consisting of nine students, joined in January 1887 and underwent final examination in December last. Seven passed, a result which I regard as very satisfactory. The successful students are of nearly uniform merit, the difference in the marks between the first and seventh being only 3 per cent. of the total. The average percentages of the whole division in the various subject heads were as follow:—

	Per cent.
Mathematics	52
Science	68
Engineering	52
Surveying	61
Drawing	58
Language	51
Physique	81
Total	53

The senior pupil is G. R. Venkatarama Aiyar, who will receive the gold medal awarded to the most distinguished student. 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. To the second student on the list, V. T. Srinivasa Aiyangar, falls the prize for *Mathematics* and *Science*, an aneroid barometer. R. Everard, who stands third, gains the prizes for *Engineering*, a planimeter, and for *Surveying* and *Drawing* a clinometer rule. The next places in the class are occupied by K. Ramaswami Aiyar, C. S. Venkatarama Aiyar, V. Rangaswami Aiyangar, and P. A. Venkatarama Aiyar. V. Rangaswami Aiyangar would have stood higher but for a serious illness which he

232/2

suffered from prior to the examination. A prize for *Workshop practice*, a set of Engineers' scales, falls to V. Rangaswami Aiyangar, who ran Everard very close in Engineering. In *Gymnastics* R. Everard and K. Ramaswami Aiyar are equal with full marks, and a prize, of an ivory two-foot rule, is therefore awarded to each. The successful students of this division will now join the Public Works Workshops for a year's practical training.

Three independent candidates, who were formerly college students, also appeared for the final examination, and one of them, V. Anantanarayana Aiyar, was successful. He will proceed with the first division to the workshops.

The second and third divisions of the Engineer class, which joined during the period of depression already alluded to, contain three and five students, respectively. They have undergone term examinations, the marks of which count towards the final total. The second division, which obtains 49 per cent. of the total marks, has, with the exception of one student, A. V. Ramalinga Aiyar, done indifferently. The third division, which secures 61 per cent., contains promising material. The first man is L. D. Venkatarama Aiyar. Both the students named gain scholarships of Rs. 30 for proficiency.

Eight candidates passed the entrance examination for the Engineer class in December last, and should join the college early in 1890.

6. *Engineer Subordinate class.*—Of the fourteen students who passed out in December 1888, all but one joined the Public Works Workshops, where they have been working during 1889. At the end of the year they were posted to works for their final year's practical course.

Of the three divisions of the Engineer Subordinate class actually at the college, the first, consisting of nine students, joined in August 1887, and appeared for final examination in December last. Of the nine students only two were successful, a result which, though not unforeseen, is very unsatisfactory. The material of the division was below the average, and it was unfavorably criticised in my report for 1888. The average percentages of marks gained by the class were—

Mathematics	32
Engineering	33
Surveying	56
Drawing	48
Language	56
Physique	81
Total	45

The two successful students, C. J. Mani and C. L. Venkatanarasayya, have, however, done well, gaining 68 and 60 per cent., respectively, of the total marks. Mani indeed has displayed great proficiency, and will receive the college silver medal, a prize for *Mathematics*, a steel tape, and one for *Engineering*, *Surveying* and *Drawing*, consisting of a silver watch. These two men will now join the Public Works Workshops for a year's practical training. One of the unsuccessful students is a Military man, who must revert to his regiment. Had he passed, he would have gained a prize for *Gymnastics*.

Three independent candidates, who were formerly college students, also appeared for the final examination, and one of them, P. Subrahmanya Aiyar, was successful. He will proceed with the first division to the workshops.

The second division of the Engineer Subordinate class joined during the cycle of depression. It contains only seven students. The material, however, is far superior to that of the first division, as is indicated by the fact that it secured an average of 61 per cent. of the total marks at the December term examination. Two military students, Private G. E. Brand and Sergeant C. J. Smith, specially distinguished themselves. Private Brand will receive a prize of a military compass for general proficiency. The scholarships of Rs. 10 are secured by W. T. J. Scanlon and M. S. Venkatarama Aiyar. Sergeant Smith distinguished himself during the year by passing the High Proficiency Test in Tamil.

The third division, consisting of twenty-one students, joined last August. One was absent on account of sickness from the term examination of December last. The class has done well, obtaining an average of 59 per cent. of the total marks.

Corporal G. Blake, S. Iswara Sastri and S. Dakshanamurti are specially commended. The scholarships fall to the two natives above mentioned.

7. *Draftsman class.*—The senior division, consisting of seven students, appeared for the final examination in December last. Five were successful in gaining certificates, one, T. A. Muthukrishna Nayudu, a certificate of the "second class," and the remainder of the "third class." The student who takes the first place is A. K. Sethu Rau with 79 per cent. of the total marks. But for low credits which he received in *Freehand*, *Model* and *Perspective Drawing* at his first term examination, he would have secured a "first class" certificate. He gains the college bronze medal for general proficiency in Drawing, and is awarded a prize, consisting of a pillar compass, for *Building* and *Topographical Drawing*, *Machine Drawing* and *Estimating*. The percentages gained by the division in the various subject heads were as follow :—

Practical and Descriptive Geometry	72
Freehand, Perspective and Model Drawing	53
Building and Topographical Drawing	75
Machine Drawing	53
Estimating	54
Total	61

Independent candidates to the number of twelve also presented themselves for the certificate examination. Five of these passed, viz., one for a "second class" and four for "third class" certificates. Several of these candidates were virtually college students, having been allowed to continue their studies as private candidates after having failed at their first term examination. The average total percentage obtained by the independent men was 45.

The second division of the Draftsman class contained eight students, and is composed of material above the average. The mean percentage of the division at the term examination of December 1889 was 68 per cent. S. Subrahmanya Aiyar is *facile princeps*, having scored 97 per cent. of the total marks. He is awarded a special prize of a rolling parallel rule. The scholarships of Rs. 8 fall to S. Subrahmanya Aiyar and M. V. Srinivasa Aiyar. Twenty-three candidates have been accepted for admission to the new junior division, which will be formed early in 1890.

8. *Surveyor class.*—In the senior division there were only three students, of whom two passed the examination—one in the second class and one in the third. The first man is B. S. Ranganayakulu Nayudu, who obtains 73 per cent. of the total marks. He gains the college bronze medal for proficiency in Surveying, and is awarded a prize consisting of an optical square. The percentages gained by the division in the various subject heads were as follow :—

	Per cent.
Surveying with chain, compass and plane table	62
Levelling	68
Theodolite Surveying	47
Topographical Drawing	53
Total	56

One independent candidate presented himself, and was successful in obtaining a "third class" certificate. He secured 59 per cent. of the total marks.

The second division of the Surveyor class contains eight students. The average percentage for the division was 53. K. S. Vyasa Rau is easily first in the term examination with 88 per cent. The scholarships of Rs. 8 fall to K. S. Vyasa Rau and G. Gopalaswami Nayudu.

Twenty-one candidates have been accepted for admission to the new division of the Surveyor class, which will be formed early in 1890.

9. From the above analysis of the results of the recent examinations it will be seen that, although the classes dealt with have generally been exceptionally small, a very fair measure of success has been attained. In the Engineer class the first division, which is moderately strong, may, considering the severe nature of the examination and the range of subjects studied, be classed as good, the second division as fair, and the third as good. A conspicuous example of failure is the first division

2323/3

of the Engineer Subordinate class, which is bad. The second and third divisions, however, are both good. In the Draftsman class, the first division is good, and the second very good. The divisions of the Surveyor class are only fair.

10. There are, however, other directions than those which directly meet the eye of the examiner, in which the college has made progress during the year. These will now be briefly referred to.

11. *Artizan class.*—A class for artizans and maistries was opened in February 1889, with twenty-six students, and was held from 6 P.M. to 8 P.M. every working day. Instruction was given, partly through the medium of English and partly of the vernacular, in Arithmetic, Mensuration, Building Construction and Plan Drawing. No examination was held, but attendance certificates will be granted. The class is a popular one, and a large number of applications has been received for 1890. Admission will be restricted, as far as possible, to persons of the artizan class.

12. *Surveying.*—From February 1889 a whole day each week was devoted by each class to out-door work. The Surveyor class gave two days per week. Formerly field work was executed in the mornings only. The effect of the change has been to treble the amount of work turned out by each survey party, and to vary the country over which the surveys are executed. During the year parties have been working at St. Thomé, Mylapore, Black Town, Teynampett and Saidápet. The senior division of the Engineer class executed a Trigonometrical survey at Guindy under Sergeant Goddard, and the second division ran some 15 miles of levels under Mr. D'Cruz. Attention has been paid to plane table work, and the classes have been practised in Hill-shading.

13. *Laboratory work.*—From August 1889 instruction in Practical Chemistry was given to the Engineer class by the Professor of Engineering, Mr. Chatterton, who prepared and printed notes and tables for the use of the students. The class was practised in qualitative analysis, and was examined practically in December.

14. *Workshop Course.*—The year 1889 was the first in which the course of practical training, prescribed under the new rules for successful students of the Engineer and Engineer Subordinate classes, was undertaken. Colonel S. C. Clarke, R.E., the General Superintendent, Public Works Workshops, reports as follows :—

"All the seventeen students, although classified as Engineers and Engineer Subordinates have been treated alike, and each one has been passed through the several shops in turn, viz., the smithy, carpentry, machine and instrument shops, winding up his course with learning how to manage the working of a stationary engine. The students first executed sketches of machinery; they were then instructed in the use of drilling and turning machines, and made to execute in iron various articles, such as screwed rods, nuts, callipers, blacksmith's squares and ornamental shafts. In connection with carpentry they were taught how to make tables, boxes, door and window frames, and to turn on the lathe ornamental table legs, &c. In the smithy they made bolts and rivets, and practised welding and rivetting. In the instrument shop they were shown how to take to pieces and set up theodolites, levels and prismatic compasses, and to turn brass screws, &c., suitable for those instruments. Finally they were put through a course of engine driving, each student taking charge of one or other of the engines for three days. The outturn of work has been variable; but on the whole I think I may say that it was good. The students generally preferred the carpentry work, and executed it more satisfactorily than the iron work. Their conduct has been uniformly good."

15. *College Workshop.*—With the view of early accustoming students to the use of tools and to habits of precision, as well as of diverting their minds to more practical channels from the purely academic grooves in which they travel prior to the commencement of technical study, a small workshop was established in the college during the year. Carpenter's and fitters' benches and tools, a lathe, grindstone, portable forge, &c., were purchased; a young native instructor was provided through the good offices of Mr. Crighton, the Locomotive Superintendent of the South Indian Railway, and work commenced in August after the long vacation. Three divisions of the Engineer class and two of the Engineer Subordinate class have since been under instruction, and many of the students have shown considerable aptitude as regards both carpentry and iron work. Time was found by using the weekly holiday and the early mornings. One or two divisions of a class attend as a rule each day of the week. Sir John Fowler, who inspected the

college during the year, laid stress on the importance of having workshops attached to an Engineering College. Complete plans and estimates for permanent shops and an experimental laboratory, to be erected at the south end of the college buildings, were accordingly drawn up by Mr. Chatterton. These have been forwarded for sanction.

16. *Practical work at the College.*—It will be seen from the above remarks that much has been done during the year by the workshop, by the chemical laboratory, and in survey practice to give the students' habits a more practical bent. With the same object the Professor of Mathematics, Mr. Middlemast, has made use of Willis' large experimental apparatus in teaching mechanics, the students being utilized to build up the parts and to assist in the experiments. Numerous inspections have been made of factories and of engineering works in progress. Sketches are made by the students on these occasions, and are submitted with brief reports. The following works among others were visited: Pallávaram quarries, Government brickfields, Lime kilns, Portland Cement works, New High Court, Victoria Hospital, Red Hills Water works, Public Works Workshops, Gun Carriage Factory, Railway Terminal Workshops and Perambúr Locomotive shops. Cement testing has been practised in the college, the students making the briquettes themselves. The Draftsman class has been exercised in preparing drawings from actual measurements, plans of the cricket pavilion, a masonry bridge over the canal, and a girder bridge on the South Indian Railway Beach extension having been executed in this way. Specimens of the drawings done by the different classes are exhibited on the tables.

17. *System of Marks.*—To encourage the various kinds of practical work referred to above, it is necessary that marks should be awarded. From the nature of the work, these marks can only be given by persons who have the students constantly under observation, *i.e.*, by the Principal and Professors. The Board of Examiners can inspect and check these marks in some few instances, but they cannot award them. When the work is of such a nature as to be open to inspection, its amount is generally too great for examination by a Board. For example, with even the small number of students in the college in 1889, the number of finished drawings executed was no less than 2,400. The prospect of marking these would make the stoutest-hearted examiner quail. At present the college awards one-tenth of the total marks to the senior classes and one-fifth to the junior; and I am of opinion that to give suitable credit to the practical work now done in the institution, these proportions should be doubled. In this view the Board of Examiners is, I believe, in accord with me.

18. *Models and Apparatus.*—Allied to the encouragement of practical work, is the provision of models, instruments and apparatus. During my absence on furlough, little or nothing was obtained, but this year a substantial increase in the stock has been effected. A supply of surveying instruments has arrived, including a transit theodolite, with Dalrymple-Hay's curve-ranger attached; a variety of meteorological instruments, and a cement-testing machine; a Whitworth's surface plate and standard gauges, and a number of models for teaching machine construction have also been obtained. Mr. Carter, the Chief Engineer of the Madras Railway, has constructed for the college a model in zinc of one span of the new Chitrávati bridge on the North-West line, and Mr. Trevithick, the Acting Agent and Manager, has kindly supplied several full-size machine details, such as spur and bevel wheels, connecting rod ends, plummer block, axle box, valves, &c. I take this opportunity of publicly thanking these two gentlemen for their kindness. The new model room and museum could not be utilized until late in the year for want of railed-off space. Handsome iron railings have now been provided, however, and the new room proves a great convenience.

19. *Physical Training.*—From the commencement of the year the number of gymnastic attendances was increased for the Engineer and Engineer Subordinate classes, and after August attendance was made compulsory also for the Draftsman and Surveyor classes. Improvements were made to the gymnastic apparatus, and good marks were obtained at the examination. A new tennis court was applied for, and will be constructed early in 1890.

2323/9

20. *Library and Reading Room.*—The library was transferred to a more commodious room, and a students' reading room was provided, which is duly appreciated. The library contains a total of 2,567 volumes and 2,543 books were taken out during the year by masters and students, exclusive of works consulted in the reference library. A case of standard plans was transferred to the library, where it is open for reference by students.

21. *Calendar.*—A calendar was compiled for the first time, giving the rules, the courses of instruction, examination papers, lists of passed students, and a variety of information regarding the college. The book is of value to masters and students as well as to Government departments. It aids also in enabling the college to keep in touch with other technical institutions both in England and in the East. During the Christmas vacation, I was able to compile from the Goevrnment records a history of the college, which will find a place in the calendar for 1890, now in the press, and which will, I trust, help to create in past and present students a deeper interest in the institution which gives or has given them their technical education.

22. *Syllabuses.*—The college syllabuses have been thoroughly revised in communication with the Board of Examiners, such subjects as Machine Drawing, Freehand, Model and Perspective Drawing being included for the first time. The syllabuses have received the approval of Government.

23. *Prizes and Endowments.*—Rajah Sir T. Madhava Rau, K.C.S.I., has generously offered a sum of Rs. 1,500 for the endowment of three annual prizes of Rs. 20 each, to be awarded for proficiency in some branch of practical training. The sanction of Government has been asked to the acceptance of this munificent offer.

A sum of Rs. 600 has been subscribed by old students of the "Second department," as the Engineer Subordinate class was formerly termed, to found an annual prize of books as a memorial of the Principalship of Major-General H. T. Rogers, Royal (late Madras) Engineers, my immediate predecessor. The "Rogers' Prize" will be awarded from and after 1890 to the most distinguished student of the Engineer Subordinate class.

On my return from furlough in February 1889, I found that no preparations had been made for a public day by ordering prizes, striking medals, preparing diplomas, &c., so that unfortunately no public distribution could then be held. Simple engraved medals of different sizes, in gold for the Engineer and Engineer Subordinate classes, and in silver for the Draftsman and Surveyor classes, were issued as early as possible, together with the prizes and certificates. Engraved medals, however, seem beneath the dignity of an institution which can trace back its history for nearly a century, and sanction was obtained to the preparation in England of a pair of dies for a college medal, which is to be of gold for the Engineer class, of silver for the Engineer Subordinate class, and of bronze for the Draftsman and Surveyor classes. An appropriate design for the obverse was prepared by the artistic hand of Colonel W. S. Hunt, while the reverse shows the royal arms. I take this opportunity of thanking Colonel Hunt for his kindly rendered service, and express the hope that his work may long remain a memorial of that talented officer. The dies have been executed by Mr. John Pinches of London, and the first supply of medals is expected in February 1890.

The prizes awarded this year, to the value of Rs. 200, consist, as usual, of instruments. A copy of Molesworth's pocket book is again presented by Mr. Narayana Conythan, an old student of the Engineer class. The book falls to G. R. Venkatarama Aiyar, the senior student in that class.

24. *University Examination.*—Two students of the first division of the Engineer class passed the B.C.E. Degree examination during their college course. The remaining seven presented themselves in January 1890 in company with six students of former years. The results of the examination will be mentioned in my supplemental report.

25. *Employment of Passed Students.*—For several years an employment register has been maintained with the view of assisting passed students to appointments, but the information volunteered by the men proved but meagre. Accordingly

forms have been circulated this year to the Engineer and Engineer Subordinates of 1885 and 1886, and to the Draftsmen and Surveyors of 1887-88, to be filled up and returned. The numbers of forms sent were 16, 73, 14 and 20 to the men of the above classes, respectively, and the corresponding numbers of replies received were 9, 46, 11 and 18. All the students from whom replies were received proved, with two exceptions, to be in employment. The Engineers were, with one exception, drawing salaries ranging from Rs. 100 to Rs. 250. Of the Engineer Subordinates nineteen were on salaries above Rs. 50, twenty-one between Rs. 25 and Rs. 50, and five on Rs. 25 or under. All the Draftsmen, with one exception, received Rs. 50 or under. Of the Surveyors, four drew salaries above Rs. 50, and fourteen Rs. 50 or under. All the above were net salaries; the allowances were in many cases half as much in addition.

As regards the employing agencies, the Public Works Department entertained thirty-nine of the men who furnished replies, Native States twenty-three, Local Boards ten, the Madras Survey six, Railways three, and the Educational Department one.

25. *Prospects of Employment.*—No Engineers nor Engineer Subordinates completed their practical course during the year under review, so that no permanent appointments of such to the Public Works Department can be expected during 1890. Consequent on the college theoretical course for Engineers being extended under the new rules from two years to three, the guaranteed appointment for 1887 could not be conferred in that year. Government accordingly determined, with the sanction of the Government of India, that the batch leaving the college in December 1888 should be given two appointments instead of one. Subsequently it was decided that these appointments should not be conferred until the termination of the practical course, the effect being that the college curriculum has been extended not from two years to three, but from two to five, so that three guaranteed appointments, viz., those for 1887, 1888 and 1889, would lapse. The first of these three has already been made good in the manner described, and it is hoped that Government, having recognized the principle that appointments which lapse in consequence of the extension of the period of training shall subsequently be restored, may be pleased to confer in 1892 an additional appointment on the batch of Engineer students now quitting the college, leaving the third appointment for a subsequent year. A separate communication has been addressed to you on this subject.

For the Engineer Subordinate class, the number of vacancies as Overseer in the Public Works Department, available in 1891 for the 1888 batch, has been announced as three. The number available in 1892 will probably be at least as many. In view of the difference in number between the passed students of 1888 and those of 1889, viz., fourteen and two, respectively, it is hoped that it will be found possible to confer a larger number of appointments than three on the earlier batch.

The Madras Survey Department has, since the college course in Surveying was adapted to meet its requirements, opened its doors to passed students. Three Engineer class men have during the year been appointed Sub-Assistant Superintendents on Rs. 100, while Surveyor class students are being accepted on Rs 50 as fast as they can be turned out. The Superintendent of the Survey recently notified ten vacancies to me, but only three Surveyors have qualified during the year.

For some years past all Gazette notifications and Public Press advertisements regarding vacancies for qualified men have been posted, as they appeared, on the College Notice Board, with the object of assisting students to obtain employment. Judging from the number issued during 1889, there is no lack of suitable work to be had. On collecting these notices, I find that there were four vacancies for Assistant Engineers under Local Boards, sixty-four for Engineer Subordinates (viz., twenty-four in the Public Works Departments of Madras, the Central Provinces, and the Straits Settlements, thirty-eight under Local Boards, and two under Native States); twenty-nine for Draftsmen (viz., twelve in the Public Works Department, five in Railways, six under Local Boards, and six others); and forty-four for Surveyors (viz., fourteen in the Public Works Department, twenty in the

Survey, and ten others). Making due allowance for repetitions, it is clear that there is at present an ample field for the employment of as many students as the college can train.

General Remarks.—In concluding this report, I will observe that although we have had generally only small divisions to deal with, and although one of these divisions fared conspicuously badly, yet an improvement is noticeable in the examination results on those of the previous year. In other directions than those which can be directly tested by examinations, I venture to say that considerable progress has been made. The year under review is the first complete twelve-month in which the new Professors of Engineering and Mathematics have been at work. The importance of their appointment I cannot over-estimate. In previous years the whole of the Engineering instruction of the highest class in the college devolved on the Principal, and he was so fully occupied with this duty and with general administration, that efficient supervision of the work of the junior classes was impossible. With the present staff, the Principal is able to devote more time to what is perhaps the most important of his duties. I take this opportunity of thanking the Professors for their assistance and co-operation, and I acknowledge also the aid of the junior staff, among whom I have particularly to notice the Assistant Instructor in Surveying and Drawing, Sergeant Goddard, and the Librarian and Storekeeper, C. Varadaraja Aiyangar, who have, each in his capacity, done specially good work. I also express my thanks to the President of the Board of Examiners, Captain Baddeley, for his cordial co-operation with me in regard to the arrangement of the programme of examination and the distribution of the marks. The year under review is the first in which the re-organized college has been in full working order. Great changes, which have been pending for nearly ten years, have been at last effected. All that the institution now requires is a fair trial of the new scheme of training. The effects of that scheme will not be visible on the country for five or six years to come. For that period, at least, I ask that no extensive changes be made. We have now all that I looked forward to when I assumed the Principalship in 1880—we have sound practical courses of instruction, we have a good staff, convenient buildings, and an independent Board of Examiners. What the college now needs is rest for assimilation and development.

From the Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 18th April 1890.

My No. 1211, dated 31st January 1890, supplied the report on the working of the College of Engineering for the sessional year 1889, viz., from 1st January to 31st December. I have now the honor to furnish the supplementary matter which is needed to bring my record down to the close of the official year 1889-90.

2. *Establishment.*—On 16th January 1890, the post of Second Assistant Instructor in Drawing was filled up for the first time by the appointment of Mr. W. C. H. Littlewood, who joined on that date from the Burma Public Works Department. Two days later Mr. R. A. Bhakya Mudaliyar, formerly a Supervisor under the Coimbatore Local Board, assumed the duties of Second Assistant Instructor in Surveying.

3. *Members.*—The numbers on the rolls on 31st March 1890 were—

—	First Division.	Second Division.	Third Division.	Total.
Engineer class	4	5	4	13
Engineer Subordinate class ...	7	21	...	28
Military Probationer	1	...	...	1
Draftsman class	8	17	...	25
Surveyor class	8	21	...	29
Artizan class	30	...	...	30
			Total ...	126

The next entrance examination for the Engineer Subordinate class will be held in May, and admission will take place in the following August. Down to this date, twenty-six applications have been received from Civilian-Matriculates, and five from Military candidates, so that a substantial "third" division may be expected for this class. The numbers above quoted show that the college is rapidly regaining the popularity it lost during 1887 and 1888.

4. *Attendance.*—During the year 1889-90, the percentage present of the total numbers on the rolls was 94 for the College department, and 92 for the School department. Towards the end of March the influenza epidemic made its appearance in the institution, and the year 1890-91 commenced with a large number of students on the sick list. This matter will be referred to in my next annual report.

5. *B.C.E. Degree Examination.*—Of the nine students forming the first division of the Engineer class in 1889, two had passed the Degree examination before completing the college theoretical course. The remaining seven presented themselves in January 1890. Of these three were successful—one in the second class and two in the third, viz., V. T. Srinivasa Aiyangar, second class, V. Ramaswami Aiyangar, third class, P. A. Venkatarama Aiyar, third class. The total number of passes for the senior division is therefore five out of a possible nine, or 55 per cent. One of the unsuccessful candidates at the examination of January 1890 appeared in the Mechanical Engineering branches VII and VIII. This is the first occasion on which these branches have been taken up. Six independent candidates presented themselves for the Degree examination, all of whom were old students of the college. One of these passed, viz., C. Kanakasuriyan Pillai.

These results show considerable improvement on those of the previous year, but they should have been better than they are. The failures are understood to have taken place in the Mathematical branches of the examination, and not in the Engineering branches as is usually the case. I attribute the absence of better results in Mathematics to two causes—(*a*) the circumstance that the examiner who was specially entrusted with the Mathematical papers for this examination failed to submit them, and the work was consequently thrown at the last moment on an examiner who was not an Engineer; (*b*) the fact that under the new college curriculum the majority of the Mathematical subjects are finally disposed of at the end of the second year of study. Beyond drawing to the notice of students the importance of keeping up their Mathematical studies, I do not consider that any special action is necessary.

6. *Victoria Stipendiary students.*—Three scholarship-holders of the Victoria Technical Institute were specially admitted in January 1890 for a year's technical course. They will present themselves eventually for the Higher Examinations in Science, Art and Industries in the technical subjects *Surveying and Levelling*, *Mensuration* and *Plan Drawing from Specification and Estimate Making*. They divide their working hours between the Draughtsman and Surveyor classes, and being, as school teachers, men of considerable intelligence, who have but a limited time in which to acquire proficiency in the subjects they have chosen, they serve as a spur to the ordinary students of the classes referred to. The experiment of admitting them to the college outside the regulations has thus proved of distinct advantage.

7. *Prizes and Endowments.*—In para. 23 of my main report it was stated that Raja Sir T. Madhava Rau, K.C.S.I., had generously offered the sum of Rs. 1,500 for the endowment of three prizes for proficiency in branches of practical training. The offer has since been accepted by Government, and a promissory note for the amount has accordingly been purchased.

8. *Code of Rules.*—The experience of the past three years has shown that the new rules work on the whole satisfactorily. As stated in para. 17 of my main report, however, the development of practical work in the college renders necessary an increase in the marks allotted for such work; while there are several other points in which minor changes might with advantage be made. I propose addressing a separate communication to you on this subject.

2323/6

From the President of the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated Chepák, 17th January 1890.

I have the honor to forward my report on the results of the examinations conducted by the Board, during December 1889.

2. The Board was composed as follows:—

President.

Captain W. L. Rabnsley, R.E.

Members.

Mr. G. H. Stuart, M.A.
" E. W. Stoney, M.E., M. Inst. C.E.
" W. N. Pedson, F.S.A.

Assistant Examiners.

Dr. VanGeyzel.
Mr. P. Vijiarunga Mudaliyar.

3. The examinations may be grouped under three main heads—

(*a*) Final examination of college students.
(*b*) Final examination of independent candidates for the certificates described in clauses (*b*) and (*c*) of Article VII of the College rules.
(*c*) Term examinations of college students.

4. The classes forming the groups, the number of students in each, with details of the results, in the case of final examinations, are given below:—

Group (a).

	Number in class.	Passed.	Failed.
(1) Engineer class, first division	9	7	2
(2) Engineer Subordinate class, first division	9	2	7
(3) Draftsman class, first division	7	5	2
(4) Surveyor class, first division	3	2	1

Group (b).

	Numbers registered for examination.	Passed.	Failed.
(1) Independent candidates for "Engineer" certificates.	3	1	2
(2) Independent candidates for "Engineer Subordinate" certificates	3*	1	2
(3) Independent candidates for "Draftsman" certificates.	12†	5	7
(4) Independent candidates for "Surveyor" certificates.	1	1	...

Group (c).

(1) Engineer class, second division, second year examination.
(2) Engineer class, third division, first year examination.
(3) Engineer Subordinate class, second division, examination of third half-year.
(4) Engineer Subordinate class, third division, examination of first half-year.
(5) Draftsman class, second division, first year examination.
(6) Surveyor class, second division, first year examination.

5. In group (*a*) the results show an improvement upon those of last year, except in the Engineer Subordinate class, in which the majority of the students are far below the standard required for certificates. The results of the examinations of this class lead me to believe that most of the men forming it were wanting in general education and ability, on entering the college, and consequently were unable to do justice to the instruction given to them. To sum up the results of the final examinations of the college students, I consider that the Engineer, Draftsman and Surveyor classes are satisfactory, for it must be remembered that practically there is no competition in the entrance examinations of the college, and consequently it devolves on the Board to reject, at the final examination, some men who would probably never have gained a place in the college, by competition. In making these remarks, I do not advocate any change in the rules, for no alteration in those can produce the required results, which, in my opinion, will be brought about

* One candidate was absent from nearly all the examinations.
† One candidate was absent from all the examinations

by natural causes, in a few years, as the value of the college training gradually becomes more widely appreciated.

6. As regards group (*b*), this being the first year in which independent candidates have appeared for "Engineer" and "Engineer Subordinate" certificates under the new rules, I can only remark that the results are fairly satisfactory, so far as these classes are concerned, while in the case of Draftsmen and Surveyors, there is a decided improvement, and the general conclusion to be drawn is that it is advisable to continue the system of granting "independent" certificates, without making any change in the existing rules.

7. The term examinations indicate that the students now in the college are, as a body, more capable than those who have just completed their theoretical course, the improvement being very marked in the Engineer Subordinate class, second division. As the term marks will be modified by the results of succeeding examinations, it would be useless to attempt any analysis of them, and I can merely state that the term examinations give promise of better results at the final examination of this year than have hitherto been obtained.

8. After inspecting the drawings, surveys, field and note books, &c., relating to work in the college, during the past year, I think it would be advisable to allot a higher proportion of the total marks, for such work, and doubtless the matter will be brought forward by the Principal of the college.

The first of the reports above read deals with the working of the college for the sessional year ending 31st December 1889. But in accordance with instructions given in Proceedings No. 6690, dated 10th August 1889, the Principal has submitted a supplemental report so as to bring the information given in the annual report down to 31st March 1890. The two reports together with the annual returns give all the information necessary for determining the work for the official year 1889-90.

2. Throughout the official year the college has been working in accordance with the reorganization scheme, sanctioned in G.O., No. 328, Educational, dated 27th May 1886, with a full staff of Professors and Teachers; but the changes in the teaching staff were rather more than usual. Captain Love remained in charge of the institution throughout the year, and the two Professors also were undisturbed, but there were several changes among the Assistant Instructors through sickness and other causes. The Director, however, thinks that the subordinate staff, as constituted at present, is, on the whole, more efficient than it has been for some years past, so far as general and special qualifications are concerned.

Year.	Total attendance on 31st March.
1885-86	185
1886-87	181
1887-88	93
1888-89	67 *
1889-90	96 *

* These figures exclude the number in the Artizan or Sub-Overseer's class opened in 1888-89.

3. The figures relating to attendance are encouraging. They bear out the Principal's remark that "the cycle of depression is now at an end." In the margin are noted the figures for the last five years. Including the attendance in the artizan class the number stood at 126 as against 93 in the previous year. Particulars relating to each class are given below:—

	Strength on 31st March	
	1889.	1890.
Engineer classes	17	13
Do. Subordinate classes	17	28
Military Probationers	2	1
Draftsman classes	18	25
Surveyor do.	13	29
Artizan do.	26	30
Total ...	93	126

If the number of admissions into the Engineer Subordinate, the Draftsman and the Surveyor classes continue as high as it was during the year under review the college will soon regain the strength it had in 1885-86. The Engineer class is, however, still poorly attended and Captain Love does not state whether there is any prospect of increase in attendance in this class. It must be remembered that according to the rules of the college the maximum number of admissions to the Civil and Mechanical Engineer classes is fixed at 15. It is noticeable that the class of Military Probationers has almost ceased to exist. The effect of the re-organization is already perceptible in the readiness with which passed students of the college secure employment and this has no doubt been the chief cause of the increase in strength noted above. But the demand for men educated in the college must almost wholly depend upon the general demand for persons possessing knowledge of the kinds imparted, for the college has the monopoly of such education in Southern India; still, the consideration that the men educated are possessed of good and suitable qualifications would naturally stimulate the demand.

4. The following is the distribution of the pupils according to race and creed:—

	1889.	1890.
Europeans and Eurasians	10	13
Native Christians	8	12
Muhammadans	1	...
Brahmans	29	47
Non-Brahman Hindus	42	53
Others	3	1
Total ...	93	126

As in previous years, the College department is taken advantage of almost entirely by Brahmans. Out of 13, ten were Brahmans, one a Native Christian and two Sudras. Not a single Muhammadan student is found even in the School department. The increase in the number of European and Eurasian candidates is noted with satisfaction as also that under Native Christians. As might be expected, the majority of students are of the middle classes, but there were 26 students belonging to the poorer classes in the School department. The classification of pupils according to occupation of parents does not call for any remarks except that the number of artizan pupils in the School department remained almost stationary—8 against 9 in 1888-89. The paucity of pupils of this class shows that admission to the Sub-Overseers' department is not as yet sought by the artizan class for whom this department is chiefly intended.

5. The final and the term examinations of the different classes were conducted as usual by a Board of Examiners appointed by Government, the members being—

President.

Captain W. L. Baddeley, R.E.

Members.

Mr. G. H. Stuart, M.A.
" E. W. Stoney, M.E., M. Inst. C.E.
" W. N. Pogson, F.S.A.

Assistant Examiners.

Dr. VanGeyzel.
Mr. P. Viziarunga Mudaliar.

6. At the final examination of the Engineer class nine appeared and seven passed, a very satisfactory result. In Science the students did poorly, but in other branches the results were creditable. It is noteworthy that six out of the seven successful candidates are Brahmans. The second division, which is the present first division, does not seem to be very promising. The results of the final examination of the Engineer Subordinate class, the Director regrets to find, were a total failure. Nine appeared and only two passed. The failures were chiefly in Mathematics and in

Engineering. The Board of Examiners attribute the cause to the low general attainments of the students comprising this class. The standard of admission to this class is the Matriculation examination, which is also the standard for admission to the L.M.S. section in the Medical College, regarding which section also the very same complaint has been made. Captain Love is requested to report if it is not desirable to demand a pass at the Upper Secondary examination or the First-in-Arts of the Madras University as a condition for admission to the Engineer Subordinate class. The results of the Draftsman and Surveyor classes were a considerable improvement on those of the previous year and are creditable to the instructors concerned. The Board also examined under the new rules some independent candidates for the different certificates with satisfactory results. The Director fully endorses the remarks of the Board that the system of granting independent certificates should be continued as at present. The reports of individual examiners have not been furnished as in the previous year. The President of the Board will be requested to see that this is done in future, as a knowledge of how the classes fared with each examiner is of importance. It is presumed that the examinations were conducted in accordance with the revised syllabuses approved by Government in their Order No. 750, Educational, dated 3rd December 1889.

7. The Director is also of opinion that the report should be the expression of the mind of the Board and not of the President only and that it should be signed by all the members of the Board. The orders of Government will be sought on the subject.

8. Out of the nine students in the first division of the Engineer class that appeared for their final examination in December, seven presented themselves for the B.C.E. Degree examination in January last. Out of these seven, only three were successful. Considering the high standard of the final examinations in Engineering, according to the college syllabuses, and the high average percentages obtained in the final examination of the Board (*vide* para. 5 of the President's letter), this result is somewhat unexpected even after allowing for one of the candidates who failed having appeared in the Mechanical branches. The Director will be glad to receive a further report from the Principal on the subject. The college cannot be held responsible for the results of independent candidates, of whom six appeared and only one passed. Captain Love attributes the failure partly to the low attainments of the candidates in Mathematics.

9. The general results of the college are summarized in the following extract from the report of the President of the Board :—

"To sum up the results of the final examinations of the college students, I consider that the Engineer, Draftsman and Surveyor classes are satisfactory, for it must be remembered that practically there is no competition in the entrance examinations of the college and consequently it devolves on the Board to reject, at the final examination, some men who would probably never have gained a place in the college, by competition. In making these remarks, I do not advocate any change in the rules, for no alteration in those can produce the required results, which, in my opinion, will be brought about by natural causes, in a few years, as the value of the college training gradually becomes more widely appreciated."

In these views the Director coincides. Taken, however, as a whole, the results of the College and University examinations indicate that the institution is beginning to turn out a better set of men. This opinon is in accordance with the pertinent remarks in para. 7 of Captain Baddeley's letter.

10. The class for artizans and maistries continues to be popular, but it is capable of further development. All the pupils should be trained with a view to their appearing for the Middle School examination in the optional branches, several of the tests in which (G.O., 686, Educational, dated 2nd November 1889) were especially introduced with this object in view.

11. A very satisfactory feature of the working of the college was the attention paid to practical work. In G.O., No. 3549, dated 24th April 1889, sanction was accorded for the opening of a temporary workshop so as to afford to the students facilities for practical training. The workshop seems so far to promise well,

2323/8

but no success can be attained in the combination of theoretical and practical teaching, until the workshops are organised on a suitable scale, and practical teaching throughout interwoven with theoretical. If this is necessary in the case of mechanical races like the English, how much more essential is it with races having little hereditary tendency towards mechanical pursuits? The attendance at the workshop should be made compulsory with all students. This was the condition on which its opening was approved by Government. The plans and estimates for a permanent workshop and an experimental laboratory are under consideration. Considerable attention was paid to outdoor work in surveying and inspection of public buildings in view of the development of practical work in the college. Captain Love recommends that the marks assigned for this part of the work should be increased. The Director is inclined to approve the suggestion, but it is one which requires very careful consideration, in communication with the Board of Examiners, before it can be recommended for the sanction of Government.

12. The use made of the library was satisfactory. Physical training seems also to have received greater attention during the year. The Director is glad to learn that Captain Love has been able to compile a calendar of the college, which, among other necessary information, contains a very interesting history of the college.

13. Detailed particulars are given in the report as regards employments secured by passed students. It would appear that the majority of passed candidates are now holding suitable posts. The opening of the Survey department to men trained in the college is very encouraging. The Railway departments should absorb a larger number than hitherto, now that the training in the college is more practical than it was before the re-organization. Owing to the extension of the college course for Engineers three guaranteed appointments are said to have lapsed. One of these has already been given and Captain Love requests that the other two appointments should be made good by conferring two appointments instead of one on the batches that pass out in 1892 and 1893. The contention that two appointments have been lost to the college appears to the Director to be unsustainable. The Principal's communication will, however, be submitted for the orders of Government with the Director's views thereon.

14. Three scholarship-holders of the Victoria Technical Institute are being trained in the college with a view to their qualifying for the Higher Examination in Science, Art and Industries. The Director is glad to learn that their admission has been a distinct gain to the college.

15. The Government has already recorded its thanks to Raja Sir T. Madhava Rau for his liberal endowment of three annual prizes. The Director also notes with pleasure the establishment of the Rogers prize by old students of the college.

16. The year under review has been one of progress in many ways. The improvement noticeable in the attendance, in the results achieved at the public examinations, in the development of practical work, and in other matters noted above clearly indicate that the college has passed the depressing period of transition and has entered upon a period of progress and development.

(A true Copy and Extract.)

(Signed) H. B. GRIGG,
Director of Public Instruction.

To the Principal, College of Engineering.
,, Principals of other Government Colleges.
,, the Superintendent, School of Arts.
,, Inspectors of Schools.
,, the Secretary, Victoria Technical Institute.
,, Rajah Sir T. Madava Rau, for information.
,, Government with covering letter.

Order—dated 31st July 1890, No. 549, Educational.

With his letter, dated 9th June 1890, No. O-42, the Director of Public Instruction submits the report of the Principal, College of Engineering, for the year 1889, together with the remarks of the President of the Board of Examiners. The statistics of the College, as it stood on the last day of the official year 1889-90, are also given in paragraph 3 of the Principal's supplemental report, dated 18th April 1890.

2. His Excellency the Governor in Council is glad to learn from the report before him that the serious decline in the strength of the College, which was dwelt on in last year's review, has proved to be only of a temporary character. The marginally-noted statement compares the fresh admissions made to each department of the College during 1890 with the corresponding figures for the previous five years. The comparison proves that, with the exception of the Engineer classes, the other departments have almost completely emerged from what Captain Love calls the "cycle of depression."

—	1885.	1886.	1887.	1888.	1889.	1890.
Engineer class	10	8	9	3	5	4
Engineer Subordinate class	38	25*	15	9	21	31*
Draftsman class	26	20	17	10	8	17
Surveyor class	23	10	10	4	9	21

* Estimate.

3. The continued smallness in size, however, of the most important section of the College, viz., the Engineer classes, seems to merit further investigation. The admissions made to this department during the three years beginning with 1888 have been 3, 5 and 4, respectively, against 10, 8, and 9 in the previous triennium. As regards the number of passes in this class, it is matter for congratulation that out of nine Engineer students who were examined in December 1889 on the conclusion of their theoretical course, seven were declared to have passed. Five of these have also passed the B.C.E. Degree examination of the Madras University, against two in the year 1889. The number of Engineer students who were successful at the final examinations of the College during the five years 1884—1888 were 10, 8, 7, 1† and 4, respectively.

† Special Examination.

4. The results of the final examination of the Engineer Subordinate class were far from creditable. Only two passed out of nine examined—a result far below the average of recent years, as will be seen from the figures given in the margin. The failures in this class are attributed by the President of the Board of Examiners to the low standard of general education attained by the students, while it is probable that the high percentages of success achieved in some of the previous years were due to the cause noted in last year's review, viz., the absence of an independent Board of Examiners. It is hoped that the quality of passes in this class will improve with the substitution of the Upper Secondary for the Matriculation examination as an entrance test to the Junior Department of the Engineering College. The final orders of Government upon this point will be passed shortly.

	Appeared.	Passed.
1888 (December)	22	14
1887 (May)	35	26
1886 (,,)	24	23
1885 (,,)	26	26
1884 (,,)	19	19

5. The results of the examinations for "Draughtsman" and "Surveyor" certificates are considered by the President of the Board of Examiners to be fairly satisfactory. The first named of these certificates was also obtained by a good proportion of independent candidates, *i.e.*, by 5 out of 12.

6. The number of pupils in the recently opened "Artisan" class appears to be on the increase, 30 students having been enrolled up to the 31st March 1890 against 24 in the preceding year.

7. His Excellency the Governor in Council has perused, with much interest, the account of the practical work done by students of the College which is contained in paragraphs 14 to 18 of the Principal's report. The suggestion in paragraph 17 that

students should receive a larger proportion of marks at the final examination for the drawings and other practical work performed by them in the course of their theoretical studies, which is supported by the Board of Examiners in paragraph 8 of its report, appears to be deserving of adoption.

8. In paragraphs 25 and 26 of the report, Captain Love deals with the prospects of employment which exist in the case of passed students of the College, and shows conclusively that there is at present "ample field for as many students as the College can train." His remarks regarding certain of the guaranteed appointments attached to the Engineer and Engineer Subordinate classes have received the separate attention of Government, and orders have been passed in G.O., dated 7th July 1890, No. 481, Educational.

9. A copy of these Proceedings will be forwarded to the Right Honorable the Secretary of State.

(True Extract.)

J. F. PRICE,
Chief Secretary.

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

Ex'd. A. Raitt.

Govt. of {1890} Madras.

EDUCATIONAL.

Issued

Recd. *Encl.*

G.O., 31st July 1890, No. 549.

No. 2323 Fra/28.8.90.

JULY.

Recorded
1 Sol L.P.

College of Engineering.

Reviewing the report on the —, Madras, for 1889-90; and forwarding copy of Proceedings to the Secretary of State.

9.