GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper:—

From the Director of Public Instruction, dated 29th June 1891, No. 7407.

ABSTRACT.—Submitting copy of his Proceedings reviewing the report on the working of the College of Engineering during 1890-91.

ENCLOSURE.

No. 7015.

PROCEEDINGS OF THE DIRECTOR OF PUBLIC INSTRUCTION, dated 16th June 1891.

College of Engineering, Madras.

Read the following letter from the Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 31st January 1891, No. 1260:—

I have the honour to submit the following review of the working of the College of Engineering during the year 1890. 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 1890 is included in the present report.

2. *Establishment.*—On 16th January the post of Second Assistant Instructor in Drawing was filled up for the first time by the appointment of Mr. Littlewood, who joined from the Burma Public Works Department. Two days later, M.R.Ry. R. A. Bhakya Mudaliar, formerly a Supervisor under the Coimbatore Local Fund Board, assumed the duties of Second Assistant Instructor in Surveying. On 13th March, M.R.Ry. Bhavaniswami Rau, B.A., from the Teachers' College, was appointed Vernacular Assistant, sub. *pro tem.*, *vice* M.R.Ry. C. R. Krishna Aiyar, B.A., transferred to Calicut College. On 22nd April, Sergeant W. H. Goddard, Assistant Instructor in Surveying, was confirmed as Instructor in Surveying and Drawing. Mr. Pope, the Assistant Instructor in Drawing, retired on pension on 1st May, after a service of upwards of thirty years, some seven of which were spent at the College. Mr. Pope's appointment will not, for the present, be filled up. On 7th June, M.R.Ry. T. Rangaswami Aiyangar, B.A., was appointed Vernacular Assistant, but was directed to continue to act as Assistant, Presidency College; and T. N. Govindaswami Rau was confirmed as Instructor in Carpentry and Fitting.

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	8	3	5	4	24
Engineer Subordinate Class	12	3	7	20	20	62
Military Probationers	...	...	...	...	...	5
Draftsman Class	...	...	8	13	...	21
Surveyor Class	...	...	8	15	...	23
Artisan Class	...	...	...	...	...	28
					Grand Total ...	163

Excluding the students undergoing the practical courses in workshops and on works, the total number actually in the College on 31st December 1890 was 136. The numbers arranged by classes of the community were—

Europeans and Eurasians	19
Brahmans	49
Other Hindus	52
Native Christians	15
Mussalmans	...
Others	1
Total ...	136

The corresponding totals in the three previous years were—1889, 109; 1888, 102; 1887, 106. The effects of the depression of 1888 are still visible in the small class of Engineer Subordinates now passing to the practical course; but from this time forward they may be said to have disappeared from the College proper. Substantial classes of Draftsmen and Surveyors will join early in 1891, when the total number of students will rise to about 160. This will be increased to about 180 in July next, when a new division of Engineer Subordinates will be admitted. The Engineer class continues small, owing to the difficulty anticipated in obtaining suitable employment. The steps taken to remove this difficulty will be alluded to later.

4. *Examinations.*—The Board of Examiners conducted the final and term examination of all the classes in December 1890, and the entrance examinations of May and December. A brief abstract of the results is given below.

5. *Engineer Classes.*—Four students completed their final year's practical course on 31st December 1890, viz., R. Srinivasa Aiyangar, B.A., B.C.E., J. M. Lacey, B.C.E., and C. Kanakasuriyan Pillai on Public Works; and V. Daivasikhamani Pillai in the Madras Railway Workshops. These Engineers, who will receive their diplomas today, represent in the senior department of the College the first-fruits of the reorganisation of the institution which was effected in 1885 and 1886. The first two have been appointed to the Public Works Department as Assistant Engineers. One of the others, V. Daivasikhamani Pillai, is the first Mechanical Engineer trained at the Madras College.

The next batch of Engineer students, 8 in number, spent the year 1890 in workshops, one of them, V. Rangaswami Aiyangar, who will become a Mechanical Engineer, at the Perambúr Locomotive Shops, and the remainder at the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer class actually in the College, the senior, consisting of three students, joined in January 1888, and underwent final examination in December last. All passed the examination. The average percentages of marks for the division in the various subject heads were as follow:—

	Per cent.
Mathematics	55
Science	33
Engineering	50
Drawing and Estimating	71
Surveying	72
Vernacular Language	67
Drills and Exercises	100
Total ...	57

On comparing the results with those of 1889, when the average total was 53 per cent., it will be seen that there has been substantial improvement in *Drawing*, *Surveying*, *Vernacular Language*, and in *Drills and Exercises*. The results in *Science*, however, are still poor.

The senior pupil is A. V. Ramalinga Aiyar, B.A., who is easily first with 65 per cent. of the total marks, and who receives 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. Ramalinga Aiyar wins prizes for *Mathematics* and *Science* an aneroid barometer, and for *Engineering*, *Surveying* and *Drawing*, a planimeter. He also gains the Narayana Oonythan prize, a copy of Molesworth's pocket book. A prize for *Vernacular Language* and *Gymnastics*, consisting of a pocket rule, is awarded to K. Gopala Aiyar.

Two independent candidates, who were formerly College students, also appeared for the final examination, and one of them, R. Sundaram Aiyar, was successful. He will proceed with the first division to the workshops.

The second division of the Engineer class, containing five students, has undergone a term examination, the mark of which count towards the final total. The average of the division was 56 per cent. The scholarship of Rs. 30 per mensem for the ensuing year remains with L. D. Venkatarama Aiyar. Another student, S. Rojagopalaswami Mudaliar, wins a "Sir Madhava Rao" prize, consisting of an aneroid barometer, for workshop practice.

The third division of four students made an average of 69 per cent. of the total marks at the late term examination. The scholarship of Rs. 30 is retained by G. S. Rama Aiyar for the ensuing year.

Six candidates passed the entrance examination for the Engineer class, and should join the College early in 1891.

6. *Engineer Subordinate class.*—Twelve students completed their final year's practical course on Public Works on 31st December last, and like the senior batch of Engineers represent some of the first results of the College reorganisation. They will receive their diplomas to day. The first seven, viz., M. Venkata Rao, G. Narayana Rao, G. Srinivasa Aiyangar, A. Arulanandam Pillai, Sergeant E. Price, L. S. Panchapakesa Sarma, and M. R. Subrahmanya Aiyar, were appointed Overseers in the Public Works Department on 1st January 1891.

The next batch of Engineer Subordinate students, three in number, spent the year 1890 in the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer Subordinate class in the College proper, the senior, consisting of seven students, joined in August 1888, and underwent final examination in December last. Five of these were successful. The average percentages of marks gained by the whole division were—

Mathematics	48
Engineering	56
Drawing and Estimating	70
Surveying	69
Vernacular Language	48
Drills and Exercises	93
Total ...	61

Comparing the figures with those for 1889, when the average total was only 45 per cent., it will be seen that the class is far superior to the indifferent one which then left the College.

Private G. E. Brand, 7th Hussars, is *facile princeps*, with the remarkable total of 85 per cent. of full marks. He will receive the silver medal awarded to the most distinguished student, and prizes for *Mathematics*, an optical square; *Engineering*, a silver watch; and for *Surveying and Drawing*, a magnetic compass. Private Brand also carries off a "Sir Madhava Rao" prize for workshop practice, viz., a field glass, as well as the "Rogers" prize, which consists of books.

The second man is Sergeant C. J. Smith, 2nd Oxfordshire Light Infantry, who obtains 72 per cent. of the total marks, and is awarded a prize for *Vernacular Language*, consisting of a clinometer rule. Then follow W. T. J. Scanlon, M. S. Venkatarama Aiyar, and T. A. Kuppuswami Aiyar. Venkatarama Aiyar, Smith and Scanlon are commended for their work in the workshops, and Brand and Scanlon for Gymnastics.

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

The second division of the Engineer Subordinate class contains 20 students, who scored an average of 52 per cent. of the total marks at the term examination of December 1890. The first man is Lance Sergeant Blake, 21st Hussars, who obtains 76 per cent. of full marks, and is awarded a prize for general proficiency, consisting of a set of architect's scales. S. Dakshanamurti, P. N. Ramachandra Aiyar, Private Briant, 2nd Middlesex Regiment, and A. J. John have also done well. The scholarships of Rs. 10 per mensem are awarded to Dakshanamurti and Ramachandra Aiyar. The "Walker" scholarship is withdrawn from A J. Alvares owing to the unsatisfactory progress made by him.

The third division, which contains 20 students, joined in August 1890, and obtained an average of 62 per cent. of the marks at the term examination. M. V. Venkatarama Aiyar heads the list, and is followed by Lance Corporal J. Phelan, 2nd Bedfordshire Regiment, K. Srinivasa Aiyar, and K. R. Raman Pillai. The two scholarships of Rs. 10 are retained by Venkatarama Aiyar and Srinivasa Aiyar.

7. *Draftsman Class.*—The senior division, consisting of 8 students, appeared for the final examination in December last. Six were successful in gaining certificates; one, M. V. Srinivasa Aiyar, a certificate of the first class; three, S. Subrahmanya Aiyar, D. Tiruvengada Mudaliar, and S. A. Manickaswami Mudaliar, certificates of the "second class;" and two, F. W. Cames and L. A. Natesa Aiyar, of the "third class." The student who occupies the first place is S. Subrahmanya Aiyar, with no less than 89 per cent. of the total marks. He wins the College bronze medal, and a prize, consisting of a pillar compass and a box of colours, for his great proficiency in *Geometrical, Freehand, Perspective and Model Drawing*, in *Building* and *Topographical Drawing*, and in *Machine Drawing*. But for comparatively low marks in *Estimating*, he would have obtained the highest class of certificate. The second man, M. V. Srinivasa Aiyar, secures a first-class certificate with 82 per cent. of the total marks, and is awarded a prize for *Estimating*, consisting of a parallel rule. The percentages of marks gained by the division in the various subject heads were—

Practical Geometry	72
Freehand, Perspective, and Model Drawing	71
Building Drawing	74
Machine Drawing	61
Estimating	46
Topographical Drawing	53
Drills and Exercises	94
Total	65

These figures compare favourably with those of the previous year, when the average total was 61 per cent. There has been improvement in *Freehand, &c.*, and *Machine Drawing*, but a falling off in *Estimating*.

Independent candidates, six in number, also presented themselves for the certificate examination. These were former students of the College, and all passed in the third class. One of them, however, already holds a third-class certificate. Their average percentage of the total marks was 58.

The second division of the Draftsman class contains 13 students. The mean percentage of the division at the term examination of December 1890 was 68, which indicates the existence of good material. S. Venkatachalam and P. S. Tiruchelvam Pillai head the list, and gain scholarships of Rs. 8 per mensem.

Thirty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1891.

8. *Surveyor Class.*—In the senior division of 1890, there were only five regular students; but all of these passed the final examination; K. S. Vyasa Rau and G. Gopalaswami Nayudu gain "first-class" certificates; K. Subha Rau, a "second-class" certificate; and V. Kothandarama Sastri and T. Balasubrahmanya Aiyar "third-class" certificates. K. S. Vyasa Rau occupies the first place with 82 per cent. of the total marks, gaining the College bronze medal, and winning a prize, consisting of a binocular field glass, for proficiency in *Chain, Campass and Plane Table Surveying*, in *Levelling*, and in *Theodolite Surveying*. G. Gopalaswami Nayudu follows him closely with 80 per cent. of the marks, and is awarded a prize for *Topographical Drawing*, consisting of a pocket rule. The percentages gained by the division in the various subject heads were as follow:—

Chain, Compass, and Plane Table Surveying	65
Levelling	69
Theodolite Surveying	69
Topographical Drawing	67
Drills and Exercises	90
Total	68

These results show a great improvement over those of last year, when the average total was 56 per cent., especially in Theodolite work and Topographical Drawing.

Three independent candidates presented themselves, of whom one was successful in gaining a "third-class" certificate.

The second division of the Surveyor class contains 14 students. The average percentage of marks at the term examination of December 1890 was 61. The scholarships of Rs. 8 per mensem fall to T. S. Vasudeva Aiyar and C. Muttukrishna Mudaliar, who occupy the first and second places in the class.

Twenty-three candidates have been accepted for admission to the new division of the Surveyor class, which will be formed early in 1891.

9. *Maistry and Artisan Class.*—This evening class, opened in 1889, was instituted for the improvement of the sons of maistries and artisans, and of young artisans themselves, in certain technical branches of knowledge. Admission was eagerly sought, but the pupils have not hitherto belonged exclusively to those grades of the population which it was desired to attract. Many candidates of a different type offered themselves, owing apparently to a belief that the course of instruction would render them eligible for appointment as Sub-Overseers in the Public Works Department. The number of applicants in December last, however, was so large that a suitable selection for the course of 1891 has been practicable. During the past year, instruction was given in *Arithmetic, Mensuration, Building Construction*, and *Plan Drawing:* and arrangements were made for the examination of the class at the end of the session in the last three of these subjects, through the medium of the vernaculars, according to the standard of the Middle School examination. The results of this examination have not yet been published.

10. *Military Students.*—The total number of soldier students in the College on the 31st December was 10, exclusive of one going through the practical course (viz., 2 in the first division of the Engineer Subordinate class, 2 in the second division, 1 in the third, and 5 probationers). The number of admissions has for some time past been small, but in August 1890 a full class of five joined. If a similar number qualify for admission next July, there will be difficulty in accommodating them, owing to the partial occupation of the College barracks by the temporary workshops. The conduct of all the men has been exemplary, not a single defaulter sheet entry having been made during the year. The two men who are now leaving the College have greatly distinguished themselves in their studies, Private Brand's results being quite phenomenal, while the men of the junior divisions are making good progress. Lance Sergeant Smith and Private Brand sent drawings to the Soldiers' Exhibition held at Bangalore in September, and both secured prizes. Lance Sergeant Blake and Lance Corporal Phelan passed in a vernacular language according to the Higher Standard in the course of the year.

11. *Victoria Technical Institute Students.*—Three scholarship-holders of the Victoria Technical Institute were specially admitted in January 1890 for a course of *Mensuration, Surveying* and *Plan Drawing*. They were attached in the first instance to the Surveyor class, and all three passed in the first two of the above subjects at the next Higher Examination in Science, Art and Industries. One student left, owing to sickness, after six months, and the other two were then attached to the Draftsman class. One of these rejoined his appointment after nine

months, while the other remained until the end of the year. These men were all school teachers of intelligence, who, having only a limited time in which to acquire proficiency in their selected subjects, served as a spur to the ordinary students of the class to which they were first attached. The experiment of admitting them to the College outside the regulations has thus proved of advantage, and will be repeated in 1891.

Besides the Victoria Technical Institute scholars, several of the regular students of the College appeared voluntarily for the Higher Examination in Science, Art and Industries in *Surveying*, *Building Construction*, *Applied Mechanics*, *Machine Construction*, &c. Most of them were successful, and five scholarships, ranging from Rs. 4 to Rs. 12 per mensem, were awarded to the College students on the results of the examinations.

12. *Surveying.*—The outturn of field work was considerably greater than in 1889, when the practice of devoting a full day weekly for each class (two days for the Surveyor class) was first instituted. The average number of survey squads was 17, and the average number of students per squad was 5. The total outturn consisted of—

Trignometrical Surveying	17 sq. miles.
Traversing with theodolite, prismatic compass or plane table.	66 miles.
Levelling (including contour lines)	112 ,,
Interior filling in with chain, compass and plane table.	24,000 acres.

The localities surveyed were Triplicane, Chintadripet, Egmore, the Spur tank, the Esplanade, Mylapore, St. Thomé, the Adyar, Saidápet, Guindy and St. Thomas' Mount.

The average work per squad will be seen from the following table :—

Nature of Survey.	Number of squads.	Average work done per squad.	Total work.
Chain Surveying	8	134 acres.	1,072 acres.
Traversing with Compass	7	5 miles.	35 miles.
Traversing with Plane Table	1	8¼ ,,	8 ,,
Traversing with Theodolite	3	7¾ ,,	23 ,,
Levelling	9	12½ ,,	76 ,,
Filling in with Compass	7	452 acres.	3,164 acres.
Filling in with Plane Table	8	934 ,,	7,544 ,,
Hill sketching...	3	161 ,,	483 ,,
Filling in Trigonometrical Survey ...	3	3,840 ,,	11,520 ,,

Next year the experiment will be tried of sending out the Engineer class in February and July for a fortnight's continuous work in the field.

13. *Inspections of Works.*—Numerous inspections of works were made as usual by the Engineer and Engineer Subordinate classes, among which may be mentioned the Government and Perambúr Brick-fields, the Madras Lime and Cement works, the quarries at Pallávaram, the new High Court buildings, the girder bridges over the Cooum, the Red Hills tank, Irrigation works near Vandalúr, the Public Works Workshops, the Gun Carriage Factory, the Napier Foundry and the Perambúr Locomotive shops. Notes and sketches were submitted by all the students. The classes referred to were also exercised in setting out work on the ground, and, together with the Draftsman class, in measuring up buildings and iron bridges. With the object of facilitating the inspection of works at a distance from Madras, sanction has been asked for the purchase of a tent to accommodate the European and Eurasian students.

14. *College Workshops.*—The temporary workshop, which was started at the College in August 1889, was fully utilised throughout the year under review, carpentry, fitting, and turning being carried on. The shop accommodates only 12 students at a time; but 46 in all received regular instruction. The workshop is open all day on Wednesdays, and on other week days from 6-30 to 8-30 A.M. The students have been practised in chipping and filing cast and wrought iron, and in simple turning and screw-cutting. In carpentry they were exercised in sawing, planing, and the execution of common joints; after which they were employed in

the manufacture of tables, benches, almirahs, and miscellaneous articles for the College use. The workshop was strengthened during the year by the acquisition of a screw-cutting lathe and a bench drill. Considering the time available—an average of 3½ hours per week per student—and the absence of previous manual training, the results are very satisfactory, and show that Natives as well as Europeans will be able to use advantageously the permanent workshops which will, it is hoped, be shortly provided. It was mentioned in last year's report that plans and estimates for a permanent workshop and Engineering laboratory to be constructed at the south end of the College building had been submitted. These were revised by the Public Works Department during 1890, and were forwarded to Government in August. The estimated cost is Rs. 56,000. The early erection of new shops is a matter of importance, as, apart from the gain to the students, the rooms occupied by the temporary shops will be required this year to fulfil their proper use as barracks for additional military students.

15. *Laboratory and Experimental Work.*—The students of the senior division of the Engineer class have practised qualitative and quantitative analysis of simple substances and of building materials in the chemical laboratory. They have also been exercised in cement-testing, and in measuring the velocity of streams. Through the courtesy of Messrs. Binny & Co., they, with the first division of the Engineer Subordinate class, were permitted to attend at the Buckingham Mills, and to take steam indicator diagrams.

16. *Apparatus.*—The models and instruments indented for from England arrived only towards the end of the year. In addition to machine tools for the workshop, they consisted of surveying and drawing instruments, contoured models of hilly ground, apparatus for teaching experimental mechanics, models of iron beams and brick bond, apparatus for teaching orthographic projection, and models of machine details.

Sanction was accorded to utilizing a portion of the allotment in the construction of apparatus locally. The articles were designed by Mr. Chatterton, and consist of briquette moulds; appliances for measuring friction, the strength and elasticity of timber beams, and the moment of inertia of a heavy wheel; and apparatus for determining centrifugal force, and the efficiency of screws. Portions of the apparatus were made in the College workshop.

Models of the Dorabhavi bridge on the Southern Mahratta Railway were presented by the Chief Engineer of the Company, to whom my thanks are due.

17. *Practical Course, Mechanical Engineers.*—Early in 1890, arrangements were made with the Madras Railway Company to receive Mechanical Engineer students at the Locomotive shops for two years on payment of a premium of Rs. 250 per annum for each; and I have to acknowledge the very liberal spirit in which my proposals were met by Mr. Trevithick, the Acting Agent and Manager. The Government agreed to pay half this premium in the case of one student annually. Additional Mechanical Engineer students will pay the full premium themselves; but they may receive training gratis at the Public Works Workshops. Two students, V. Daivasikhamani Pillai and V. Rangaswami Aiyangar, the first of whom had worked previously at the Public Works shops at Dowlaishweram and Madras, joined at Perambúr on 1st March. The following is an extract from a report by Mr. Phipps, the Locomotive Superintendent: "The two College students have during the year conducted themselves entirely to my satisfaction. They have been punctual in their attendance, and have both shown much willingness to do their best, and to avail themselves in every possible way of the opportunity given them of learning the profession they have selected." Daivasikhamani Pillai was employed during one month in the Erecting shop, one month in the Fitting shop, one month in the Lathe shop, two months in the Foundry, one in the Blacksmiths' shop, one in the Carriage shop, and one in the Drawing office. The remainder of his time was spent in firing locomotives. Rangaswami Aiyangar spent five months in the Erecting shop, during which he assisted at the complete construction of a new engine from commencement to completion, and the rest of the year in the Fitting shop.

18. *Workshop Course, Civil Engineers and Subordinates.*—Seven Civil Engineers, and three Engineer Subordinate students spent the year at the Public Works Workshops. All of them commenced their course in the Carpenters' shop, where they remained for three months. They were then passed by turns through the Lathe, Filers' and Smiths' shops, the Instrument Department, and the Foundry, and completed the years' course with the working of a stationary engine for a week.

The Superintendent reports that the style of work done was generally good. He states that all the students behaved well during the course, and that the Engineers were regular in their attendance. The Engineer Subordinate students were less regular; but their absences were with leave.

This course has undoubtedly been of great advantage to the students; but I am of opinion that it is susceptible of improvement. The classes which have just joined the workshops have acquired in the College sufficient practice in carpentry, turning, and fitting to execute useful work under proper supervision. It has accordingly been suggested to the Superintendent of the Public Works Workshops that the students should no longer be kept apart by themselves, but that they should be dispersed among the regular hands, and be allowed to gain practical knowledge by working with them in a systematic manner.

19. *Works Course, Civil Engineers and Subordinates.*—Three Civil Engineers and twelve Engineer Subordinate students were attached throughout the year to various circles where important Public Works are in progress. The course comprises the practical details of brick-making, brick-laying, quarrying, building of all kinds, the management of labour, and accounts. An abstract of the progress reports received from the Public Works Department, which is given below, shows that all the students regarding whom reports have been received have acquitted themselves satisfactorily. Some of the students have had better opportunities than others; and it is hoped that in future it will be found possible to give work to all which will involve more individual responsibility. The importance of this practical course, which gives a familiarity with details of construction that a College training is powerless to convey, can hardly be over-estimated :—

Name.	Abstract of Progress Report.
R. Srinivasa Aiyangar, B.A., B.C.E.	*Nellore Division.*—Progress report not yet received.
J. M. Lacey, B.C.E. ...	*Periyár, No.* 1 *Division.*—Progress report not yet received.
C. Kanakasurian Pillai, B.C.E.	*Periyár, No.* 2 *Division.*—Main channel masonry works. Employed in laying out and measuring up foundations, mixing mortar and arranging labour; in surveying, levelling, preparing survey and sections of channel, and on earthwork in branch channel. Can be entrusted with laying out channels and with all kinds of masonry work. Conduct very good. Has always proved willing and painstaking.
U. Venkata Rau ...	*Cuddalore Bridge Works*, January to September.—Attended at Ponniar masonry bridge, and Gadilam iron bridge. Assisted in taking levels and setting out work. Acquired fair practical knowledge of well-sinking, brick masonary and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of a weir under difficulties in Rajakal channel. Worked satisfactorily.
G. Narayana Rau ...	*Tanjore Division.*—Employed on bridge-making, brick-laying, opening and laying foundations, details of masonry work, earthwork, river training, office work and accounts. Very diligent and well conducted, and made satisfactory progress.

Name.	Abstract of Progress Report.
G. Srinivasa Aiyangar.	*North Arcot Division,* January to August.—Engaged on estimates for earthwork and masonry, and on execution of various works. Also on levelling and estimating for repair of tanks and channels. Worked very well indeed. *Cuddalore Bridge Works,* September to December.—Gadilam iron bridge. Employed on masonry work, iron riveting, laying out and raising approaches, surveying and levelling. Made himself very useful; was regular in attendance and hardworking. Conduct good.
A. Arulanandam Pillai.	*Cuddalore Bridge Works,* January to September.—Attended at Ponniar masonary bridge and Gadilam iron bridge. Levelling and setting out work. Acquired fair practical knowledge of well-sinking, brick masonry and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of sluice under difficulties in lofty tank bund. Assisted in building offices. Very intelligent and hard-working; conduct very good.
Sergeant E. Price, 7th Hussars.	*Periyár No.* 1 *Division.*—Progress report not yet received.
L. S. Panchapakesa Sarma.	*Trichinopoly Division.*—Instructed in practical details of buildings and irrigation works. Employed in estimating. Very intelligent.
M. R. Subrahmanya Aiyar.	*Tinnevelly Division.*—Employed on buildings and irrigation works, in levelling and on small surveys. Industrious and painstaking. Will make a good subordinate.
P. V. Ramaswami Aiyar.	*Madura Division.*—Engaged on irrigation work. Has shown himself active and well conducted. Will make a good subordinate.
C. J. Plummer ...	*Consulting Architect's Division.*—Attended the Brickfields and Lime-kilns. Is industrious and painstaking, and will make a good sub-ordinate. Conduct uniformly good.
P. M. Swaminatha Aiyar.	*Periyár No.* 2 *Division.*—Main channel masonry works. Laid out and measured up foundations. Employed in mixing mortar and arranging labour; also in surveying and levelling, and in preparing plans and estimates for buildings and channels. Is hardworking, willing and painstaking. Will become a good subordinate. Conduct very good.
T. Venkatarama Aiyar.	*Kistna, Eastern Division.*—Employed in quarrying, fitting gearing to under-sluices, and on repairs to anicut. Also on construction of buildings, boat basin and canal bridge. Is obedient, and has made good use of his time.
P. Sivasubramanya Pillai.	*Kistna, Western Division.*—Employed on buildings, surveying, levelling, and accounts. Good application, progress satisfactory.

The possibility of affording the students a greater variety of work has been under consideration. The Hon'ble Mr. Garstin penned a minute on the subject in April last, and proposals have since been made to divide the year into three portions, so that one portion may be spent by each student in a Building Division, one in an Irrigation Division, and one in a Road or Railway Division.

Sanction was accorded during the year to the grant of travelling allowances at third-class rates to students joining and attached to works.

20. *Revision of Rules.*—It was pointed out in the Annual Report for 1889, that the recent increase in the practical work done at the College rendered desirable a substantial augmentation of the proportions of marks awarded by the staff. The principle having been approved by Government, a new arrangement, by which the original proportions were doubled, was introduced at the last examination. The marks awarded are submitted to the Board of Examiners, who scrutinise as far as possible the session work executed. Advantage was taken of the embodiment of this alteration in the College rules to make revision in a variety of details where experience showed that minor changes were desirable. The chief alterations provided for the admission to the Engineer Subordinate class of persons who have passed the Upper Secondary examination, and of a redistribution of the marks allotted

to the various branches in which the Draftsman and Surveyor classes receive instruction. The rules also provide for the long vacation taking place in May and June instead of June and July; and for fee payments to be made by the Artisan class.

21. *Library and Reading Room.*—The Library, which consists of a Lending branch and Consulting branch, contains a total of 2,700 volumes, of which 133 were added in the course of 1890. During the year, 3,780 books were taken out, viz., 793 by staff, and 2,987 by students, while 1,202 references were made to the Consulting library. During the previous year the number of books taken out was 2,543, so that the increase in the use of the Library during the past year is no less than 50 per cent. Ten years ago, the number of books issued was under 300.

The College Calendar for 1890 contained a history of the College, the annual report, and other information which did not find a place in the issue of the previous year. The Calendar for 1891, now in the press, will contain further additional matter.

A set of examples in Carpentry was prepared and published by the Professor of Engineering, and an elementary work on Surveying was issued by Mr. D' Cruz, the Assistant Instructor in that subject.

22. *Physical Training.*—Regular training in Gymnastics was given to all the College classes, except that for Artisans, throughout the year. Considerable progress was made, as is testified by the marks gained at the final examination. From August last, Drill was introduced, selected military students acting voluntarily as instructors. Each Gymnastic class was divided into two squads, each of which worked for half the attendance at gymnastics, and for the other half at drill. This arrangement rendered the classes manageable, and increased the amount of work done. The new tennis court, alluded to in last year's report, was completed in May, and has since been in fairly constant use.

23. *Attendance.*—The rules regarding leave to students were made more stringent, with the result that the percentages of numbers present to numbers on the rolls rose to 97 for the College department, and 94 for the School department. These figures would have been even higher but for the epidemic of influenza which made its appearance in March, and caused a large number of temporary absences. In September there was a severe visitation of cholera in Madras, from which the College did not entirely escape. Among the students there were two cases, one of which unfortunately proved fatal. In November another fatality occurred through fever.

24. *Conduct.*—The conduct of the students has on the whole been good. There were, however, several dismissals for continued absence without leave and non-payment of fees; and more than one case of loss of instruments was reported. In October, a student of the Draftsman class was found in possession of a missing article, for which he was unable satisfactorily to account. The Police were called in, the student admitted theft, and was expelled on the spot. He was subsequently prosecuted and convicted. No further case of loss has occurred; and it is hoped that the swift punishment which followed on the detection of the crime will serve as a permanent deterrent.

25. *B.C.E. Degree Examination.*—Of the nine Engineer class students who left the College in December 1889, two passed the Degree examination in the preceding January, during their College course, while three of the remainder passed in January 1890. The successful percentage of the class was therefore 55. The failures occurred for the most part in mathematical subjects—a circumstance which I attribute to the difference between the College course and the Degree examination. The only branch of pure Mathematics studied in the College during the third year is the Differential and Integral Calculus, a subject which does not at present appear in the Degree syllabus. The revision of the latter is now engaging the attention of the Engineering Faculty. Six other candidates, old students of the College, appeared in 1890, of whom one was successful. The three Engineer class students who have just passed out of the College, presented themselves for the Degree examination in January 1891. The results will be made known in my supplemental report.

26. *Prizes and Endowments.*—I announced in my last report that Raja Sir T. Madhava Rao, 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 was accepted by Government, and the prizes, each of the value of Rs. 20, thus become available for the first time on the present occasion. Two have been awarded for Workshop practice, and one for Practical Surveying. The "Rogers" Prize, the outcome of an endowment by old students of the Eengineer Subordinate class in memory of the Principalship of Major-General Rogers, R.E., also becomes available for the first time this year. The prize consists of books. A copy of Molesworth's pocket book is again presented by M.R.Ry. Narayana Oonythan, an old student of the Engineer class. The remaining prizes consist as usual of instruments. The medals presented this year were struck at the Bombay Mint from dies engraved in London for the College. The handsome design for the diplomas and certificates which are issued today was made by S. Subrahmanya Aiyar, the senior student of the Draftsman class. The forms have been lithographed for present use, but the original design has been sent to England to be engraved.

27. *Employment of Passed Students.*—The question of prospect of employment is one of deep interest to all the students of this College, and especially so to those who will today receive the diplomas and certificates declaring them to be fitted to practise the professions and callings for which they have been studying. The case of the passed men of December 1889 will first be considered. The batches consisted only of Draftsmen and Surveyors, and contained small numbers. Of the five Draftsmen, one joined the College Surveyor class, and the remainder are all employed (three of them on Railways) on an average salary of Rs. 40. The five independent Draftsmen of December 1889 are also employed on an average salary of Rs. 28. The two Surveyors are in receipt of average salaries of Rs. 40.

The vacancies notified during the year have been *Engineers* and *Assistant Engineers*, 3 (Local Boards 2, Mechanical Engineer 1); *Overseers* and *Sub-Overseers*, 34 (Local Boards 18, Burma P.W.D. 12, others 4), average salary at outset, Rs. 50; *Draftsmen*, 23 (P.W.D. 13, Railways 5, Local Boards 3, others 2), average salary Rs. 40; *Surveyors* 11 (P.W.D.3, Railways 1, Local Boards 3, others 4), average salary Rs. 50.

As regards the students who completed their course on 31st December 1890, Government have conferred, with effect from 1st January 1891 two appointments as Assistant Engineer, and seven as Overseer, in the Public Works Department, on the senior men of the corresponding batches. The statistics just given show that the remaining Engineer subordinates, as well as the Draftsmen and Surveyors, are not likely to remain long unemployed. The two Engineers who do not obtain Government appointments will, it is hoped, secure suitable employment, especially Daivasikhamani Pillai, our first Mechanical Engineer. On the facility with which these men and succeeding batches of Engineers obtain professional work depends the number of admissions to the College Engineer class. When the stamp of native Engineer as now, for the first time thoroughly trained, becomes generally understood and appreciated, I anticipate a wider field of employment. This will take time however, and until public opinion has become formed, the College must look to Government and the Railways to afford all possible encouragement. To this end it was suggested in last year's report that the guaranteed appointments of 1888 and 1889, which lapsed as a result of the extension of the course, should be conferred on later batches. Subsequently, it was asked that this College should be placed on the same footing as the Colleges of Poona and Calcutta with respect to the number of Engineer appointments guaranteed from year to year. These applications were negatived by reason of insufficiency of vacancies in the Public Works Establishment. It was then pointed out that the requirements of State Railway surveys and construction could not be met by the Madras Public Works Department, and that large numbers of Engineers were imported from other Provinces for such work; and it was suggested that a promising field existed for the temporary employment of locally trained Engineers. This application is now under the consideration of Government, and it is hoped that it will be favourably considered.

All the 28 students of the Artisan class which attended the College in 1890 appeared for the Middle School examination in—

(1) Mensuration;
(2) Building Materials and Construction; and
(3) Plan-drawing and Estimating.

Passed in subjects (1) and (2)	4
Do. in subject (1) alone	2
Do. in do. (2) do.	6
Do. in do. (3) do.	*Nil.*

Entrance Examination, Engineer Classes.—Six candidates appeared for the entrance examination for the Engineer classes held in December 1890, and all of them were successful; but only three have joined the College.

Read the following letter from the Acting Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 20th April 1891, No. 107-C:—

In continuation of this office No. 1260-C, dated 31st January 1891, I have the honour to forward a supplementary report to complete the information required to the end of the official year.

2. *Establishment.*—Captain H. D. Love proceeded to England on duty and was relieved by me as Acting Principal on 27th February 1891. M.R.Ry. R. A. Bhakya Mudaliar was confirmed as Assistant Instructor, Surveying, with effect from 18th January 1890. M.R.Ry. T. Rangaswami Aiyangar, B.A., Vernacular Assistant, was permanently transferred to the Presidency College on 18th February 1891. M.R.Ry. M. R. Vaidyanatha Sastri, B.A., was appointed Vernacular Assistant of the College, but was directed to continue to act at the Calicut College on 18th February 1891.

3. The numbers on the rolls on 31st March 1891 were as follow:—

—	First Division.	Second Division.	Third Division.	Total.
Engineer class	5	4	3	12
Do. Subordinate class	20	18	...	38
Military Probationers	5	...	...	5
Draughtsman class	13	30	...	43
Surveyor do.	14	19 + 2*	...	35
Artisan do.	35	...	...	35
			Total ...	168

The two marked thus * are Victoria Technical Institute scholars permitted to work with the Surveyor's class (*vide* your No. 8690, dated 8th October 1889).

The next entrance examination for the Engineer Subordinate class will be held on the 27th April and admission will take place after the end of the vacation. Forty-eight applications have been received from civilian matriculates and four from military candidates.

4. *Attendance.*—During the past official year the percentage present of the total number on the rolls was 95·2 for the College department and 94·3 for the School department (*vide* the statement below).

Average Number on Rolls.

Class.	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College Department.												
Engineer class, 1st division ...	4	4	4	3	3	3	3	5	5	5		
Do. 2nd do. ...	5	5	5	5	5	5	5	4	4	4		
Do. 3rd do. ...	4	4	4	4	4	4	4	3	3	3		
Total ...	13	13	13	12	12	12	12	12	12	12	123	12·3
School Department.												
Engineer sub-class, 1st division.	7	7	7	7	7	7	7	21	20	20		
Do. 2nd do. ...	21	21	21	21	20	20	20	19	18	18		
Do. 3rd do. ...	...	...	21	21	21	20	20	...	...	...		
Draughtsman class, 1st division.	8	8	8	8	8	8	8	13	13	13		
Do. 2nd do. ...	16	16	18	17	15	14	14	25	30	30		
Surveyor class, 1st do. ...	8	8	8	8	8	8	8	13	14	14		
Do. 2nd do. ...	21	21	17	16	16	15	14	20	21	21		
Artisan class	30	30	30	29	28	28	28	32	35	35		
Military Probationer class ...	1	1	5	5	5	5	5	5	5	5		
Total ...	112	112	135	132	128	125	124	148	156	156	1,328	132·8

Average Daily Attendance.

—	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College department	11	13	12	12	12	12	12	10	11	12	117	11·7
School do.	99	103	125	123	120	119	121	142	150	150	1,252	125·2

5. The order of Government with reference to the wearing of gowns has not as yet been complied with as I was under the impression that it was still under reference. The order, it is hoped, will be carried out from the beginning of next term.

Read the following report from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated Madras, 29th January 1891:—

We have the honour to forward our report on the results of the examinations conducted by us during December 1890.

2. The Board was composed as follows:—

President:
Major W. L. C. BADDELEY, R.E.

Members:
Mr. G. H. STUART, M.A.
„ E. W. STONEY, M.E., M. INST. C.E.

Assistant Examiners.
Mr. W. N. POGSON, F.S.A.
Dr. VANGEYZEL.
M.R.Ry. 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, 1st division	3	3	...
(2) Engineer Subordinate class, 1st division	7	5	2
(3) Draughtsman class, 1st division	8	6	2
(4) Surveyor class, 1st division	5	5	...

Group (b).

	Numbers registered for examination.	Passed.	Failed.
(1) Independent candidates for "Engineer" certificates.	2	1	1
(2) Independent candidates for "Engineer Subordinate" certificates	*5	1	4
(3) Independent candidates for "Draughtsman" certificates	6	6	...
(4) Independent candidates for "Surveyor" certificates.	3	1	2

* One candidate was absent from nearly all the examinations.

Group (c).

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

5. In group (*a*) the results show an improvement upon those of the last year, generally throughout all the classes, but more especially in the 1st division of the Engineer Subordinate class. The excellent work done by some members of this class was not unexpected, for, in Major Baddeley's report on the examinations of 1889, special reference was made to the improvement shown at the term examinations by this section of the College. Private G. E. Brand, Sergeant C. J. Smith and W. T. J. Scaulon have done very well, the first two have proved themselves to be exceptionally good all round men, and all three should become useful members of the Department of Public Works.

6. We are glad to observe that the suggestion, in last year's report, for an increase in the College marks, as compared with those allotted by the Board, has been adopted; and the junior classes now in the College will receive the full benefit of the alteration.

7. In group (*b*) the results are not satisfactory except among the Draughtsmen, who have all done fairly well, though no man has obtained a higher certificate than third class. As the names registered for examination in group (*b*) were College failures, a higher percentage of "passed" was not to be expected, but under the new rules for the employment of Draughtsmen in the Public Works Department, passed men will come up from time to time to endeavour to obtain higher certificates, and the results of this concession should be carefully watched.

8. The subject of "Estimating" was an unsatisfactory feature in the recent examinations, and requires the special attention of the College staff. The marks obtained by the Engineer class, 1st division, in "Science" were very low, but those gained by the 2nd division lead us to expect better results in this branch of study at the next final examination.

9. The term examinations were generally satisfactory, and point to good results at future final examinations.

10. In concluding this report, we would observe that there has been considerable improvement in the results of the examinations since the appointments of Mr. Chatterton and Mr. Middlemast; the new rules appear to work well, and we have no doubt that future years will, under the present system of education in the College, show still better results.

The above papers relate to the working of the College during 1890-91. The supplementary report should have referred to the results of the last B.C.E. Degree examination and the general financial position of the institution.

2. *Staff.*—Captain Love held charge of the office of Principal till the 27th February 1891, when on being relieved by Major Smart, he proceeded Home to complete his course at Chatham. The Professorial staff remained undisturbed and the changes in the subordinate staff were fewer than usual. The post of Second Assistant Instructor in Drawing was filled during the year, while that of the First Assistant Instructor in Drawing, which fell vacant on the retirement of Mr. Pope, was not filled.

3. *Strength.*—Excluding the 27 students in their practical course, the strength of the College at the end of the session was 136 against 109 at the close of the previous session. On the 31st March last the number stood at 166, not including the two Victoria Technical Institute scholars. The average attendance was injuriously affected by the bad condition of the public health during the year. It is satisfactory to note that, in spite of these disturbing elements, the stringent rules regarding leave to students introduced during the year with a view to check continued absence without permission resulted in raising the percentage of average attendance from 94 to 97 in the College and from 92 to 94 in the School department.

4. *Distribution of Students.*—The distribution of students among the different classes during the past two years is given in the margin. The total number rose by 40, and the Engineer class excepted, all the classes participated in the increase, notably the Draughtsman and Engineer Subordinate classes. There is every reason to hope, if the present rate of advance is kept up, that the latter class will ere long regain its former popularity. The raising of the limit of admissions in article IV lately sanctioned by Government, may lead to further improvement in the strength of the several school classes, as the value of the theoretical and practical instruction now imparted in the institution is better appreciated by employers of skilled labour than it was. The present activity in railway and building construction in several parts of the Presidency is probably influencing students in the adoption of Engineering, or of branches of technical knowledge subsidiary thereto, as their profession. The Maistry and Artisan class is numerically as strong as it can be under existing arrangements, but the Director has under consideration a plan for developing the class and extending its usefulness. Of the 28 students in this class at the end of the session 1890, only four were artisans, two of them being employed as sub-maistries on Government buildings under construction, one a bricklayer and the other a tailor. From one point of view this is not satisfactory, but from another the tendency of all classes to devote themselves more and more to industrial pursuits is very encouraging, for it shows that the non-artisan classes are beginning to press for a share in the artisan employment of the country either as maistries or as workers. The tendency should be encouraged in the interests of the artisan class as well as of all classes of the community. The Engineer class continued small, and the numbers stood at 12 on the 31st March 1891 against 13 on the corresponding day in 1890. Of the six candidates who appeared for and passed the entrance examination for admission to this class held in December 1890, only three joined the College. The smallness of

	Strength on the 31st March	
	1890.	1891.
Engineer classes	13	12
Engineer Subordinate classes	28	38
Military Probationers ...	1	5
Draughtsman's class ...	25	43
Surveyor's class	29	33
Artisan class	30	35
Total ...	126	166

this class, which is less than a third of its normal size, is solely attributed to the limited prospects of employment for passed students. There is no likelihood of the number of guaranteed appointments being increased; but the spread of technical knowledge, the growth of a scientific knowledge of the resources of Southern India, the opening to a larger extent than hitherto of railway and other departments to young men trained in the College, the development of the mining industry; the establishment of manufacturing mills and other enterprises requiring engineering knowledge are calculated to bring about a marked improvement in this direction. But the Director is assured that these circumstances will never have their full effect on this branch of education until the system of education itself is made much more practical, though not less theoretical, than it is at present. The existence of a really practical Engineering school in the country will enhance greatly the demand for skilled engineering labour.

5. *Classes of Community represented at the College.*—Information has not been furnished in the supplementary report regarding the classes of the population to which the pupils on the 31st March last belonged. The following figures are taken from the annual returns and include the two Victoria Technical Institute scholars :—

Classes.	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Europeans and Eurasians ..	...	13	1	14
Brahmans	10	37	7	64
Other Hindus	2	51	2	61
Native Christians	1	11	2	13
Muhammadans	...	...	...	2
Others	...	1	...	2
Total ...	13	113	12	156

It is disappointing to find that not a single Muhammadan has joined the College department. The increase under Native Christians is greater than that under Other Hindus. The increase in the Brahmans in the School department shows that this class of the population is taking to technical pursuits, probably chiefly owing to the pressure of competition in clerical callings. The earnest attention of the Anjumani Mufid-i-Ali-Islam is invited to this absence of Muhammadans from the College department, notwithstanding the fact that article IV of the College rules holds out a qualified precedence to the members of this community, and that encouragement in the way of scholarship is offered in Chapter V of the Grant-in-Aid Code and by the Victoria Technical Institute. The admission of two Muhammadan pupils into the School department is, however, noted with pleasure.

6. *Social and Economic condition of College Students.*—The figures in the margin classifying students according to the chief callings of their parents or guardians show that all the College students belonged to official or landholding classes, whilst in the School department only one pupil in thirty was either a trader's or an artisan's son.

	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Officials	4	46	7	78
Landholders ...	9	29	5	44
Petty officials ...	...	11	...	9
Traders	...	7	...	5
Artisans	...	8	...	6
Others	...	12	...	14
Total ...	13	113	12	156

7. *University Examinations.*—The results of the B.C.E. examination held in January 1889 and 1890 were commented on in the last review. Only one, viz., A. V. Ramalinga Aiyar, B.A., out of the three students from the senior division of the College that appeared for the last B.C.E. examination, was successful, while none passed out of seven students

of the previous years that presented themselves for the examination. From the analysis of failures given in the margin, it is observed that as many as six candidates at the last B.C.E. examination failed in Science and three in Mathematics, and the same number in Constructive Engineering. The heavy failure in Science and the fact that comparatively poor results were obtained by the students in this subject at the final examinations also held by the College Board of Examiners should receive the early attention of the Principal and the Professors concerned in view of ascertaining clearly where the cause of failure lies. Possibly the amount of time given to the subject is insufficient.

Subjects of failure.	Number failed.
Mathematics	3
Science	6
Mensuration and Estimate-making ...	1
Constructive Engineering	3
Architectural and Topographical Drawing	1

8. *Examinations conducted by the College Board of Examiners.*—The final, term and entrance examinations were as usual conducted by a Board of Examiners consisting of the following members appointed by Government :—

Major W. L. C. Baddeley, R.E.—*President.*
Mr. J. H. Stuart, M.A., ,, E. W. Stoney, M.E., M. INST. C.E., ,, W. N. Pogson, F.S.A., } *Members.*
Dr. VanGeyzel, M.R Ry. P. Vijiarunga Mudaliyar, } *Assistant Examiners.*

The above Board examined not only the College students, but also batches of independent candidates for certificates of the different grades. The notes, if not the reports, of the individual examiners have again not been forwarded as required. The attention of the President was drawn to this omission in the review of the last report, but the matter seems to have again escaped his attention. It is hoped that he will in future conform to this requisition, as the opinion of each examiner as to the way in which the pupils have acquitted themselves is of importance.

Engineer Class.—All the three students from the senior division passed the final examination for Assistant Engineers. There was an appreciable improvement in the average marks secured by each of the three divisions of the Engineer class. But the tabular results still show some weakness in Science, Mathematics and Engineering.

Engineer Subordinate class.—Five out of the seven students forming the senior division passed the final examination—a considerable improvement over the result of the preceding year, when two passed out of nine entered. Though the total average percentage 61 against 45 is higher, the relatively low percentages in Mathematics, Engineering and Vernacular language indicate that the students were not quite up to the mark. One student, for instance, was able to secure only 94 out of 370 marks in Mathematics. The deficiency may no doubt be partly attributed to the low general attainments of the students comprising this class; but as under G.O., No. 630, dated 12th September 1890, F.As. and Upper Secondary men will be preferred to Matriculates in future, there is every probability of students of higher calibre entering the College in the near future. At the term examination the second division scored 52 per cent. of the total marks against 61 per cent. of the previous year's batch, while the third division 62 per cent. against 59 per cent. The former division requires to be very carefully worked up to secure suitable results at the next final examination.

Draughtsmen Class.—Six out of the eight students of the senior division succeeded in securing certificates, one of the first, three of the second, and two of the third class. The percentages of marks gained in Machine Drawing and Topographical Drawing are not, however, satisfactory. The results in Estimating are also very disappointing, and as pointed out by the Board of Examiners, this subject demands special attention from the College staff. As in the previous year, the junior division gained 68 per cent. of the total marks.

Surveyor's Class.—It is satisfactory to note that all the five students that appeared for the final examination secured certificates, two of the first, one of the second, and two of the third class, and that the average percentages of marks in the senior and junior divisions rose from 56 and 53 to 68 and 61, respectively.

Independent Candidates.—The numbers registered and passed for the different certificates are noted below : —

	Number registered.	Number passed.	
For Engineer	2	1	
„ do. Subordinates	5	1	
„ Draughtsmen	6	6	in the third class.
„ Surveyors	3	1	do. do.

The results obtained by the Engineer subordinates were very unfavourable. Turning to the Surveyors, the two students who failed fared very badly, more especially in Theodolite Surveying and Topographical Drawing.

9. *Government Higher Examinations in Science, Arts and Industries.*—A good number of the regular students of the College as well as the three scholarship holders of the Victoria Technical Institute competed for the Government examinations in Science and Art, the former in Surveying and Levelling, Building Construction, Applied Mechanics, Machine Construction, Pure Mathematics, Bridge-making, Hydraulics, Mechanical Drawing and Earth and Railway work, and the latter in Mensuration, Surveying and Plan-drawing. The last three passed in Mensuration and Surveying, and most of the former were also successful. Five of them have been awarded scholarships ranging from Rs. 4 to 12 per mensem under Chapter V of the Grant-in-Aid Code. It seems desirable to encourage students to attend these examination as the preparation does not interfere with their regular work, whilst it gives an opportunity to the students to show marked ability in individual subjects, which cannot be so effectively accomplished or so publicly recognized under the College Examination system.

10. *Maistry and Artisan Class.*—Of the 20 students who appeared for the Middle School examination in technical subjects, two passed in Mensuration, six in Building Materials and Construction and four in both subjects—Mensuration and Building Materials and Construction. The system of working the class needs improving before it can be regarded, as it should be, as a school for maistries and persons of that class.

11. *Practical Courses.*—The Survey practice during the year was sufficiently extensive. In the College workshop the students had worked at Carpentry, Fitting and Turning with advantage. Only 46 students, however, were able to receive regular instruction as the workshop could not accommodate a larger number. The Director trusts that Government will be able to accord its early sanction to one of the alternative schemes now before it for providing a permanent workshop.

Under G.O., No. 294, dated 23rd April 1890, Educational, two students—V. Devasikhamani Pillai and V. Rangaswami Aiyangar—underwent training as Mechanical Engineers in the Locomotive Workshops, Perambúr, and are reported to have made considerable progress.

Seven Civil Engineers and three Engineer Subordinates spent the year at the Public Works Workshops. It is satisfactory to note the testimony of the Superintendent that the style of work done by them was generally good.

Three Civil Engineers and 12 Engineer Subordinates were employed in various circles where important public works are under execution. The progress reports received from the several Superintending Officers show that the students have displayed considerable aptitude for the profession and acquitted themselves satisfactorily. No reports have yet been received on the work of three students, which is regretted. The most important feature during the year in connection with the practical work was the doubling of marks with a view to afford sufficient stimulus for greater exertion and improvement.

12. *Library and Physical Education.*—Good use was made of the library. Drill was introduced during the year into the Draughtsman and Surveyor's classes, and the number of marks for Physique in the Engineer class raised. The tabular

results show that the students secured nearly the maximum number of marks in Drill and Exercises. This is very creditable.

13. *Prospects of Passed Students.*—This is the first year in which the students of the Engineer and Engineer Subordinate classes who completed the theoretical and practical courses under the reorganization scheme received their College diplomas. Of the four Engineers, two have secured the guaranteed appointments, and under G.O., No. 364, Public Works Department, dated 9th February 1891, nine Engineer Subordinates will be posted to the Public Works Department. There is a reasonable prospect of the other students gaining suitable berths in the railways under construction. In its order quoted above, the Government was pleased to reserve for the Subordinate Engineers of future years six appointments, which is very encouraging. The Director is glad to find that all the Draughtsmen who passed have succeeded in obtaining employment. The register of passed students maintained in the College does not appear to be complete. It is very necessary that a full history should be kept corrected to date.

14. *Finance.*—The expenditure on the College and School departments aggregated approximately Rs. 15,960 and Rs. 39,485 and the income from fees amounted to Rs. 2,183 in College and Rs. 5,955 in school. The net cost of the College and School departments was thus Rs. 13,778 and Rs. 33,530. The net cost per head was Rs. 1,148 in the College and Rs. 252 in the School department.

15. The record of the past year is one of substantial progress on the practical as well as on the theoretical side, but much remains to be done before the College can be said to provide for the country an amount of technical education in regard to subjects falling within the scope of an institution of the kind fully equivalent to its cost. This object may be secured if it is amalgamated or associated with the School of Arts, and the number of subjects taught practically and theoretically in the combined or associated institution made to correspond with the industrial necessities of the country. Hitherto it has done little more than provide Engineering Assistants and subsidiary employés for a single great department—that of Public Works. This is good service, but it can do much more for the country without unduly increasing its cost.

(True Copies and Extract.)

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

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

ORDER—dated 28th July 1891, No. 580, Educational.

There is but little to add to Mr. Grigg's careful review of the reports upon the progress of the College of Engineering during 1890-91 and the Government agrees generally with his observations.

2. As remarked by the Director of Public Instruction, the year under report was one of substantial progress, the advance over the preceding year in the strength of all departments, except the Engineer classes, being very marked. The figures given below contain particulars of the attendance in each class during the last 3 years :—

Class.	Number in class on 31st March		
	1889.	1890.	1891.
Engineer	17	13	12
Do. subordinate	17	28	38
Military probationers	2	1	5
Draughtsman	18	25	43
Surveyor	13	29	33
Artisan	26	30	35
Total ..	93	126	166

The figures are not so satisfactory if carried further back, for on the 31st March 1887 the total strength of the College was 181 and on the corresponding date in 1886 it was 185, so that the institution cannot be said to have as yet completely recovered from the depression which characterized the years 1887-88 and 1888-89. The steady increase which has taken place since then, in spite of the far longer and more difficult course prescribed since the reorganization in 1886, is, however, a highly satisfactory feature and seems to show that the former decline was attributable rather to the introduction of the revised course of studies than to the difficulty of obtaining employment.

3. The weakness of the Engineer classes is remarkable and the Director of Public Instruction is probably correct in attributing this to the limited prospects of employment. Unfortunately the Government sees no probability at present of any increase in the number of appointments guaranteed to the Engineer classes and for some time to come it is probable that the demand for the members of these classes will be comparatively small. The recent alterations in the system of marking, the construction of the new workshop sanctioned in G.O., dated 25th June 1891, No. 481, Educational, and the contemplated changes in the nature of the practical course, all with a view to increasing the practical character of the instruction imparted, will, however, doubtless have an effect in increasing the demand for the superior grades of men educated in the College.

4. The percentage of the maximum marks obtained on the average by Engineer students at the final examination in December was 57 against 53 in the preceding year; similarly, the Engineer subordinate class obtained 61 *per cent.* against 45, the Draughtsman class 65 against 61, and the Surveyor class 68 against 56. This advance is gratifying, but in certain other respects the results produced by examination were not so satisfactory. Thus the average marks gained by the Engineer students in Science amounted to only 33 *per cent.* of the total and in the case both of these candidates and of the Engineer subordinate class the results obtained in Mathematics were decidedly poor.

The result of the B.C.E. examination was not creditable, only one out of the candidates examined having passed, and he only in the third class; it is, however, observed that three of the candidates examined had been studying privately.

On the other hand, the proportion of students who passed the final College examination was, in the case of each class, decidedly satisfactory.

5. The Government notes with pleasure the highly favourable report upon the conduct and attainments of the Military pupils and the remarks made by officers of the Public Works Department upon the progress of students attached for practical instruction to their divisions. The attention of the Public Works Department will, however, be invited to the absence of any progress reports from the Nellore and Periyár No. I Divisions; the punctual submission of these reports should be insisted upon.

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

(True Extract.)

Chief Secretary.

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

Exd. P. L. Pereira.

Govt. of {1891} Madras.

EDUCATIONAL.

Issued

Recd. *Encl.*

G.O., 28th July 1891, No. 580.

JULY.

College of Engineering.

Reviewing the report upon the working of the — during the year 1890-91 and forwarding copy of Proceedings to the Secretary of State.

R. 2299 W & 26 August 1891.

Recorded

2. The attention of Supdg. Engrs will be drawn to para 5 of the Govt orders with reference to paras 81 C and 101 C Fo Code.

Sd/ J. P.

S. E.
C. A. Galt.
S. of W. S. Project.

30TH JULY 1891, No. 690, REVENUE.

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—again the following G.O., dated 9th October 1890, No. 6110, Mis., Revenue:—

* * * * *

Order—dated 9th October 1890, No. 6110, Mis., Revenue.

The form prescribed in G.O., dated 7th July 1838, No. 1266 L., with the addition of a column to show the probable value of the land to be taken up will be adopted in all cases in which draft declarations are submitted to Government for the acquisition of lands under Act X of 1870.

(True Extract.)

(Signed) C. A. GALTON,
Secretary to Government.

To all Departments of the Secretariat.
,, the Commissioners of Land Revenue.
,, the Commissioner of Revenue Settlement, Land Records and Agriculture.
,, the Commissioner of Salt, Abkári and Separate Revenue.

ORDER—dated 30th July 1891, No. 690, Revenue.

Land Revenue, No. 57.

The additional column ordered in the Government Order read above to be inserted in the draft declarations for the acquisition of lands under Act X of 1870 is required solely for the information of Government and should not be published in the Gazette.

(True Extract.)

(Signed) C. A. GALTON,
Secretary to Government.

To all Departments of the Secretariat.
Copy to the Superintendent, Government Press.

Exd. Aubert.

70 Copies.

Govt. of {1891} Madras.

REVENUE.

Issued

Recd. *Encl.*

G.O., 30th July 1891, No. 690.

JULY.

Acquisition of Lands.

Stating that the additional column showing the probable value of the land to be taken up, ordered to be inserted in the draft declarations for the — under Act X of 1870, should not be published in the Gazette.

No 2295 W dt 25th Aug 1891

Recorded for guidance with reference to the standing orders

G.O. 225 (W) dt 24th July 1888

" 2786 (W) 20th Oct 1890

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper:—

From the Director of Public Instruction, dated 29th June 1891, No. 7407.

ABSTRACT.—Submitting copy of his Proceedings reviewing the report on the working of the College of Engineering during 1890-91.

ENCLOSURE.

No. 7015.

PROCEEDINGS OF THE DIRECTOR OF PUBLIC INSTRUCTION, dated 16th June 1891.

College of Engineering, Madras.

Read the following letter from the Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 31st January 1891, No. 1260:—

I have the honour to submit the following review of the working of the College of Engineering during the year 1890. 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 1890 is included in the present report.

2. *Establishment.*—On 16th January the post of Second Assistant Instructor in Drawing was filled up for the first time by the appointment of Mr. Littlewood, who joined from the Burma Public Works Department. Two days later, M.R.Ry. R. A. Bhakya Mudaliar, formerly a Supervisor under the Coimbatore Local Fund Board, assumed the duties of Second Assistant Instructor in Surveying. On 13th March, M.R.Ry. Bhavaniswami Rau, B.A., from the Teachers' College, was appointed Vernacular Assistant, sub. *pro tem.*, *vice* M.R.Ry. C. R. Krishna Aiyar, B.A., transferred to Calicut College. On 22nd April, Sergeant W. H. Goddard, Assistant Instructor in Surveying, was confirmed as Instructor in Surveying and Drawing. Mr. Pope, the Assistant Instructor in Drawing, retired on pension on 1st May, after a service of upwards of thirty years, some seven of which were spent at the College. Mr. Pope's appointment will not, for the present, be filled up. On 7th June, M.R.Ry. T. Rangaswami Aiyangar, B.A., was appointed Vernacular Assistant, but was directed to continue to act as Assistant, Presidency College; and T. N. Govindaswami Rau was confirmed as Instructor in Carpentry and Fitting.

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	8	3	5	4	24
Engineer Subordinate Class	12	3	7	20	20	62
Military Probationers	...	...	...	...	...	5
Draftsman Class	...	...	8	13	...	21
Surveyor Class	...	...	8	15	...	23
Artisan Class	...	...	...	...	...	28
					Grand Total ...	163

Excluding the students undergoing the practical courses in workshops and on works, the total number actually in the College on 31st December 1890 was 136. The numbers arranged by classes of the community were—

Europeans and Eurasians	19
Brahmans	49
Other Hindus	52
Native Christians	15
Mussalmans	...
Others	1
Total	136

The corresponding totals in the three previous years were—1889, 109; 1888, 102; 1887, 106. The effects of the depression of 1888 are still visible in the small class of Engineer Subordinates now passing to the practical course; but from this time forward they may be said to have disappeared from the College proper. Substantial classes of Draftsmen and Surveyors will join early in 1891, when the total number of students will rise to about 160. This will be increased to about 180 in July next, when a new division of Engineer Subordinates will be admitted. The Engineer class continues small, owing to the difficulty anticipated in obtaining suitable employment. The steps taken to remove this difficulty will be alluded to later.

4. *Examinations.*—The Board of Examiners conducted the final and term examination of all the classes in December 1890, and the entrance examinations of May and December. A brief abstract of the results is given below.

5. *Engineer Classes.*—Four students completed their final year's practical course on 31st December 1890, viz., R. Srinivasa Aiyangar, B.A., B.C.E., J. M. Lacey, B.C.E., and C. Kanakasuriyan Pillai on Public Works; and V. Daivasikhamani Pillai in the Madras Railway Workshops. These Engineers, who will receive their diplomas today, represent in the senior department of the College the first-fruits of the reorganisation of the institution which was effected in 1885 and 1886. The first two have been appointed to the Public Works Department as Assistant Engineers. One of the others, V. Daivasikhamani Pillai, is the first Mechanical Engineer trained at the Madras College.

The next batch of Engineer students, 8 in number, spent the year 1890 in workshops, one of them, V. Rangaswami Aiyangar, who will become a Mechanical Engineer, at the Perambúr Locomotive Shops, and the remainder at the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer class actually in the College, the senior, consisting of three students, joined in January 1888, and underwent final examination in December last. All passed the examination. The average percentages of marks for the division in the various subject heads were as follow:—

	Per cent.
Mathematics	55
Science	33
Engineering	50
Drawing and Estimating	71
Surveying	72
Vernacular Language	67
Drills and Exercises	100
Total	57

On comparing the results with those of 1889, when the average total was 53 per cent., it will be seen that there has been substantial improvement in *Drawing*, *Surveying*, *Vernacular Language*, and in *Drills and Exercises*. The results in *Science*, however, are still poor.

The senior pupil is A. V. Ramalinga Aiyar, B.A., who is easily first with 65 per cent. of the total marks, and who receives 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. Ramalinga Aiyar wins prizes for *Mathematics* and *Science* an aneroid barometer, and for *Engineering*, *Surveying* and *Drawing*, a planimeter. He also gains the Narayana Oonythan prize, a copy of Molesworth's pocket book. A prize for *Vernacular Language* and *Gymnastics*, consisting of a pocket rule, is awarded to K. Gopala Aiyar.

Two independent candidates, who were formerly College students, also appeared for the final examination, and one of them, R. Sundaram Aiyar, was successful. He will proceed with the first division to the workshops.

The second division of the Engineer class, containing five students, has undergone a term examination, the mark of which count towards the final total. The average of the division was 56 per cent. The scholarship of Rs. 30 per mensem for the ensuing year remains with L. D. Venkatarama Aiyar. Another student, S. Rojagopalaswami Mudaliar, wins a "Sir Madhava Rao" prize, consisting of an aneroid barometer, for workshop practice.

The third division of four students made an average of 69 per cent. of the total marks at the late term examination. The scholarship of Rs. 30 is retained by G. S. Rama Aiyar for the ensuing year.

Six candidates passed the entrance examination for the Engineer class, and should join the College early in 1891.

6. *Engineer Subordinate class.*—Twelve students completed their final year's practical course on Public Works on 31st December last, and like the senior batch of Engineers represent some of the first results of the College reorganisation. They will receive their diplomas to day. The first seven, viz., M. Venkata Rao, G. Narayana Rao, G. Srinivasa Aiyangar, A. Arulanandam Pillai, Sergeant E. Price, L. S. Panchapakesa Sarma, and M. R. Subrahmanya Aiyar, were appointed Overseers in the Public Works Department on 1st January 1891.

The next batch of Engineer Subordinate students, three in number, spent the year 1890 in the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer Subordinate class in the College proper, the senior, consisting of seven students, joined in August 1888, and underwent final examination in December last. Five of these were successful. The average percentages of marks gained by the whole division were—

Mathematics	48
Engineering	56
Drawing and Estimating	70
Surveying	69
Vernacular Language	48
Drills and Exercises	93
Total	61

Comparing the figures with those for 1889, when the average total was only 45 per cent., it will be seen that the class is far superior to the indifferent one which then left the College.

Private G. E. Brand, 7th Hussars, is *facile princeps*, with the remarkable total of 85 per cent. of full marks. He will receive the silver medal awarded to the most distinguished student, and prizes for *Mathematics*, an optical square; *Engineering*, a silver watch; and for *Surveying and Drawing*, a magnetic compass. Private Brand also carries off a "Sir Madhava Rao" prize for workshop practice, viz., a field glass, as well as the "Rogers" prize, which consists of books.

The second man is Sergeant C. J. Smith, 2nd Oxfordshire Light Infantry, who obtains 72 per cent. of the total marks, and is awarded a prize for *Vernacular Language*, consisting of a clinometer rule. Then follow W. T. J. Scanlon, M. S. Venkatarama Aiyar, and T. A. Kuppuswami Aiyar. Venkatarama Aiyar, Smith and Scanlon are commended for their work in the workshops, and Brand and Scanlon for Gymnastics.

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

The second division of the Engineer Subordinate class contains 20 students, who scored an average of 52 per cent. of the total marks at the term examination of December 1890. The first man is Lance Sergeant Blake, 21st Hussars, who obtains 76 per cent. of full marks, and is awarded a prize for general proficiency, consisting of a set of architect's scales. S. Dakshanamurti, P. N. Ramachandra Aiyar, Private Briant, 2nd Middlesex Regiment, and A. J. John have also done well. The scholarships of Rs. 10 per mensem are awarded to Dakshanamurti and Ramachandra Aiyar. The "Walker" scholarship is withdrawn from A J. Alvares owing to the unsatisfactory progress made by him.

The third division, which contains 20 students, joined in August 1890, and obtained an average of 62 per cent. of the marks at the term examination. M. V. Venkatarama Aiyar heads the list, and is followed by Lance Corporal J. Phelan, 2nd Bedfordshire Regiment, K. Srinivasa Aiyar, and K. R. Raman Pillai. The two scholarships of Rs. 10 are retained by Venkatarama Aiyar and Srinivasa Aiyar.

7. *Draftsman Class.*—The senior division, consisting of 8 students, appeared for the final examination in December last. Six were successful in gaining certificates; one, M. V. Srinivasa Aiyar, a certificate of the first class; three, S. Subrahmanya Aiyar, D. Tiruvengada Mudaliar, and S. A. Manickaswami Mudaliar, certificates of the "second class;" and two, F. W. Cames and L. A. Natesa Aiyar, of the "third class." The student who occupies the first place is S. Subrahmanya Aiyar, with no less than 89 per cent. of the total marks. He wins the College bronze medal, and a prize, consisting of a pillar compass and a box of colours, for his great proficiency in *Geometrical, Freehand, Perspective and Model Drawing*, in *Building* and *Topographical Drawing*, and in *Machine Drawing*. But for comparatively low marks in *Estimating*, he would have obtained the highest class of certificate. The second man, M. V. Srinivasa Aiyar, secures a first-class certificate with 82 per cent. of the total marks, and is awarded a prize for *Estimating*, consisting of a parallel rule. The percentages of marks gained by the division in the various subject heads were—

Practical Geometry	72
Freehand, Perspective, and Model Drawing	71
Building Drawing	74
Machine Drawing	61
Estimating	46
Topographical Drawing	53
Drills and Exercises	94
Total ...	65

These figures compare favourably with those of the previous year, when the average total was 61 per cent. There has been improvement in *Freehand, &c.*, and *Machine Drawing*, but a falling off in *Estimating*.

Independent candidates, six in number, also presented themselves for the certificate examination. These were former students of the College, and all passed in the third class. One of them, however, already holds a third-class certificate. Their average percentage of the total marks was 58.

The second division of the Draftsman class contains 13 students. The mean percentage of the division at the term examination of December 1890 was 68, which indicates the existence of good material. S. Venkatachalam and P. S. Tiruchelvam Pillai head the list, and gain scholarships of Rs. 8 per mensem.

Thirty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1891.

8. *Surveyor Class.*—In the senior division of 1890, there were only five regular students; but all of these passed the final examination; K. S. Vyasa Rau and G. Gopalaswami Nayudu gain "first-class" certificates; K. Subha Rau, a "second-class" certificate; and V. Kothandarama Sastri and T. Balasubrahmanya Aiyar "third-class" certificates. K. S. Vyasa Rau occupies the first place with 82 per cent. of the total marks, gaining the College bronze medal, and winning a prize, consisting of a binocular field glass, for proficiency in *Chain, Compass and Plane Table Surveying*, in *Levelling*, and in *Theodolite Surveying*. G. Gopalaswami Nayudu follows him closely with 80 per cent. of the marks, and is awarded a prize for *Topographical Drawing*, consisting of a pocket rule. The percentages gained by the division in the various subject heads were as follow:—

Chain, Compass, and Plane Table Surveying	65
Levelling	69
Theodolite Surveying	69
Topographical Drawing	67
Drills and Exercises	90
Total ...	68

These results show a great improvement over those of last year, when the average total was 56 per cent., especially in Theodolite work and Topographical Drawing.

Three independent candidates presented themselves, of whom one was successful in gaining a "third-class" certificate.

The second division of the Surveyor class contains 14 students. The average percentage of marks at the term examination of December 1890 was 61. The scholarships of Rs. 8 per mensem fall to T. S. Vasudeva Aiyar and C. Muttukrishna Mudaliar, who occupy the first and second places in the class.

Twenty-three candidates have been accepted for admission to the new division of the Surveyor class, which will be formed early in 1891.

9. *Maistry and Artisan Class.*—This evening class, opened in 1889, was instituted for the improvement of the sons of maistries and artisans, and of young artisans themselves, in certain technical branches of knowledge. Admission was eagerly sought, but the pupils have not hitherto belonged exclusively to those grades of the population which it was desired to attract. Many candidates of a different type offered themselves, owing apparently to a belief that the course of instruction would render them eligible for appointment as Sub-Overseers in the Public Works Department. The number of applicants in December last, however, was so large that a suitable selection for the course of 1891 has been practicable. During the past year, instruction was given in *Arithmetic, Mensuration, Building Construction*, and *Plan Drawing*: and arrangements were made for the examination of the class at the end of the session in the last three of these subjects, through the medium of the vernaculars, according to the standard of the Middle School examination. The results of this examination have not yet been published.

10. *Military Students.*—The total number of soldier students in the College on the 31st December was 10, exclusive of one going through the practical course (viz., 2 in the first division of the Engineer Subordinate class, 2 in the second division, 1 in the third, and 5 probationers). The number of admissions has for some time past been small, but in August 1890 a full class of five joined. If a similar number qualify for admission next July, there will be difficulty in accommodating them, owing to the partial occupation of the College barracks by the temporary workshops. The conduct of all the men has been exemplary, not a single defaulter sheet entry having been made during the year. The two men who are now leaving the College have greatly distinguished themselves in their studies, Private Brand's results being quite phenomenal, while the men of the junior divisions are making good progress. Lance Sergeant Smith and Private Brand sent drawings to the Soldiers' Exhibition held at Bangalore in September, and both secured prizes. Lance Sergeant Blake and Lance Corporal Phelan passed in a vernacular language according to the Higher Standard in the course of the year.

11. *Victoria Technical Institute Students.*—Three scholarship-holders of the Victoria Technical Institute were specially admitted in January 1890 for a course of *Mensuration, Surveying* and *Plan Drawing*. They were attached in the first instance to the Surveyor class, and all three passed in the first two of the above subjects at the next Higher Examination in Science, Art and Industries. One student left, owing to sickness, after six months, and the other two were then attached to the Draftsman class. One of these rejoined his appointment after nine

months, while the other remained until the end of the year. These men were all school teachers of intelligence, who, having only a limited time in which to acquire proficiency in their selected subjects, served as a spur to the ordinary students of the class to which they were first attached. The experiment of admitting them to the College outside the regulations has thus proved of advantage, and will be repeated in 1891.

Besides the Victoria Technical Institute scholars, several of the regular students of the College appeared voluntarily for the Higher Examination in Science, Art and Industries in *Surveying*, *Building Construction*, *Applied Mechanics*, *Machine Construction*, &c. Most of them were successful, and five scholarships, ranging from Rs. 4 to Rs. 12 per mensem, were awarded to the College students on the results of the examinations.

12. *Surveying.*—The outturn of field work was considerably greater than in 1889, when the practice of devoting a full day weekly for each class (two days for the Surveyor class) was first instituted. The average number of survey squads was 17, and the average number of students per squad was 5. The total outturn consisted of—

Trignometrical Surveying	17 sq. miles.
Traversing with theodolite, prismatic compass or plane table.	66 miles.
Levelling (including contour lines)	112 ,,
Interior filling in with chain, compass and plane table.	24,000 acres.

The localities surveyed were Triplicane, Chintadripet, Egmore, the Spur tank, the Esplanade, Mylapore, St. Thomé, the Adyar, Saidápet, Guindy and St. Thomas' Mount.

The average work per squad will be seen from the following table :—

Nature of Survey.	Number of squads.	Average work done per squad.	Total work.
Chain Surveying	8	134 acres.	1,072 acres.
Traversing with Compass	7	5 miles.	35 miles.
Traversing with Plane Table	1	8¼ ,,	8 ,,
Traversing with Theodolite	3	7¾ ,,	23 ,,
Levelling	9	12½ ,,	76 ,,
Filling in with Compass	7	452 acres.	3,164 acres.
Filling in with Plane Table	8	934 ,,	7,544 ,,
Hill sketching...	3	161 ,,	483 ,,
Filling in Trigonometrical Survey ...	3	3,840 ,,	11,520 ,,

Next year the experiment will be tried of sending out the Engineer class in February and July for a fortnight's continuous work in the field.

13. *Inspections of Works.*—Numerous inspections of works were made as usual by the Engineer and Engineer Subordinate classes, among which may be mentioned the Government and Perambúr Brick-fields, the Madras Lime and Cement works, the quarries at Pallávaram, the new High Court buildings, the girder bridges over the Cooum, the Red Hills tank, Irrigation works near Vandalúr, the Public Works Workshops, the Gun Carriage Factory, the Napier Foundry and the Perambúr Locomotive shops. Notes and sketches were submitted by all the students. The classes referred to were also exercised in setting out work on the ground, and, together with the Draftsman class, in measuring up buildings and iron bridges. With the object of facilitating the inspection of works at a distance from Madras, sanction has been asked for the purchase of a tent to accommodate the European and Eurasian students.

14. *College Workshops.*—The temporary workshop, which was started at the College in August 1889, was fully utilised throughout the year under review, carpentry, fitting, and turning being carried on. The shop accommodates only 12 students at a time; but 46 in all received regular instruction. The workshop is open all day on Wednesdays, and on other week days from 6-30 to 8-30 A.M. The students have been practised in chipping and filing cast and wrought iron, and in simple turning and screw-cutting. In carpentry they were exercised in sawing, planing, and the execution of common joints; after which they were employed in

the manufacture of tables, benches, almirahs, and miscellaneous articles for the College use. The workshop was strengthened during the year by the acquisition of a screw-cutting lathe and a bench drill. Considering the time available—an average of 3½ hours per week per student—and the absence of previous manual training, the results are very satisfactory, and show that Natives as well as Europeans will be able to use advantageously the permanent workshops which will, it is hoped, be shortly provided. It was mentioned in last year's report that plans and estimates for a permanent workshop and Engineering laboratory to be constructed at the south end of the College building had been submitted. These were revised by the Public Works Department during 1890, and were forwarded to Government in August. The estimated cost is Rs. 56,000. The early erection of new shops is a matter of importance, as, apart from the gain to the students, the rooms occupied by the temporary shops will be required this year to fulfil their proper use as barracks for additional military students.

15. *Laboratory and Experimental Work.*—The students of the senior division of the Engineer class have practised qualitative and quantitative analysis of simple substances and of building materials in the chemical laboratory. They have also been exercised in cement-testing, and in measuring the velocity of streams. Through the courtesy of Messrs. Binny & Co., they, with the first division of the Engineer Subordinate class, were permitted to attend at the Buckingham Mills, and to take steam indicator diagrams.

16. *Apparatus.*—The models and instruments indented for from England arrived only towards the end of the year. In addition to machine tools for the workshop, they consisted of surveying and drawing instruments, contoured models of hilly ground, apparatus for teaching experimental mechanics, models of iron beams and brick bond, apparatus for teaching orthographic projection, and models of machine details.

Sanction was accorded to utilizing a portion of the allotment in the construction of apparatus locally. The articles were designed by Mr. Chatterton, and consist of briquette moulds; appliances for measuring friction, the strength and elasticity of timber beams, and the moment of inertia of a heavy wheel; and apparatus for determining centrifugal force, and the efficiency of screws. Portions of the apparatus were made in the College workshop.

Models of the Dorabhavi bridge on the Southern Mahratta Railway were presented by the Chief Engineer of the Company, to whom my thanks are due.

17. *Practical Course, Mechanical Engineers.*—Early in 1890, arrangements were made with the Madras Railway Company to receive Mechanical Engineer students at the Locomotive shops for two years on payment of a premium of Rs. 250 per annum for each; and I have to acknowledge the very liberal spirit in which my proposals were met by Mr. Trevithick, the Acting Agent and Manager. The Government agreed to pay half this premium in the case of one student annually. Additional Mechanical Engineer students will pay the full premium themselves; but they may receive training gratis at the Public Works Workshops. Two students, V. Daivasikhamani Pillai and V. Rangaswami Aiyangar, the first of whom had worked previously at the Public Works shops at Dowlaishweram and Madras, joined at Perambúr on 1st March. The following is an extract from a report by Mr. Phipps, the Locomotive Superintendent: "The two College students have during the year conducted themselves entirely to my satisfaction. They have been punctual in their attendance, and have both shown much willingness to do their best, and to avail themselves in every possible way of the opportunity given them of learning the profession they have selected." Daivasikhamani Pillai was employed during one month in the Erecting shop, one month in the Fitting shop, one month in the Lathe shop, two months in the Foundry, one in the Blacksmiths' shop, one in the Carriage shop, and one in the Drawing office. The remainder of his time was spent in firing locomotives. Rangaswami Aiyangar spent five months in the Erecting shop, during which he assisted at the complete construction of a new engine from commencement to completion, and the rest of the year in the Fitting shop.

18. *Workshop Course, Civil Engineers and Subordinates.*—Seven Civil Engineers, and three Engineer Subordinate students spent the year at the Public Works Workshops. All of them commenced their course in the Carpenters' shop, where they remained for three months. They were then passed by turns through the Lathe, Filers' and Smiths' shops, the Instrument Department, and the Foundry, and completed the years' course with the working of a stationary engine for a week.

The Superintendent reports that the style of work done was generally good. He states that all the students behaved well during the course, and that the Engineers were regular in their attendance. The Engineer Subordinate students were less regular; but their absences were with leave.

This course has undoubtedly been of great advantage to the students; but I am of opinion that it is susceptible of improvement. The classes which have just joined the workshops have acquired in the College sufficient practice in carpentry, turning, and fitting to execute useful work under proper supervision. It has accordingly been suggested to the Superintendent of the Public Works Workshops that the students should no longer be kept apart by themselves, but that they should be dispersed among the regular hands, and be allowed to gain practical knowledge by working with them in a systematic manner.

19. *Works Course, Civil Engineers and Subordinates.*—Three Civil Engineers and twelve Engineer Subordinate students were attached throughout the year to various circles where important Public Works are in progress. The course comprises the practical details of brick-making, brick-laying, quarrying, building of all kinds, the management of labour, and accounts. An abstract of the progress reports received from the Public Works Department, which is given below, shows that all the students regarding whom reports have been received have acquitted themselves satisfactorily. Some of the students have had better opportunities than others; and it is hoped that in future it will be found possible to give work to all which will involve more individual responsibility. The importance of this practical course, which gives a familiarity with details of construction that a College training is powerless to convey, can hardly be over-estimated:—

Name.	Abstract of Progress Report.
R. Srinivasa Aiyangar, B.A., B.C.E.	*Nellore Division.*—Progress report not yet received.
J. M. Lacey, B.C.E. ...	*Periyár, No.* 1 *Division.*—Progress report not yet received.
C. Kanakasúrian Pillai, B.C.E.	*Periyár, No.* 2 *Division.*—Main channel masonry works. Employed in laying out and measuring up foundations, mixing mortar and arranging labour; in surveying, levelling, preparing survey and sections of channel, and on earthwork in branch channel. Can be entrusted with laying out channels and with all kinds of masonry work. Conduct very good. Has always proved willing and painstaking.
U. Venkata Rau ...	*Cuddalore Bridge Works,* January to September.—Attended at Ponniar masonry bridge, and Gadilam iron bridge. Assisted in taking levels and setting out work. Acquired fair practical knowledge of well-sinking, brick masonary and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of a weir under difficulties in Rajakal channel. Worked satisfactorily.
G. Narayana Rau ...	*Tanjore Division.*—Employed on bridge-making, brick-laying, opening and laying foundations, details of masonry work, earthwork, river training, office work and accounts. Very diligent and well conducted, and made satisfactory progress.

Name.	Abstract of Progress Report.
G. Srinivasa Aiyangar.	*North Arcot Division,* January to August.—Engaged on estimates for earthwork and masonry, and on execution of various works. Also on levelling and estimating for repair of tanks and channels. Worked very well indeed. *Cuddalore Bridge Works,* September to December.—Gadilam iron bridge. Employed on masonry work, iron riveting, laying out and raising approaches, surveying and levelling. Made himself very useful; was regular in attendance and hardworking. Conduct good.
A. Arulanandam Pillai.	*Cuddalore Bridge Works,* January to September.—Attended at Ponniar masonary bridge and Gadilam iron bridge. Levelling and setting out work. Acquired fair practical knowledge of well-sinking, brick masonry and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of sluice under difficulties in lofty tank bund. Assisted in building offices. Very intelligent and hard-working; conduct very good.
Sergeant E. Price, 7th Hussars.	*Periyár No.* 1 *Division.*—Progress report not yet received.
L. S. Panchapakesa Sarma.	*Trichinopoly Division.*—Instructed in practical details of buildings and irrigation works. Employed in estimating. Very intelligent.
M. R. Subrahmanya Aiyar.	*Tinnevelly Division.*—Employed on buildings and irrigation works, in levelling and on small surveys. Industrious and painstaking. Will make a good subordinate.
P. V. Ramaswami Aiyar.	*Madura Division.*—Engaged on irrigation work. Has shown himself active and well conducted. Will make a good subordinate.
C. J. Plummer ...	*Consulting Architect's Division.*—Attended the Brickfields and Lime-kilns. Is industrious and painstaking, and will make a good subordinate. Conduct uniformly good.
P. M. Swaminatha Aiyar.	*Periyár No.* 2 *Division.*—Main channel masonry works. Laid out and measured up foundations. Employed in mixing mortar and arranging labour; also in surveying and levelling, and in preparing plans and estimates for buildings and channels. Is hardworking, willing and painstaking. Will become a good subordinate. Conduct very good.
T. Venkatarama Aiyar.	*Kistna, Eastern Division.*—Employed in quarrying, fitting gearing to under-sluices, and on repairs to anicut. Also on construction of buildings, boat basin and canal bridge. Is obedient, and has made good use of his time.
P. Sivasubramanya Pillai.	*Kistna, Western Division.*—Employed on buildings, surveying, levelling, and accounts. Good application, progress satisfactory.

The possibility of affording the students a greater variety of work has been under consideration. The Hon'ble Mr. Garstin penned a minute on the subject in April last, and proposals have since been made to divide the year into three portions, so that one portion may be spent by each student in a Building Division, one in an Irrigation Division, and one in a Road or Railway Division.

Sanction was accorded during the year to the grant of travelling allowances at third-class rates to students joining and attached to works.

20. *Revision of Rules.*—It was pointed out in the Annual Report for 1889, that the recent increase in the practical work done at the College rendered desirable a substantial augmentation of the proportions of marks awarded by the staff. The principle having been approved by Government, a new arrangement, by which the original proportions were doubled, was introduced at the last examination. The marks awarded are submitted to the Board of Examiners, who scrutinise as far as possible the session work executed. Advantage was taken of the embodiment of this alteration in the College rules to make revision in a variety of details where experience showed that minor changes were desirable. The chief alterations provided for the admission to the Engineer Subordinate class of persons who have passed the Upper Secondary examination, and of a redistribution of the marks allotted

to the various branches in which the Draftsman and Surveyor classes receive instruction. The rules also provide for the long vacation taking place in May and June instead of June and July ; and for fee payments to be made by the Artisan class.

21. *Library and Reading Room.*—The Library, which consists of a Lending branch and Consulting branch, contains a total of 2,700 volumes, of which 133 were added in the course of 1890. During the year, 3,780 books were taken out, viz., 793 by staff, and 2,987 by students, while 1,202 references were made to the Consulting library. During the previous year the number of books taken out was 2,543, so that the increase in the use of the Library during the past year is no less than 50 per cent. Ten years ago, the number of books issued was under 300.

The College Calendar for 1890 contained a history of the College, the annual report, and other information which did not find a place in the issue of the previous year. The Calendar for 1891, now in the press, will contain further additional matter.

A set of examples in Carpentry was prepared and published by the Professor of Engineering, and an elementary work on Surveying was issued by Mr. D' Cruz, the Assistant Instructor in that subject.

22. *Physical Training.*—Regular training in Gymnastics was given to all the College classes, except that for Artisans, throughout the year. Considerable progress was made, as is testified by the marks gained at the final examination. From August last, Drill was introduced, selected military students acting voluntarily as instructors. Each Gymnastic class was divided into two squads, each of which worked for half the attendance at gymnastics, and for the other half at drill. This arrangement rendered the classes manageable, and increased the amount of work done. The new tennis court, alluded to in last year's report, was completed in May, and has since been in fairly constant use.

23. *Attendance.*—The rules regarding leave to students were made more stringent, with the result that the percentages of numbers present to numbers on the rolls rose to 97 for the College department, and 94 for the School department. These figures would have been even higher but for the epidemic of influenza which made its appearance in March, and caused a large number of temporary absences. In September there was a severe visitation of cholera in Madras, from which the College did not entirely escape. Among the students there were two cases, one of which unfortunately proved fatal. In November another fatality occurred through fever.

24. *Conduct.*—The conduct of the students has on the whole been good. There were, however, several dismissals for continued absence without leave and non-payment of fees; and more than one case of loss of instruments was reported. In October, a student of the Draftsman class was found in possession of a missing article, for which he was unable satisfactorily to account. The Police were called in, the student admitted theft, and was expelled on the spot. He was subsequently prosecuted and convicted. No further case of loss has occurred; and it is hoped that the swift punishment which followed on the detection of the crime will serve as a permanent deterrent.

25. *B.C.E. Degree Examination.*—Of the nine Engineer class students who left the College in December 1889, two passed the Degree examination in the preceding January, during their College course, while three of the remainder passed in January 1890. The successful percentage of the class was therefore 55. The failures occurred for the most part in mathematical subjects—a circumstance which I attribute to the difference between the College course and the Degree examination. The only branch of pure Mathematics studied in the College during the third year is the Differential and Integral Calculus, a subject which does not at present appear in the Degree syllabus. The revision of the latter is now engaging the attention of the Engineering Faculty. Six other candidates, old students of the College, appeared in 1890, of whom one was successful. The three Engineer class students who have just passed out of the College, presented themselves for the Degree examination in January 1891. The results will be made known in my supplemental report.

26. *Prizes and Endowments.*—I announced in my last report that Raja Sir T. Madhava Rao, 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 was accepted by Government, and the prizes, each of the value of Rs. 20, thus become available for the first time on the present occasion. Two have been awarded for Workshop practice, and one for Practical Surveying. The "Rogers" Prize, the outcome of an endowment by old students of the Eengineer Subordinate class in memory of the Principalship of Major-General Rogers, R.E., also becomes available for the first time this year. The prize consists of books. A copy of Molesworth's pocket book is again presented by M.R.Ry. Narayana Oonythan, an old student of the Engineer class. The remaining prizes consist as usual of instruments. The medals presented this year were struck at the Bombay Mint from dies engraved in London for the College. The handsome design for the diplomas and certificates which are issued today was made by S. Subrahmanya Aiyar, the senior student of the Draftsman class. The forms have been lithographed for present use, but the original design has been sent to England to be engraved.

27. *Employment of Passed Students.*—The question of prospect of employment is one of deep interest to all the students of this College, and especially so to those who will today receive the diplomas and certificates declaring them to be fitted to practise the professions and callings for which they have been studying. The case of the passed men of December 1889 will first be considered. The batches consisted only of Draftsmen and Surveyors, and contained small numbers. Of the five Draftsmen, one joined the College Surveyor class, and the remainder are all employed (three of them on Railways) on an average salary of Rs. 40. The five independent Draftsmen of December 1889 are also employed on an average salary of Rs. 28. The two Surveyors are in receipt of average salaries of Rs. 40.

The vacancies notified during the year have been *Engineers* and *Assistant Engineers*, 3 (Local Boards 2, Mechanical Engineer 1) ; *Overseers* and *Sub-Overseers*, 34 (Local Boards 18, Burma P.W.D. 12, others 4), average salary at outset, Rs. 50 ; *Draftsmen*, 23 (P.W.D. 13, Railways 5, Local Boards 3, others 2), average salary Rs. 40 ; *Surveyors* 11 (P.W.D.3, Railways 1, Local Boards 3, others 4), average salary Rs. 50.

As regards the students who completed their course on 31st December 1890, Government have conferred, with effect from 1st January 1891 two appointments as Assistant Engineer, and seven as Overseer, in the Public Works Department, on the senior men of the corresponding batches. The statistics just given show that the remaining Engineer subordinates, as well as the Draftsmen and Surveyors, are not likely to remain long unemployed. The two Engineers who do not obtain Government appointments will, it is hoped, secure suitable employment, especially Daivasikhamani Pillai, our first Mechanical Engineer. On the facility with which these men and succeeding batches of Engineers obtain professional work depends the number of admissions to the College Engineer class. When the stamp of native Engineer as now, for the first time thoroughly trained, becomes generally understood and appreciated, I anticipate a wider field of employment. This will take time however, and until public opinion has become formed, the College must look to Government and the Railways to afford all possible encouragement. To this end it was suggested in last year's report that the guaranteed appointments of 1888 and 1889, which lapsed as a result of the extension of the course, should be conferred on later batches. Subsequently, it was asked that this College should be placed on the same footing as the Colleges of Poona and Calcutta with respect to the number of Engineer appointments guaranteed from year to year. These applications were negatived by reason of insufficiency of vacancies in the Public Works Establishment. It was then pointed out that the requirements of State Railway surveys and construction could not be met by the Madras Public Works Department, and that large numbers of Engineers were imported from other Provinces for such work ; and it was suggested that a promising field existed for the temporary employment of locally trained Engineers. This application is now under the consideration of Government, and it is hoped that it will be favourably considered.

Officers from other provinces naturally prefer to employ as assistants and subordinates, natives of those provinces, with whose powers and peculiarities they are familiar. All I ask for, however, is a trial of the men who have the best claim to employment within the limits of this Presidency. If, after a reasonable period of probation, they are not found suitable, let them make way for better men.

With respect to guarantees to the Upper Subordinate class, I have pointed out that, to secure a constant flow of men from the College to the Public Works Department, it is essential that the number of guaranteed appointments should be as numerous as possible, and fairly constant from year to year; and the desirableness has accordingly been urged of establishing a reserve of appointments. The existence of the reserve will ensure the usual number of appointments during years in which a reduction may be required in the Public Works establishment, and will thus avert a depression in the College which would re-act on the Department again five years later. The reserved appointments can of course be occupied temporarily until required. The present time seems a suitable one for the formation of such a reserve, since no permanent appointments to the Upper Subordinate establishment were made during 1888, 1889 or 1890, and the number of vacancies must consequently be considerably in excess of the appointments conferred on 1st January last.

28. *General Remarks.*—I take this opportunity of acknowledging the hearty co-operation of the members of the College staff, and especially of the Professors of Mathematics and Engineering. The latter, Mr. Chatterton, has superintended the College workshops, the Chemical Laboratory, and the details of most of the experimental work performed. In the junior establishment Sergeant Goddard has displayed much energy in improving the quality of the Surveying and Drawing. All the other members of the staff, among whom I particularise Conductor Cames and Mr. D'Cruz, have worked well. Thanks are also due to the Board of Examiners under the presidentship of Major Baddeley, who submitted the results of the examinations with unusual expedition; as well as to the Locomotive Superintendent of the Madras Railway, the Superintendent of the Public Works Workshops, and the various officers of the Public Works Department who have supervised the practical training of the students.

The report now concluded shows that the past year has been one of steady progress. More work has been done than heretofore, and the results, as tested by examination, show a substantial improvement on those of the previous year. If the work be contrasted with the outturn of five or six years ago, when the Principal was the sole member of the superior staff, when there were no practical courses, no College workshop, no Examining Board, no training in Mechanical Engineering and Machine Drawing, no commodious buildings, I think it will be admitted that great strides have lately been made in Engineering education in Madras.

Read the following letter from the Acting Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 13th March 1891, No. 1439-C:—

With reference to your official memo. No. 2246, dated 4th March 1891, I have the honour to submit detailed lists of the results of the examinations held in December 1890, and a statement showing the distribution of the students in the College at the end of the session according to classes of the community, and to subjoin information on the other matters referred to in the memorandum under reply.

B.C.E. Degree Examination of 1891.—Eleven candidates registered their names for this examination, but one of them, an ex-student, did not appear. Of the 10 who underwent examination in January last, only one (A. V. Ramalinga Aiyar, B.A., who stood first at the College final examination in the preceding December) was successful, being placed in the third class; the candidate who took up Mechanical Engineering also failed. Of these 10 candidates, three were in

their final year's theoretical course, one in the second and three in the first year's practical course, and the remaining three were studying privately, having failed at previous examinations.

Passed Students.—Register of passed students have been maintained at the College (please see para. 25 of report for 1889—Calendar for 1890); but the information afforded is not altogether satisfactory, as many do not supply the information asked for.

Progress Reports.—Progress reports regarding R. Srinivasa Aiyangar, J. M. Lacey and Sergeant Price do not appear to have been received. As these men have been already appointed to the Department, it appears unnecessary to call for these reports now.

Of the 28 students in the Artisan class, only four were artisans, two of them being employed as sub-maistries on Government buildings under construction, one was a bricklayer, and the other a cutting tailor.

The candidates who sought admission to this class in 1890 and 1891 may be classed as follows:—

According to classes of the community—

	1890.	1891.
Brahmans	13	15
Rajput	...	1
Vellalas	24	37
Chettis	2	4
Yathavas	3	3
Native Christians	3	6
Malayalee Sudra	1	...
Visvakarma	1	6
Balijas (Nayudus)	8	11
Vanniahs (Nayakars)	3	5
Karnam	1	1
Mussalmans	...	2
Total	59	91

According to the occupations of candidates—

	1890.	1891.
Maistry, Sub-Overseer, Municipal Overseer, Apprentice, School of Arts, &c.	9	20
Draughtsmen	7	...
Clerks, &c.	3	11
Students—		
Engineering College	...	10
School of Arts	6	9
Others	25	20
Teachers	4	4
Engraver	...	1
Goldsmith	...	1
Landholder	...	1
Contractor	...	1
Messenger	...	1
Nil	5	12
Total	59	91

According to the occupations of parents—

	1890.	1891.
Landholders	5	8
Clerks, &c.	17	19
Merchants	2	6
Draughtsmen, Maistries or Contractors	20	26
Bricklayer Maistry, Carpenter or Mason	4	7
Engineer, Overseer, Public Works Department or Municipality.	5	10
Book-binder, Painter, &c.	...	4
Nil	6	11
Total	59	91

All the 28 students of the Artisan class which attended the College in 1890 appeared for the Middle School examination in—

(1) Mensuration;
(2) Building Materials and Construction; and
(3) Plan-drawing and Estimating.

Passed in subjects (1) and (2)	4
Do. in subject (1) alone	2
Do. in do. (2) do.	6
Do. in do. (3) do.	*Nil.*

Entrance Examination, Engineer Classes.—Six candidates appeared for the entrance examination for the Engineer classes held in December 1890, and all of them were successful; but only three have joined the College.

Read the following letter from the Acting Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 20th April 1891, No. 107-C:—

In continuation of this office No. 1260-C, dated 31st January 1891, I have the honour to forward a supplementary report to complete the information required to the end of the official year.

2. *Establishment.*—Captain H. D. Love proceeded to England on duty and was relieved by me as Acting Principal on 27th February 1891. M.R.Ry. R. A. Bhakya Mudaliar was confirmed as Assistant Instructor, Surveying, with effect from 18th January 1890. M.R.Ry. T. Rangaswami Aiyangar, B.A., Vernacular Assistant, was permanently transferred to the Presidency College on 18th February 1891. M.R.Ry. M. R. Vaidyanatha Sastri, B.A., was appointed Vernacular Assistant of the College, but was directed to continue to act at the Calicut College on 18th February 1891.

3. The numbers on the rolls on 31st March 1891 were as follow:—

—	First Division.	Second Division.	Third Division.	Total.
Engineer class	5	4	3	12
Do. Subordinate class	20	18	...	38
Military Probationers	5	...	...	5
Draughtsman class	13	30	...	43
Surveyor do.	14	19 + 2*	...	35
Artisan do.	35	...	...	35
			Total ...	168

The two marked thus * are Victoria Technical Institute scholars permitted to work with the Surveyor's class (*vide* your No. 8690, dated 8th October 1889).

The next entrance examination for the Engineer Subordinate class will be held on the 27th April and admission will take place after the end of the vacation. Forty-eight applications have been received from civilian matriculates and four from military candidates.

4. *Attendance.*—During the past official year the percentage present of the total number on the rolls was 95·2 for the College department and 94·3 for the School department (*vide* the statement below).

Average Number on Rolls.

Class.	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College Department.												
Engineer class, 1st division ...	4	4	4	3	3	3	3	5	5	5		
Do. 2nd do. ...	5	5	5	5	5	5	5	4	4	4		
Do. 3rd do. ...	4	4	4	4	4	4	4	3	3	3		
Total ...	13	13	13	12	12	12	12	12	12	12	123	12·3
School Department.												
Engineer sub-class, 1st division.	7	7	7	7	7	7	7	21	20	20		
Do. 2nd do. ...	21	21	21	21	20	20	20	19	18	18		
Do. 3rd do. ...	...	...	21	21	21	20	20	...	...	...		
Draughtsman class, 1st division.	8	8	8	8	8	8	8	13	13	13		
Do. 2nd do. ...	16	16	18	17	15	14	14	25	30	30		
Surveyor class, 1st do. ...	8	8	8	8	8	8	8	13	14	14		
Do. 2nd do. ...	21	21	17	16	16	15	14	20	21	21		
Artisan class	30	30	30	29	28	28	28	32	35	35		
Military Probationer class ...	1	1	5	5	5	5	5	5	5	5		
Total ...	112	112	135	132	128	125	124	148	156	156	1,328	132·8

Average Daily Attendance.

—	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College department	11	13	12	12	12	12	12	10	11	12	117	11·7
School do.	99	103	125	123	120	119	121	142	150	150	1,252	125·2

5. The order of Government with reference to the wearing of gowns has not as yet been complied with as I was under the impression that it was still under reference. The order, it is hoped, will be carried out from the beginning of next term.

Read the following report from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated Madras, 29th January 1891:—

We have the honour to forward our report on the results of the examinations conducted by us during December 1890.

2. The Board was composed as follows:—

President:

Major W. L. C. BADDELEY, R.E.

Members:

Mr. G. H. STUART, M.A.
„ E. W. STONEY, M.E., M. INST. C.E.

Assistant Examiners.

Mr. W. N. POGSON, F.S.A.
Dr. VANGEYZEL.
M.R.Ry. 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, 1st division	3	3	...
(2) Engineer Subordinate class, 1st division	7	5	2
(3) Draughtsman class, 1st division	8	6	2
(4) Surveyor class, 1st division	5	5	...

Group (b).

	Numbers registered for examination.	Passed.	Failed.
(1) Independent candidates for "Engineer" certificates.	2	1	1
(2) Independent candidates for "Engineer Subordinate" certificates	*5	1	4
(3) Independent candidates for "Draughtsman" certificates	6	6	...
(4) Independent candidates for "Surveyor" certificates.	3	1	2

* One candidate was absent from nearly all the examinations.

Group (c).

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

5. In group (*a*) the results show an improvement upon those of the last year, generally throughout all the classes, but more especially in the 1st division of the Engineer Subordinate class. The excellent work done by some members of this class was not unexpected, for, in Major Baddeley's report on the examinations of 1889, special reference was made to the improvement shown at the term examinations by this section of the College. Private G. E. Brand, Sergeant C. J. Smith and W. T. J. Scaulon have done very well, the first two have proved themselves to be exceptionally good all round men, and all three should become useful members of the Department of Public Works.

6. We are glad to observe that the suggestion, in last year's report, for an increase in the College marks, as compared with those allotted by the Board, has been adopted; and the junior classes now in the College will receive the full benefit of the alteration.

7. In group (*b*) the results are not satisfactory except among the Draughtsmen, who have all done fairly well, though no man has obtained a higher certificate than third class. As the names registered for examination in group (*b*) were College failures, a higher percentage of "passed" was not to be expected, but under the new rules for the employment of Draughtsmen in the Public Works Department, passed men will come up from time to time to endeavour to obtain higher certificates, and the results of this concession should be carefully watched.

8. The subject of "Estimating" was an unsatisfactory feature in the recent examinations, and requires the special attention of the College staff. The marks obtained by the Engineer class, 1st division, in "Science" were very low, but those gained by the 2nd division lead us to expect better results in this branch of study at the next final examination.

9. The term examinations were generally satisfactory, and point to good results at future final examinations.

10. In concluding this report, we would observe that there has been considerable improvement in the results of the examinations since the appointments of Mr. Chatterton and Mr. Middlemast; the new rules appear to work well, and we have no doubt that future years will, under the present system of education in the College, show still better results.

The above papers relate to the working of the College during 1890-91. The supplementary report should have referred to the results of the last B.C.E. Degree examination and the general financial position of the institution.

2. *Staff.*—Captain Love held charge of the office of Principal till the 27th February 1891, when on being relieved by Major Smart, he proceeded Home to complete his course at Chatham. The Professorial staff remained undisturbed and the changes in the subordinate staff were fewer than usual. The post of Second Assistant Instructor in Drawing was filled during the year, while that of the First Assistant Instructor in Drawing, which fell vacant on the retirement of Mr. Pope, was not filled.

3. *Strength.*—Excluding the 27 students in their practical course, the strength of the College at the end of the session was 136 against 109 at the close of the previous session. On the 31st March last the number stood at 166, not including the two Victoria Technical Institute scholars. The average attendance was injuriously affected by the bad condition of the public health during the year. It is satisfactory to note that, in spite of these disturbing elements, the stringent rules regarding leave to students introduced during the year with a view to check continued absence without permission resulted in raising the percentage of average attendance from 94 to 97 in the College and from 92 to 94 in the School department.

4. *Distribution of Students.*—The distribution of students among the different classes during the past two years is given in the margin. The total number rose by 40, and the Engineer class excepted, all the classes participated in the increase, notably the Draughtsman and Engineer Subordinate classes. There is every reason to hope, if the present rate of advance is kept up, that the latter class will ere long regain its former popularity. The raising of the limit of admissions in article IV lately sanctioned by Government, may lead to further improvement in the strength of the several school classes, as the value of the theoretical and practical instruction now imparted in the institution is better appreciated by employers of skilled labour than it was. The present activity in railway and building construction in several parts of the Presidency is probably influencing students in the adoption of Engineering, or of branches of technical knowledge subsidiary thereto, as their profession. The Maistry and Artisan class is numerically as strong as it can be under existing arrangements, but the Director has under consideration a plan for developing the class and extending its usefulness. Of the 28 students in this class at the end of the session 1890, only four were artisans, two of them being employed as sub-maistries on Government buildings under construction, one a bricklayer and the other a tailor. From one point of view this is not satisfactory, but from another the tendency of all classes to devote themselves more and more to industrial pursuits is very encouraging, for it shows that the non-artisan classes are beginning to press for a share in the artisan employment of the country either as maistries or as workers. The tendency should be encouraged in the interests of the artisan class as well as of all classes of the community. The Engineer class continued small, and the numbers stood at 12 on the 31st March 1891 against 13 on the corresponding day in 1890. Of the six candidates who appeared for and passed the entrance examination for admission to this class held in December 1890, only three joined the College. The smallness of

	Strength on the 31st March	
	1890.	1891.
Engineer classes	13	12
Engineer Subordinate classes	28	38
Military Probationers ...	1	5
Draughtsman's class ...	25	43
Surveyor's class	29	33
Artisan class	30	35
Total ...	126	166

this class, which is less than a third of its normal size, is solely attributed to the limited prospects of employment for passed students. There is no likelihood of the number of guaranteed appointments being increased ; but the spread of technical knowledge, the growth of a scientific knowledge of the resources of Southern India, the opening to a larger extent than hitherto of railway and other departments to young men trained in the College, the development of the mining industry; the establishment of manufacturing mills and other enterprises requiring engineering knowledge are calculated to bring about a marked improvement in this direction. But the Director is assured that these circumstances will never have their full effect on this branch of education until the system of education itself is made much more practical, though not less theoretical, than it is at present. The existence of a really practical Engineering school in the country will enhance greatly the demand for skilled engineering labour.

5. *Classes of Community represented at the College.*—Information has not been furnished in the supplementary report regarding the classes of the population to which the pupils on the 31st March last belonged. The following figures are taken from the annual returns and include the two Victoria Technical Institute scholars :—

Classes.	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Europeans and Eurasians ..	...	13	1	14
Brahmans	10	37	7	64
Other Hindus	2	51	2	61
Native Christians	1	11	2	13
Muhammadans	...	...	...	2
Others	...	1	...	2
Total ...	13	113	12	156

It is disappointing to find that not a single Muhammadan has joined the College department. The increase under Native Christians is greater than that under Other Hindus. The increase in the Brahmans in the School department shows that this class of the population is taking to technical pursuits, probably chiefly owing to the pressure of competition in clerical callings. The earnest attention of the Anjumani Mufid-i-Ali-Islam is invited to this absence of Muhammadans from the College department, notwithstanding the fact that article IV of the College rules holds out a qualified precedence to the members of this community, and that encouragement in the way of scholarship is offered in Chapter V of the Grant-in-Aid Code and by the Victoria Technical Institute. The admission of two Muhammadan pupils into the School department is, however, noted with pleasure.

6. *Social and Economic condition of College Students.*—The figures in the margin classifying students according to the chief callings of their parents or guardians show that all the College students belonged to official or land-holding classes, whilst in the School department only one pupil in thirty was either a trader's or an artisan's son.

—	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Officials	4	46	7	78
Landholders ...	9	29	5	44
Petty officials ...	...	11	...	9
Traders	...	7	...	5
Artisans	...	8	...	6
Others	...	12	...	14
Total ...	13	113	12	156

7. *University Examinations.*—The results of the B.C.E. examination held in January 1889 and 1890 were commented on in the last review. Only one, viz., A. V. Ramalinga Aiyar, B.A., out of the three students from the senior division of the College that appeared for the last B.C.E. examination, was successful, while none passed out of seven students

of the previous years that presented themselves for the examination. From the analysis of failures given in the margin, it is observed that as many as six candidates at the last B.C.E. examination failed in Science and three in Mathematics, and the same number in Constructive Engineering. The heavy failure in Science and the fact that comparatively poor results were obtained by the students in this subject at the final examinations also held by the College Board of Examiners should receive the early attention of the Principal and the Professors concerned in view of ascertaining clearly where the cause of failure lies. Possibly the amount of time given to the subject is insufficient.

Subjects of failure.	Number failed.
Mathematics	3
Science	6
Mensuration and Estimate-making ...	1
Constructive Engineering	3
Architectural and Topographical Drawing	1

8. *Examinations conducted by the College Board of Examiners.*—The final, term and entrance examinations were as usual conducted by a Board of Examiners consisting of the following members appointed by Government :—

Major W. L. C. Baddeley, R.E.—*President.*
Mr. J. H. Stuart, M.A., } *Members.*
„ E. W. Stoney, M.E., M. INST. C.E., } *Members.*
„ W. N. Pogson, F.S.A., } *Members.*
Dr. VanGeyzel, } *Assistant Examiners.*
M.R Ry. P. Vijiarunga Mudaliyar, } *Assistant Examiners.*

The above Board examined not only the College students, but also batches of independent candidates for certificates of the different grades. The notes, if not the reports, of the individual examiners have again not been forwarded as required. The attention of the President was drawn to this omission in the review of the last report, but the matter seems to have again escaped his attention. It is hoped that he will in future conform to this requisition, as the opinion of each examiner as to the way in which the pupils have acquitted themselves is of importance.

Engineer Class.—All the three students from the senior division passed the final examination for Assistant Engineers. There was an appreciable improvement in the average marks secured by each of the three divisions of the Engineer class. But the tabular results still show some weakness in Science, Mathematics and Engineering.

Engineer Subordinate class.—Five out of the seven students forming the senior division passed the final examination—a considerable improvement over the result of the preceding year, when two passed out of nine entered. Though the total average percentage 61 against 45 is higher, the relatively low percentages in Mathematics, Engineering and Vernacular language indicate that the students were not quite up to the mark. One student, for instance, was able to secure only 94 out of 370 marks in Mathematics. The deficiency may no doubt be partly attributed to the low general attainments of the students comprising this class ; but as under G.O., No. 630, dated 12th September 1890, F.As. and Upper Secondary men will be preferred to Matriculates in future, there is every probability of students of higher calibre entering the College in the near future. At the term examination the second division scored 52 per cent. of the total marks against 61 per cent. of the previous year's batch, while the third division 62 per cent. against 59 per cent. The former division requires to be very carefully worked up to secure suitable results at the next final examination.

Draughtsmen Class.—Six out of the eight students of the senior division succeeded in securing certificates, one of the first, three of the second, and two of the third class. The percentages of marks gained in Machine Drawing and Topographical Drawing are not, however, satisfactory. The results in Estimating are also very disappointing, and as pointed out by the Board of Examiners, this subject demands special attention from the College staff. As in the previous year, the junior division gained 68 per cent. of the total marks.

Surveyor's Class.—It is satisfactory to note that all the five students that appeared for the final examination secured certificates, two of the first, one of the second, and two of the third class, and that the average percentages of marks in the senior and junior divisions rose from 56 and 53 to 68 and 61, respectively.

Independent Candidates.—The numbers registered and passed for the different certificates are noted below : —

	Number registered.	Number passed.	
For Engineer	2	1	
„ do. Subordinates	5	1	
„ Draughtsmen	6	6	in the third class.
„ Surveyors	3	1	do. do.

The results obtained by the Engineer subordinates were very unfavourable. Turning to the Surveyors, the two students who failed fared very badly, more especially in Theodolite Surveying and Topographical Drawing.

9. *Government Higher Examinations in Science, Arts and Industries.*—A good number of the regular students of the College as well as the three scholarship holders of the Victoria Technical Institute competed for the Government examinations in Science and Art, the former in Surveying and Levelling, Building Construction, Applied Mechanics, Machine Construction, Pure Mathematics, Bridge-making, Hydraulics, Mechanical Drawing and Earth and Railway work, and the latter in Mensuration, Surveying and Plan-drawing. The last three passed in Mensuration and Surveying, and most of the former were also successful. Five of them have been awarded scholarships ranging from Rs. 4 to 12 per mensem under Chapter V of the Grant-in-Aid Code. It seems desirable to encourage students to attend these examination as the preparation does not interfere with their regular work, whilst it gives an opportunity to the students to show marked ability in individual subjects, which cannot be so effectively accomplished or so publicly recognized under the College Examination system.

10. *Maistry and Artisan Class.*—Of the 20 students who appeared for the Middle School examination in technical subjects, two passed in Mensuration, six in Building Materials and Construction and four in both subjects—Mensuration and Building Materials and Construction. The system of working the class needs improving before it can be regarded, as it should be, as a school for maistries and persons of that class.

11. *Practical Courses.*—The Survey practice during the year was sufficiently extensive. In the College workshop the students had worked at Carpentry, Fitting and Turning with advantage. Only 46 students, however, were able to receive regular instruction as the workshop could not accommodate a larger number. The Director trusts that Government will be able to accord its early sanction to one of the alternative schemes now before it for providing a permanent workshop.

Under G.O., No. 294, dated 23rd April 1890, Educational, two students—V. Devasikhamani Pillai and V. Rangaswami Aiyangar—underwent training as Mechanical Engineers in the Locomotive Workshops, Perambúr, and are reported to have made considerable progress.

Seven Civil Engineers and three Engineer Subordinates spent the year at the Public Works Workshops. It is satisfactory to note the testimony of the Superintendent that the style of work done by them was generally good.

Three Civil Engineers and 12 Engineer Subordinates were employed in various circles where important public works are under execution. The progress reports received from the several Superintending Officers show that the students have displayed considerable aptitude for the profession and acquitted themselves satisfactorily. No reports have yet been received on the work of three students, which is regretted. The most important feature during the year in connection with the practical work was the doubling of marks with a view to afford sufficient stimulus for greater exertion and improvement.

12. *Library and Physical Education.*—Good use was made of the library. Drill was introduced during the year into the Draughtsman and Surveyor's classes, and the number of marks for Physique in the Engineer class raised. The tabular

results show that the students secured nearly the maximum number of marks in Drill and Exercises. This is very creditable.

13. *Prospects of Passed Students.*—This is the first year in which the students of the Engineer and Engineer Subordinate classes who completed the theoretical and practical courses under the reorganization scheme received their College diplomas. Of the four Engineers, two have secured the guaranteed appointments, and under G.O., No. 364, Public Works Department, dated 9th February 1891, nine Engineer Subordinates will be posted to the Public Works Department. There is a reasonable prospect of the other students gaining suitable berths in the railways under construction. In its order quoted above, the Government was pleased to reserve for the Subordinate Engineers of future years six appointments, which is very encouraging. The Director is glad to find that all the Draughtsmen who passed have succeeded in obtaining employment. The register of passed students maintained in the College does not appear to be complete. It is very necessary that a full history should be kept corrected to date.

14. *Finance.*—The expenditure on the College and School departments aggregated approximately Rs. 15,960 and Rs. 39,485 and the income from fees amounted to Rs. 2,183 in College and Rs. 5,955 in school. The net cost of the College and School departments was thus Rs. 13,778 and Rs. 33,530. The net cost per head was Rs. 1,148 in the College and Rs. 252 in the School department.

15. The record of the past year is one of substantial progress on the practical as well as on the theoretical side, but much remains to be done before the College can be said to provide for the country an amount of technical education in regard to subjects falling within the scope of an institution of the kind fully equivalent to its cost. This object may be secured if it is amalgamated or associated with the School of Arts, and the number of subjects taught practically and theoretically in the combined or associated institution made to correspond with the industrial necessities of the country. Hitherto it has done little more than provide Engineering Assistants and subsidiary employés for a single great department—that of Public Works. This is good service, but it can do much more for the country without unduly increasing its cost.

(True Copies and Extract.)

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

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

ORDER—dated 28th July 1891, No. 580, Educational.

There is but little to add to Mr. Grigg's careful review of the reports upon the progress of the College of Engineering during 1890-91 and the Government agrees generally with his observations.

2. As remarked by the Director of Public Instruction, the year under report was one of substantial progress, the advance over the preceding year in the strength of all departments, except the Engineer classes, being very marked. The figures given below contain particulars of the attendance in each class during the last 3 years :—

Class.	Number in class on 31st March		
	1889.	1890.	1891.
Engineer	17	13	12
Do. subordinate	17	28	38
Military probationers	2	1	5
Draughtsman	18	25	43
Surveyor	13	29	33
Artisan	26	30	35
Total ..	93	126	166

The figures are not so satisfactory if carried further back, for on the 31st March 1887 the total strength of the College was 181 and on the corresponding date in 1886 it was 185, so that the institution cannot be said to have as yet completely recovered from the depression which characterized the years 1887-88 and 1888-89. The steady increase which has taken place since then, in spite of the far longer and more difficult course prescribed since the reorganization in 1886, is, however, a highly satisfactory feature and seems to show that the former decline was attributable rather to the introduction of the revised course of studies than to the difficulty of obtaining employment.

3. The weakness of the Engineer classes is remarkable and the Director of Public Instruction is probably correct in attributing this to the limited prospects of employment. Unfortunately the Government sees no probability at present of any increase in the number of appointments guaranteed to the Engineer classes and for some time to come it is probable that the demand for the members of these classes will be comparatively small. The recent alterations in the system of marking, the construction of the new workshop sanctioned in G.O., dated 25th June 1891, No. 481, Educational, and the contemplated changes in the nature of the practical course, all with a view to increasing the practical character of the instruction imparted, will, however, doubtless have an effect in increasing the demand for the superior grades of men educated in the College.

4. The percentage of the maximum marks obtained on the average by Engineer students at the final examination in December was 57 against 53 in the preceding year; similarly, the Engineer subordinate class obtained 61 *per cent.* against 45, the Draughtsman class 65 against 61, and the Surveyor class 68 against 56. This advance is gratifying, but in certain other respects the results produced by examination were not so satisfactory. Thus the average marks gained by the Engineer students in Science amounted to only 33 *per cent.* of the total and in the case both of these candidates and of the Engineer subordinate class the results obtained in Mathematics were decidedly poor.

The result of the B.C.E. examination was not creditable, only one out of the candidates examined having passed, and he only in the third class; it is, however, observed that three of the candidates examined had been studying privately.

On the other hand, the proportion of students who passed the final College examination was, in the case of each class, decidedly satisfactory.

5. The Government notes with pleasure the highly favourable report upon the conduct and attainments of the Military pupils and the remarks made by officers of the Public Works Department upon the progress of students attached for practical instruction to their divisions. The attention of the Public Works Department will, however, be invited to the absence of any progress reports from the Nellore and Periyár No. I Divisions; the punctual submission of these reports should be insisted upon.

6. 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.
„ Military Department.

Exd. P. L. Pereira.

Govt. of {1891} Madras.

EDUCATIONAL.

Issued

Recd. *Encl.*

G.O., 28th July 1891, No. 580.

JULY.

College of Engineering.

Reviewing the report upon the working of the — during the year 1890-91 and forwarding copy of Proceedings to the Secretary of State.

No. 2299 W dy 26th Augt 1891

Recorded.

2. The attention of Supdg. Engrs will be drawn to para 5 of the Govt. order with reference to paras 81C and 101C P.W. Code.

(Sd) J. P. W

Supdg. Engrs
C.A. to Govt
S. of W P. Project.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

READ—the following paper:—

From the Director of Public Instruction, dated 29th June 1891, No. 7407.

ABSTRACT.—Submitting copy of his Proceedings reviewing the report on the working of the College of Engineering during 1890-91.

ENCLOSURE.

No. 7015.

PROCEEDINGS OF THE DIRECTOR OF PUBLIC INSTRUCTION, dated 16th June 1891.

College of Engineering, Madras.

Read the following letter from the Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 31st January 1891, No. 1260:—

I have the honour to submit the following review of the working of the College of Engineering during the year 1890. 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 1890 is included in the present report.

2. *Establishment.*—On 16th January the post of Second Assistant Instructor in Drawing was filled up for the first time by the appointment of Mr. Littlewood, who joined from the Burma Public Works Department. Two days later, M.R.Ry. R. A. Bhakya Mudaliar, formerly a Supervisor under the Coimbatore Local Fund Board, assumed the duties of Second Assistant Instructor in Surveying. On 13th March, M.R.Ry. Bhavaniswami Rau, B.A., from the Teachers' College, was appointed Vernacular Assistant, sub. *pro tem.*, *vice* M.R.Ry. C. R. Krishna Aiyar, B.A., transferred to Calicut College. On 22nd April, Sergeant W. H. Goddard, Assistant Instructor in Surveying, was confirmed as Instructor in Surveying and Drawing. Mr. Pope, the Assistant Instructor in Drawing, retired on pension on 1st May, after a service of upwards of thirty years, some seven of which were spent at the College. Mr. Pope's appointment will not, for the present, be filled up. On 7th June, M.R.Ry. T. Rangaswami Aiyangar, B.A., was appointed Vernacular Assistant, but was directed to continue to act as Assistant, Presidency College; and T. N. Govindaswami Rau was confirmed as Instructor in Carpentry and Fitting.

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	8	3	5	4	24
Engineer Subordinate Class	12	3	7	20	20	62
Military Probationers	...	...	...	...	...	5
Draftsman Class	...	...	8	13	...	21
Surveyor Class	...	...	8	15	...	23
Artisan Class	...	...	...	...	...	28
					Grand Total ...	163

Excluding the students undergoing the practical courses in workshops and on works, the total number actually in the College on 31st December 1890 was 136. The numbers arranged by classes of the community were—

Europeans and Eurasians	19
Brahmans	49
Other Hindus	52
Native Christians	15
Mussalmans	...
Others	1
Total ...	136

The corresponding totals in the three previous years were—1889, 109; 1888, 102; 1887, 106. The effects of the depression of 1888 are still visible in the small class of Engineer Subordinates now passing to the practical course; but from this time forward they may be said to have disappeared from the College proper. Substantial classes of Draftsmen and Surveyors will join early in 1891, when the total number of students will rise to about 160. This will be increased to about 180 in July next, when a new division of Engineer Subordinates will be admitted. The Engineer class continues small, owing to the difficulty anticipated in obtaining suitable employment. The steps taken to remove this difficulty will be alluded to later.

4. *Examinations.*—The Board of Examiners conducted the final and term examination of all the classes in December 1890, and the entrance examinations of May and December. A brief abstract of the results is given below.

5. *Engineer Classes.*—Four students completed their final year's practical course on 31st December 1890, viz., R. Srinivasa Aiyangar, B.A., B.C.E., J. M. Lacey, B.C.E., and C. Kanakasuriyan Pillai on Public Works; and V. Daivasikhamani Pillai in the Madras Railway Workshops. These Engineers, who will receive their diplomas today, represent in the senior department of the College the first-fruits of the reorganisation of the institution which was effected in 1885 and 1886. The first two have been appointed to the Public Works Department as Assistant Engineers. One of the others, V. Daivasikhamani Pillai, is the first Mechanical Engineer trained at the Madras College.

The next batch of Engineer students, 8 in number, spent the year 1890 in workshops, one of them, V. Rangaswami Aiyangar, who will become a Mechanical Engineer, at the Perambúr Locomotive Shops, and the remainder at the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer class actually in the College, the senior, consisting of three students, joined in January 1888, and underwent final examination in December last. All passed the examination. The average percentages of marks for the division in the various subject heads were as follow:—

	Per cent.
Mathematics	55
Science	33
Engineering	50
Drawing and Estimating	71
Surveying	72
Vernacular Language	67
Drills and Exercises	100
Total ...	57

On comparing the results with those of 1889, when the average total was 53 per cent., it will be seen that there has been substantial improvement in *Drawing*, *Surveying*, *Vernacular Language*, and in *Drills and Exercises*. The results in *Science*, however, are still poor.

The senior pupil is A. V. Ramalinga Aiyar, B.A., who is easily first with 65 per cent. of the total marks, and who receives 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. Ramalinga Aiyar wins prizes for *Mathematics* and *Science* an aneroid barometer, and for *Engineering*, *Surveying* and *Drawing*, a planimeter. He also gains the Narayana Oonythan prize, a copy of Molesworth's pocket book. A prize for *Vernacular Language* and *Gymnastics*, consisting of a pocket rule, is awarded to K. Gopala Aiyar.

Two independent candidates, who were formerly College students, also appeared for the final examination, and one of them, R. Sundaram Aiyar, was successful. He will proceed with the first division to the workshops.

The second division of the Engineer class, containing five students, has undergone a term examination, the mark of which count towards the final total. The average of the division was 56 per cent. The scholarship of Rs. 30 per mensem for the ensuing year remains with L. D. Venkatarama Aiyar. Another student, S. Rojagopalaswami Mudaliar, wins a "Sir Madhava Rao" prize, consisting of an aneroid barometer, for workshop practice.

The third division of four students made an average of 69 per cent. of the total marks at the late term examination. The scholarship of Rs. 30 is retained by G. S. Rama Aiyar for the ensuing year.

Six candidates passed the entrance examination for the Engineer class, and should join the College early in 1891.

6. *Engineer Subordinate class.*—Twelve students completed their final year's practical course on Public Works on 31st December last, and like the senior batch of Engineers represent some of the first results of the College reorganisation. They will receive their diplomas to day. The first seven, viz., M. Venkata Rao, G. Narayana Rao, G. Srinivasa Aiyangar, A. Arulanandam Pillai, Sergeant E. Price, L. S. Panchapakesa Sarma, and M. R. Subrahmanya Aiyar, were appointed Overseers in the Public Works Department on 1st January 1891.

The next batch of Engineer Subordinate students, three in number, spent the year 1890 in the Public Works Workshops. Their work will be referred to later.

Of the three divisions of the Engineer Subordinate class in the College proper, the senior, consisting of seven students, joined in August 1888, and underwent final examination in December last. Five of these were successful. The average percentages of marks gained by the whole division were—

Mathematics	48
Engineering	56
Drawing and Estimating	70
Surveying	69
Vernacular Language	48
Drills and Exercises	93
Total ...	61

Comparing the figures with those for 1889, when the average total was only 45 per cent., it will be seen that the class is far superior to the indifferent one which then left the College.

Private G. E. Brand, 7th Hussars, is *facile princeps*, with the remarkable total of 85 per cent. of full marks. He will receive the silver medal awarded to the most distinguished student, and prizes for *Mathematics*, an optical square; *Engineering*, a silver watch; and for *Surveying and Drawing*, a magnetic compass. Private Brand also carries off a "Sir Madhava Rao" prize for workshop practice, viz., a field glass, as well as the "Rogers" prize, which consists of books.

The second man is Sergeant C. J. Smith, 2nd Oxfordshire Light Infantry, who obtains 72 per cent. of the total marks, and is awarded a prize for *Vernacular Language*, consisting of a clinometer rule. Then follow W. T. J. Scanlon, M. S. Venkatarama Aiyar, and T. A. Kuppuswami Aiyar. Venkatarama Aiyar, Smith and Scanlon are commended for their work in the workshops, and Brand and Scanlon for Gymnastics.

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

The second division of the Engineer Subordinate class contains 20 students, who scored an average of 52 per cent. of the total marks at the term examination of December 1890. The first man is Lance Sergeant Blake, 21st Hussars, who obtains 76 per cent. of full marks, and is awarded a prize for general proficiency, consisting of a set of architect's scales. S. Dakshanamurti, P. N. Ramachandra Aiyar, Private Briant, 2nd Middlesex Regiment, and A. J. John have also done well. The scholarships of Rs. 10 per mensem are awarded to Dakshanamurti and Ramachandra Aiyar. The "Walker" scholarship is withdrawn from A J. Alvares owing to the unsatisfactory progress made by him.

The third division, which contains 20 students, joined in August 1890, and obtained an average of 62 per cent. of the marks at the term examination. M. V. Venkatarama Aiyar heads the list, and is followed by Lance Corporal J. Phelan, 2nd Bedfordshire Regiment, K. Srinivasa Aiyar, and K. R. Raman Pillai. The two scholarships of Rs. 10 are retained by Venkatarama Aiyar and Srinivasa Aiyar.

7. *Draftsman Class.*—The senior division, consisting of 8 students, appeared for the final examination in December last. Six were successful in gaining certificates; one, M. V. Srinivasa Aiyar, a certificate of the first class; three, S. Subrahmanya Aiyar, D. Tiruvengada Mudaliar, and S. A. Manickaswami Mudaliar, certificates of the "second class;" and two, F. W. Cames and L. A. Natesa Aiyar, of the "third class." The student who occupies the first place is S. Subrahmanya Aiyar, with no less than 89 per cent. of the total marks. He wins the College bronze medal, and a prize, consisting of a pillar compass and a box of colours, for his great proficiency in *Geometrical*, *Freehand*, *Perspective and Model Drawing*, in *Building* and *Topographical Drawing*, and in *Machine Drawing*. But for comparatively low marks in *Estimating*, he would have obtained the highest class of certificate. The second man, M. V. Srinivasa Aiyar, secures a first-class certificate with 82 per cent. of the total marks, and is awarded a prize for *Estimating*, consisting of a parallel rule. The percentages of marks gained by the division in the various subject heads were—

Practical Geometry	72
Freehand, Perspective, and Model Drawing	71
Building Drawing	74
Machine Drawing	61
Estimating	46
Topographical Drawing	53
Drills and Exercises	94
Total ...	65

These figures compare favourably with those of the previous year, when the average total was 61 per cent. There has been improvement in *Freehand*, *&c.*, and *Machine Drawing*, but a falling off in *Estimating*.

Independent candidates, six in number, also presented themselves for the certificate examination. These were former students of the College, and all passed in the third class. One of them, however, already holds a third-class certificate. Their average percentage of the total marks was 58.

The second division of the Draftsman class contains 13 students. The mean percentage of the division at the term examination of December 1890 was 68, which indicates the existence of good material. S. Venkatachalam and P. S. Tiruchelvam Pillai head the list, and gain scholarships of Rs. 8 per mensem.

Thirty-five candidates have been accepted for admission to the new junior division, which will be formed early in 1891.

8. *Surveyor Class.*—In the senior division of 1890, there were only five regular students; but all of these passed the final examination; K. S. Vyasa Rau and G. Gopalaswami Nayudu gain "first-class" certificates; K. Subha Rau, a "second-class" certificate; and V. Kothandarama Sastri and T. Balasubrahmanya Aiyar "third-class" certificates. K. S. Vyasa Rau occupies the first place with 82 per cent. of the total marks, gaining the College bronze medal, and winning a prize, consisting of a binocular field glass, for proficiency in *Chain, Campass and Plane Table Surveying*, in *Levelling*, and in *Theodolite Surveying*. G. Gopalaswami Nayudu follows him closely with 80 per cent. of the marks, and is awarded a prize for *Topographical Drawing*, consisting of a pocket rule. The percentages gained by the division in the various subject heads were as follow:—

Chain, Compass, and Plane Table Surveying	65
Levelling	69
Theodolite Surveying	69
Topographical Drawing	67
Drills and Exercises	90
Total ...	68

These results show a great improvement over those of last year, when the average total was 56 per cent., especially in Theodolite work and Topographical Drawing.

Three independent candidates presented themselves, of whom one was successful in gaining a "third-class" certificate.

The second division of the Surveyor class contains 14 students. The average percentage of marks at the term examination of December 1890 was 61. The scholarships of Rs. 8 per mensem fall to T. S. Vasudeva Aiyar and C. Muttukrishna Mudaliar, who occupy the first and second places in the class.

Twenty-three candidates have been accepted for admission to the new division of the Surveyor class, which will be formed early in 1891.

9. *Maistry and Artisan Class.*—This evening class, opened in 1889, was instituted for the improvement of the sons of maistries and artisans, and of young artisans themselves, in certain technical branches of knowledge. Admission was eagerly sought, but the pupils have not hitherto belonged exclusively to those grades of the population which it was desired to attract. Many candidates of a different type offered themselves, owing apparently to a belief that the course of instruction would render them eligible for appointment as Sub-Overseers in the Public Works Department. The number of applicants in December last, however, was so large that a suitable selection for the course of 1891 has been practicable. During the past year, instruction was given in *Arithmetic*, *Mensuration*, *Building Construction*, and *Plan Drawing*: and arrangements were made for the examination of the class at the end of the session in the last three of these subjects, through the medium of the vernaculars, according to the standard of the Middle School examination. The results of this examination have not yet been published.

10. *Military Students.*—The total number of soldier students in the College on the 31st December was 10, exclusive of one going through the practical course (viz., 2 in the first division of the Engineer Subordinate class, 2 in the second division, 1 in the third, and 5 probationers). The number of admissions has for some time past been small, but in August 1890 a full class of five joined. If a similar number qualify for admission next July, there will be difficulty in accommodating them, owing to the partial occupation of the College barracks by the temporary workshops. The conduct of all the men has been exemplary, not a single defaulter sheet entry having been made during the year. The two men who are now leaving the College have greatly distinguished themselves in their studies, Private Brand's results being quite phenomenal, while the men of the junior divisions are making good progress. Lance Sergeant Smith and Private Brand sent drawings to the Soldiers' Exhibition held at Bangalore in September, and both secured prizes. Lance Sergeant Blake and Lance Corporal Phelan passed in a vernacular language according to the Higher Standard in the course of the year.

11. *Victoria Technical Institute Students.*—Three scholarship-holders of the Victoria Technical Institute were specially admitted in January 1890 for a course of *Mensuration*, *Surveying* and *Plan Drawing*. They were attached in the first instance to the Surveyor class, and all three passed in the first two of the above subjects at the next Higher Examination in Science, Art and Industries. One student left, owing to sickness, after six months, and the other two were then attached to the Draftsman class. One of these rejoined his appointment after nine

months, while the other remained until the end of the year. These men were all school teachers of intelligence, who, having only a limited time in which to acquire proficiency in their selected subjects, served as a spur to the ordinary students of the class to which they were first attached. The experiment of admitting them to the College outside the regulations has thus proved of advantage, and will be repeated in 1891.

Besides the Victoria Technical Institute scholars, several of the regular students of the College appeared voluntarily for the Higher Examination in Science, Art and Industries in *Surveying*, *Building Construction*, *Applied Mechanics*, *Machine Construction*, &c. Most of them were successful, and five scholarships, ranging from Rs. 4 to Rs. 12 per mensem, were awarded to the College students on the results of the examinations.

12. *Surveying.*—The outturn of field work was considerably greater than in 1889, when the practice of devoting a full day weekly for each class (two days for the Surveyor class) was first instituted. The average number of survey squads was 17, and the average number of students per squad was 5. The total outturn consisted of—

Trignometrical Surveying	17 sq. miles.
Traversing with theodolite, prismatic compass or plane table.	66 miles.
Levelling (including contour lines)	112 „
Interior filling in with chain, compass and plane table. .	24,000 acres.

The localities surveyed were Triplicane, Chintadripet, Egmore, the Spur tank, the Esplanade, Mylapore, St. Thomé, the Adyar, Saidápet, Guindy and St. Thomas' Mount.

The average work per squad will be seen from the following table :—

Nature of Survey.	Number of squads.	Average work done per squad.	Total work.
Chain Surveying	8	134 acres.	1,072 acres.
Traversing with Compass	7	5 miles.	35 miles.
Traversing with Plane Table	1	8½ „	8 „
Traversing with Theodolite	3	7⅔ „	23 „
Levelling	9	12½ „	76 „
Filling in with Compass	7	452 acres.	3,164 acres.
Filling in with Plane Table	8	934 „	7,544 „
Hill sketching...	3	161 „	483 „
Filling in Trigonometrical Survey ...	3	3,840 „	11,520 „

Next year the experiment will be tried of sending out the Engineer class in February and July for a fortnight's continuous work in the field.

13. *Inspections of Works.*—Numerous inspections of works were made as usual by the Engineer and Engineer Subordinate classes, among which may be mentioned the Government and Perambúr Brick-fields, the Madras Lime and Cement works, the quarries at Pallávaram, the new High Court buildings, the girder bridges over the Cooum, the Red Hills tank, Irrigation works near Vandalúr, the Public Works Workshops, the Gun Carriage Factory, the Napier Foundry and the Perambúr Locomotive shops. Notes and sketches were submitted by all the students. The classes referred to were also exercised in setting out work on the ground, and, together with the Draftsman class, in measuring up buildings and iron bridges. With the object of facilitating the inspection of works at a distance from Madras, sanction has been asked for the purchase of a tent to accommodate the European and Eurasian students.

14. *College Workshops.*—The temporary workshop, which was started at the College in August 1889, was fully utilised throughout the year under review, carpentry, fitting, and turning being carried on. The shop accommodates only 12 students at a time; but 46 in all received regular instruction. The workshop is open all day on Wednesdays, and on other week days from 6-30 to 8-30 A.M. The students have been practised in chipping and filing cast and wrought iron, and in simple turning and screw-cutting. In carpentry they were exercised in sawing, planing, and the execution of common joints; after which they were employed in

the manufacture of tables, benches, almirahs, and miscellaneous articles for the College use. The workshop was strengthened during the year by the acquisition of a screw-cutting lathe and a bench drill. Considering the time available—an average of 3½ hours per week per student—and the absence of previous manual training, the results are very satisfactory, and show that Natives as well as Europeans will be able to use advantageously the permanent workshops which will, it is hoped, be shortly provided. It was mentioned in last year's report that plans and estimates for a permanent workshop and Engineering laboratory to be constructed at the south end of the College building had been submitted. These were revised by the Public Works Department during 1890, and were forwarded to Government in August. The estimated cost is Rs. 56,000. The early erection of new shops is a matter of importance, as, apart from the gain to the students, the rooms occupied by the temporary shops will be required this year to fulfil their proper use as barracks for additional military students.

15. *Laboratory and Experimental Work.*—The students of the senior division of the Engineer class have practised qualitative and quantitative analysis of simple substances and of building materials in the chemical laboratory. They have also been exercised in cement-testing, and in measuring the velocity of streams. Through the courtesy of Messrs. Binny & Co., they, with the first division of the Engineer Subordinate class, were permitted to attend at the Buckingham Mills, and to take steam indicator diagrams.

16. *Apparatus.*—The models and instruments indented for from England arrived only towards the end of the year. In addition to machine tools for the workshop, they consisted of surveying and drawing instruments, contoured models of hilly ground, apparatus for teaching experimental mechanics, models of iron beams and brick bond, apparatus for teaching orthographic projection, and models of machine details.

Sanction was accorded to utilizing a portion of the allotment in the construction of apparatus locally. The articles were designed by Mr. Chatterton, and consist of briquette moulds; appliances for measuring friction, the strength and elasticity of timber beams, and the moment of inertia of a heavy wheel; and apparatus for determining centrifugal force, and the efficiency of screws. Portions of the apparatus were made in the College workshop.

Models of the Dorabhavi bridge on the Southern Mahratta Railway were presented by the Chief Engineer of the Company, to whom my thanks are due.

17. *Practical Course, Mechanical Engineers.*—Early in 1890, arrangements were made with the Madras Railway Company to receive Mechanical Engineer students at the Locomotive shops for two years on payment of a premium of Rs. 250 per annum for each; and I have to acknowledge the very liberal spirit in which my proposals were met by Mr. Trevithick, the Acting Agent and Manager. The Government agreed to pay half this premium in the case of one student annually. Additional Mechanical Engineer students will pay the full premium themselves; but they may receive training gratis at the Public Works Workshops. Two students, V. Daivasikhamani Pillai and V. Rangaswami Aiyangar, the first of whom had worked previously at the Public Works shops at Dowlaishweram and Madras, joined at Perambúr on 1st March. The following is an extract from a report by Mr. Phipps, the Locomotive Superintendent: "The two College students have during the year conducted themselves entirely to my satisfaction. They have been punctual in their attendance, and have both shown much willingness to do their best, and to avail themselves in every possible way of the opportunity given them of learning the profession they have selected." Daivasikhamani Pillai was employed during one month in the Erecting shop, one month in the Fitting shop, one month in the Lathe shop, two months in the Foundry, one in the Blacksmiths' shop, one in the Carriage shop, and one in the Drawing office. The remainder of his time was spent in firing locomotives. Rangaswami Aiyangar spent five months in the Erecting shop, during which he assisted at the complete construction of a new engine from commencement to completion, and the rest of the year in the Fitting shop.

18. *Workshop Course, Civil Engineers and Subordinates.*—Seven Civil Engineers, and three Engineer Subordinate students spent the year at the Public Works Workshops. All of them commenced their course in the Carpenters' shop, where they remained for three months. They were then passed by turns through the Lathe, Filers' and Smiths' shops, the Instrument Department, and the Foundry, and completed the years' course with the working of a stationary engine for a week.

The Superintendent reports that the style of work done was generally good. He states that all the students behaved well during the course, and that the Engineers were regular in their attendance. The Engineer Subordinate students were less regular; but their absences were with leave.

This course has undoubtedly been of great advantage to the students; but I am of opinion that it is susceptible of improvement. The classes which have just joined the workshops have acquired in the College sufficient practice in carpentry, turning, and fitting to execute useful work under proper supervision. It has accordingly been suggested to the Superintendent of the Public Works Workshops that the students should no longer be kept apart by themselves, but that they should be dispersed among the regular hands, and be allowed to gain practical knowledge by working with them in a systematic manner.

19. *Works Course, Civil Engineers and Subordinates.*—Three Civil Engineers and twelve Engineer Subordinate students were attached throughout the year to various circles where important Public Works are in progress. The course comprises the practical details of brick-making, brick-laying, quarrying, building of all kinds, the management of labour, and accounts. An abstract of the progress reports received from the Public Works Department, which is given below, shows that all the students regarding whom reports have been received have acquitted themselves satisfactorily. Some of the students have had better opportunities than others; and it is hoped that in future it will be found possible to give work to all which will involve more individual responsibility. The importance of this practical course, which gives a familiarity with details of construction that a College training is powerless to convey, can hardly be over-estimated :—

Name.	Abstract of Progress Report.
R. Srinivasa Aiyangar, B.A., B.C.E.	*Nellore Division.*—Progress report not yet received.
J. M. Lacey, B.C.E. ...	*Periyár, No.* 1 *Division.*—Progress report not yet received.
C. Kanakasurian Pillai, B.C.E.	*Periyár, No.* 2 *Division.*—Main channel masonry works. Employed in laying out and measuring up foundations, mixing mortar and arranging labour; in surveying, levelling, preparing survey and sections of channel, and on earthwork in branch channel. Can be entrusted with laying out channels and with all kinds of masonry work. Conduct very good. Has always proved willing and painstaking.
U. Venkata Rau ...	*Cuddalore Bridge Works,* January to September.—Attended at Ponniar masonry bridge, and Gadilam iron bridge. Assisted in taking levels and setting out work. Acquired fair practical knowledge of well-sinking, brick masonary and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of a weir under difficulties in Rajakal channel. Worked satisfactorily.
G. Narayana Rau ...	*Tanjore Division.*—Employed on bridge-making, brick-laying, opening and laying foundations, details of masonry work, earthwork, river training, office work and accounts. Very diligent and well conducted, and made satisfactory progress.

Name.	Abstract of Progress Report.
G. Srinivasa Aiyangar.	*North Arcot Division,* January to August.—Engaged on estimates for earthwork and masonry, and on execution of various works. Also on levelling and estimating for repair of tanks and channels. Worked very well indeed. *Cuddalore Bridge Works,* September to December.—Gadilam iron bridge. Employed on masonry work, iron riveting, laying out and raising approaches, surveying and levelling. Made himself very useful; was regular in attendance and hardworking. Conduct good.
A. Arulanandam Pillai.	*Cuddalore Bridge Works,* January to September.—Attended at Ponniar masonary bridge and Gadilam iron bridge. Levelling and setting out work. Acquired fair practical knowledge of well-sinking, brick masonry and concrete, riveting girders, erecting centerings, and turning 60 feet arches. Regular in attendance, conduct good. *North Arcot Division,* September to December.—Supervised construction of sluice under difficulties in lofty tank bund. Assisted in building offices. Very intelligent and hard-working; conduct very good.
Sergeant E. Price, 7th Hussars.	*Periyár No.* 1 *Division.*—Progress report not yet received.
L. S. Panchapakesa Sarma.	*Trichinopoly Division.*—Instructed in practical details of buildings and irrigation works. Employed in estimating. Very intelligent.
M. R. Subrahmanya Aiyar.	*Tinnevelly Division.*—Employed on buildings and irrigation works, in levelling and on small surveys. Industrious and painstaking. Will make a good subordinate.
P. V. Ramaswami Aiyar.	*Madura Division.*—Engaged on irrigation work. Has shown himself active and well conducted. Will make a good subordinate.
C. J. Plummer ...	*Consulting Architect's Division.*—Attended the Brickfields and Lime-kilns. Is industrious and painstaking, and will make a good subordinate. Conduct uniformly good.
P. M. Swaminatha Aiyar.	*Periyár No.* 2 *Division.*—Main channel masonry works. Laid out and measured up foundations. Employed in mixing mortar and arranging labour; also in surveying and levelling, and in preparing plans and estimates for buildings and channels. Is hardworking, willing and painstaking. Will become a good subordinate. Conduct very good.
T. Venkatarama Aiyar.	*Kistna, Eastern Division.*—Employed in quarrying, fitting gearing to under-sluices, and on repairs to anicut. Also on construction of buildings, boat basin and canal bridge. Is obedient, and has made good use of his time.
P. Sivasubramanya Pillai.	*Kistna, Western Division.*—Employed on buildings, surveying, levelling, and accounts. Good application, progress satisfactory.

The possibility of affording the students a greater variety of work has been under consideration. The Hon'ble Mr. Garstin penned a minute on the subject in April last, and proposals have since been made to divide the year into three portions, so that one portion may be spent by each student in a Building Division, one in an Irrigation Division, and one in a Road or Railway Division.

Sanction was accorded during the year to the grant of travelling allowances at third-class rates to students joining and attached to works.

20. *Revision of Rules.*—It was pointed out in the Annual Report for 1889, that the recent increase in the practical work done at the College rendered desirable a substantial augmentation of the proportions of marks awarded by the staff. The principle having been approved by Government, a new arrangement, by which the original proportions were doubled, was introduced at the last examination. The marks awarded are submitted to the Board of Examiners, who scrutinise as far as possible the session work executed. Advantage was taken of the embodiment of this alteration in the College rules to make revision in a variety of details where experience showed that minor changes were desirable. The chief alterations provided for the admission to the Engineer Subordinate class of persons who have passed the Upper Secondary examination, and of a redistribution of the marks allotted

to the various branches in which the Draftsman and Surveyor classes receive instruction. The rules also provide for the long vacation taking place in May and June instead of June and July ; and for fee payments to be made by the Artisan class.

21. *Library and Reading Room.*—The Library, which consists of a Lending branch and Consulting branch, contains a total of 2,700 volumes, of which 133 were added in the course of 1890. During the year, 3,780 books were taken out, viz., 793 by staff, and 2,987 by students, while 1,202 references were made to the Consulting library. During the previous year the number of books taken out was 2,543, so that the increase in the use of the Library during the past year is no less than 50 per cent. Ten years ago, the number of books issued was under 300.

The College Calendar for 1890 contained a history of the College, the annual report, and other information which did not find a place in the issue of the previous year. The Calendar for 1891, now in the press, will contain further additional matter.

A set of examples in Carpentry was prepared and published by the Professor of Engineering, and an elementary work on Surveying was issued by Mr. D' Cruz, the Assistant Instructor in that subject.

22. *Physical Training.*—Regular training in Gymnastics was given to all the College classes, except that for Artisans, throughout the year. Considerable progress was made, as is testified by the marks gained at the final examination. From August last, Drill was introduced, selected military students acting voluntarily as instructors. Each Gymnastic class was divided into two squads, each of which worked for half the attendance at gymnastics, and for the other half at drill. This arrangement rendered the classes manageable, and increased the amount of work done. The new tennis court, alluded to in last year's report, was completed in May, and has since been in fairly constant use.

23. *Attendance.*—The rules regarding leave to students were made more stringent, with the result that the percentages of numbers present to numbers on the rolls rose to 97 for the College department, and 94 for the School department. These figures would have been even higher but for the epidemic of influenza which made its appearance in March, and caused a large number of temporary absences. In September there was a severe visitation of cholera in Madras, from which the College did not entirely escape. Among the students there were two cases, one of which unfortunately proved fatal. In November another fatality occurred through fever.

24. *Conduct.*—The conduct of the students has on the whole been good. There were, however, several dismissals for continued absence without leave and non-payment of fees; and more than one case of loss of instruments was reported. In October, a student of the Draftsman class was found in possession of a missing article, for which he was unable satisfactorily to account. The Police were called in, the student admitted theft, and was expelled on the spot. He was subsequently prosecuted and convicted. No further case of loss has occurred; and it is hoped that the swift punishment which followed on the detection of the crime will serve as a permanent deterrent.

25. *B.C.E. Degree Examination.*—Of the nine Engineer class students who left the College in December 1889, two passed the Degree examination in the preceding January, during their College course, while three of the remainder passed in January 1890. The successful percentage of the class was therefore 55. The failures occurred for the most part in mathematical subjects—a circumstance which I attribute to the difference between the College course and the Degree examination. The only branch of pure Mathematics studied in the College during the third year is the Differential and Integral Calculus, a subject which does not at present appear in the Degree syllabus. The revision of the latter is now engaging the attention of the Engineering Faculty. Six other candidates, old students of the College, appeared in 1890, of whom one was successful. The three Engineer class students who have just passed out of the College, presented themselves for the Degree examination in January 1891. The results will be made known in my supplemental report.

26. *Prizes and Endowments.*—I announced in my last report that Raja Sir T. Madhava Rao, 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 was accepted by Government, and the prizes, each of the value of Rs. 20, thus become available for the first time on the present occasion. Two have been awarded for Workshop practice, and one for Practical Surveying. The "Rogers" Prize, the outcome of an endowment by old students of the Eengineer Subordinate class in memory of the Principalship of Major-General Rogers, R.E., also becomes available for the first time this year. The prize consists of books. A copy of Molesworth's pocket book is again presented by M.R.Ry. Narayana Oonythan, an old student of the Engineer class. The remaining prizes consist as usual of instruments. The medals presented this year were struck at the Bombay Mint from dies engraved in London for the College. The handsome design for the diplomas and certificates which are issued today was made by S. Subrahmanya Aiyar, the senior student of the Draftsman class. The forms have been lithographed for present use, but the original design has been sent to England to be engraved.

27. *Employment of Passed Students.*—The question of prospect of employment is one of deep interest to all the students of this College, and especially so to those who will today receive the diplomas and certificates declaring them to be fitted to practise the professions and callings for which they have been studying. The case of the passed men of December 1889 will first be considered. The batches consisted only of Draftsmen and Surveyors, and contained small numbers. Of the five Draftsmen, one joined the College Surveyor class, and the remainder are all employed (three of them on Railways) on an average salary of Rs. 40. The five independent Draftsmen of December 1889 are also employed on an average salary of Rs. 28. The two Surveyors are in receipt of average salaries of Rs. 40.

The vacancies notified during the year have been *Engineers* and *Assistant Engineers*, 3 (Local Boards 2, Mechanical Engineer 1) ; *Overseers* and *Sub-Overseers*, 34 (Local Boards 18, Burma P.W.D. 12, others 4), average salary at outset, Rs. 50; *Draftsmen*, 23 (P.W.D. 13, Railways 5, Local Boards 3, others 2), average salary Rs. 40; *Surveyors* 11 (P.W.D.3, Railways 1, Local Boards 3, others 4), average salary Rs. 50.

As regards the students who completed their course on 31st December 1890, Government have conferred, with effect from 1st January 1891 two appointments as Assistant Engineer, and seven as Overseer, in the Public Works Department, on the senior men of the corresponding batches. The statistics just given show that the remaining Engineer subordinates, as well as the Draftsmen and Surveyors, are not likely to remain long unemployed. The two Engineers who do not obtain Government appointments will, it is hoped, secure suitable employment, especially Daivasikhamani Pillai, our first Mechanical Engineer. On the facility with which these men and succeeding batches of Engineers obtain professional work depends the number of admissions to the College Engineer class. When the stamp of native Engineer as now, for the first time thoroughly trained, becomes generally understood and appreciated, I anticipate a wider field of employment. This will take time however, and until public opinion has become formed, the College must look to Government and the Railways to afford all possible encouragement. To this end it was suggested in last year's report that the guaranteed appointments of 1888 and 1889, which lapsed as a result of the extension of the course, should be conferred on later batches. Subsequently, it was asked that this College should be placed on the same footing as the Colleges of Poona and Calcutta with respect to the number of Engineer appointments guaranteed from year to year. These applications were negatived by reason of insufficiency of vacancies in the Public Works Establishment. It was then pointed out that the requirements of State Railway surveys and construction could not be met by the Madras Public Works Department, and that large numbers of Engineers were imported from other Provinces for such work; and it was suggested that a promising field existed for the temporary employment of locally trained Engineers. This application is now under the consideration of Government, and it is hoped that it will be favourably considered.

Officers from other provinces naturally prefer to employ as assistants and subordinates, natives of those provinces, with whose powers and peculiarities they are familiar. All I ask for, however, is a trial of the men who have the best claim to employment within the limits of this Presidency. If, after a reasonable period of probation, they are not found suitable, let them make way for better men.

With respect to guarantees to the Upper Subordinate class, I have pointed out that, to secure a constant flow of men from the College to the Public Works Department, it is essential that the number of guaranteed appointments should be as numerous as possible, and fairly constant from year to year; and the desirableness has accordingly been urged of establishing a reserve of appointments. The existence of the reserve will ensure the usual number of appointments during years in which a reduction may be required in the Public Works establishment, and will thus avert a depression in the College which would re-act on the Department again five years later. The reserved appointments can of course be occupied temporarily until required. The present time seems a suitable one for the formation of such a reserve, since no permanent appointments to the Upper Subordinate establishment were made during 1888, 1889 or 1890, and the number of vacancies must consequently be considerably in excess of the appointments conferred on 1st January last.

28. *General Remarks.*—I take this opportunity of acknowledging the hearty co-operation of the members of the College staff, and especially of the Professors of Mathematics and Engineering. The latter, Mr. Chatterton, has superintended the College workshops, the Chemical Laboratory, and the details of most of the experimental work performed. In the junior establishment Sergeant Goddard has displayed much energy in improving the quality of the Surveying and Drawing. All the other members of the staff, among whom I particularise Conductor Cames and Mr. D'Cruz, have worked well. Thanks are also due to the Board of Examiners under the presidentship of Major Baddeley, who submitted the results of the examinations with unusual expedition; as well as to the Locomotive Superintendent of the Madras Railway, the Superintendent of the Public Works Workshops, and the various officers of the Public Works Department who have supervised the practical training of the students.

The report now concluded shows that the past year has been one of steady progress. More work has been done than heretofore, and the results, as tested by examination, show a substantial improvement on those of the previous year. If the work be contrasted with the outturn of five or six years ago, when the Principal was the sole member of the superior staff, when there were no practical courses, no College workshop, no Examining Board, no training in Mechanical Engineering and Machine Drawing, no commodious buildings, I think it will be admitted that great strides have lately been made in Engineering education in Madras.

Read the following letter from the Acting Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 13th March 1891, No. 1439-C :—

With reference to your official memo. No. 2246, dated 4th March 1891, I have the honour to submit detailed lists of the results of the examinations held in December 1890, and a statement showing the distribution of the students in the College at the end of the session according to classes of the community, and to subjoin information on the other matters referred to in the memorandum under reply.

B.C.E. Degree Examination of 1891.—Eleven candidates registered their names for this examination, but one of them, an ex-student, did not appear. Of the 10 who underwent examination in January last, only one (A. V. Ramalinga Aiyar, B.A., who stood first at the College final examination in the preceding December) was successful, being placed in the third class; the candidate who took up Mechanical Engineering also failed. Of these 10 candidates, three were in

their final year's theoretical course, one in the second and three in the first year's practical course, and the remaining three were studying privately, having failed at previous examinations.

Passed Students.—Register of passed students have been maintained at the College (please see para. 25 of report for 1889—Calendar for 1890); but the information afforded is not altogether satisfactory, as many do not supply the information asked for.

Progress Reports.—Progress reports regarding R. Srinivasa Aiyangar, J. M. Lacey and Sergeant Price do not appear to have been received. As these men have been already appointed to the Department, it appears unnecessary to call for these reports now.

Of the 28 students in the Artisan class, only four were artisans, two of them being employed as sub-maistries on Government buildings under construction, one was a bricklayer, and the other a cutting tailor.

The candidates who sought admission to this class in 1890 and 1891 may be classed as follows :—

According to classes of the community—

	1890.	1891.
Brahmans	13	15
Rajput	...	1
Vellalas	24	37
Chettis	2	4
Yathavas	3	3
Native Christians	3	6
Malayalee Sudra	1	...
Visvakarma	1	6
Balijas (Nayudus)	8	11
Vanniahs (Nayakars)	3	5
Karnam	1	1
Mussalmans	...	2
Total	59	91

According to the occupations of candidates—

	1890.	1891.
Maistry, Sub-Overseer, Municipal Overseer, Apprentice, School of Arts, &c.	9	20
Draughtsmen	7	...
Clerks, &c.	3	11
Students—		
Engineering College	...	10
School of Arts	6	9
Others	25	20
Teachers	4	4
Engraver	...	1
Goldsmith	...	1
Landholder	...	1
Contractor	...	1
Messenger	...	1
Nil	5	12
Total	59	91

According to the occupations of parents—

	1890.	1891.
Landholders	5	8
Clerks, &c.	17	19
Merchants	2	6
Draughtsmen, Maistries or Contractors	20	26
Bricklayer Maistry, Carpenter or Mason	4	7
Engineer, Overseer, Public Works Department or Municipality.	5	10
Book-binder, Painter, &c.	...	4
Nil	6	11
Total	59	91

All the 28 students of the Artisan class which attended the College in 1890 appeared for the Middle School examination in—

(1) Mensuration;
(2) Building Materials and Construction; and
(3) Plan-drawing and Estimating.

Passed in subjects (1) and (2)	...	...	...	...	...	...	4
Do. in subject (1) alone	...	...	...	...	...	...	2
Do. in do. (2) do.	...	...	...	...	...	...	6
Do. in do. (3) do.	...	...	...	...	...	...	*Nil.*

Entrance Examination, Engineer Classes.—Six candidates appeared for the entrance examination for the Engineer classes held in December 1890, and all of them were successful; but only three have joined the College.

Read the following letter from the Acting Principal, College of Engineering, to the Director of Public Instruction, dated Madras, 20th April 1891, No. 107-C:—

In continuation of this office No. 1260-C, dated 31st January 1891, I have the honour to forward a supplementary report to complete the information required to the end of the official year.

2. *Establishment.*—Captain H. D. Love proceeded to England on duty and was relieved by me as Acting Principal on 27th February 1891. M.R.Ry. R. A. Bhakya Mudaliar was confirmed as Assistant Instructor, Surveying, with effect from 18th January 1890. M.R.Ry. T. Rangaswami Aiyangar, B.A., Vernacular Assistant, was permanently transferred to the Presidency College on 18th February 1891. M.R.Ry. M. R. Vaidyanatha Sastri, B.A., was appointed Vernacular Assistant of the College, but was directed to continue to act at the Calicut College on 18th February 1891.

3. The numbers on the rolls on 31st March 1891 were as follow:—

—	First Division.	Second Division.	Third Division.	Total.
Engineer class	5	4	3	12
Do. Subordinate class	20	18	...	38
Military Probationers	5	...	...	5
Draughtsman class	13	30	...	43
Surveyor do.	14	19 + 2*	...	35
Artisan do.	35	...	...	35
			Total ...	168

The two marked thus * are Victoria Technical Institute scholars permitted to work with the Surveyor's class (*vide* your No. 8690, dated 8th October 1889).

The next entrance examination for the Engineer Subordinate class will be held on the 27th April and admission will take place after the end of the vacation. Forty-eight applications have been received from civilian matriculates and four from military candidates.

4. *Attendance.*—During the past official year the percentage present of the total number on the rolls was 95·2 for the College department and 94·3 for the School department (*vide* the statement below).

Average Number on Rolls.

Class.	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College Department.												
Engineer class, 1st division ...	4	4	4	3	3	3	3	5	5	5		
Do. 2nd do. ...	5	5	5	5	5	5	5	4	4	4		
Do. 3rd do. ...	4	4	4	4	4	4	4	3	3	3		
Total ...	13	13	13	12	12	12	12	12	12	12	123	12·3
School Department.												
Engineer sub-class, 1st division.	7	7	7	7	7	7	7	21	20	20		
Do. 2nd do. ...	21	21	21	21	20	20	20	19	18	18		
Do. 3rd do. ...	...	...	21	21	21	20	20	...	...	...		
Draughtsman class, 1st division.	8	8	8	8	8	8	8	13	13	13		
Do. 2nd do. ...	16	16	18	17	15	14	14	25	30	30		
Surveyor class, 1st do. ...	8	8	8	8	8	8	8	13	14	14		
Do. 2nd do. ...	21	21	17	16	16	15	14	20	21	21		
Artisan class	30	30	30	29	28	28	28	32	35	35		
Military Probationer class ...	1	1	5	5	5	5	5	5	5	5		
Total ...	112	112	135	132	128	125	124	148	156	156	1,328	132·8

Average Daily Attendance.

—	April.	May.	August.	September.	October.	November.	December.	January.	February.	March.	Total.	Average.
College department	11	13	12	12	12	12	12	10	11	12	117	11·7
School do.	99	103	125	123	120	119	121	142	150	150	1,252	125·2

5. The order of Government with reference to the wearing of gowns has not as yet been complied with as I was under the impression that it was still under reference. The order, it is hoped, will be carried out from the beginning of next term.

Read the following report from the Board of Examiners, College of Engineering, Madras, to the Director of Public Instruction, dated Madras, 29th January 1891:—

We have the honour to forward our report on the results of the examinations conducted by us during December 1890.

2. The Board was composed as follows:—

President:

Major W. L. C. BADDELEY, R.E.

Members:

Mr. G. H. STUART, M.A.
„ E. W. STONEY, M.E., M. INST. C.E.

Assistant Examiners.

Mr. W. N. POGSON, F.S.A.
Dr. VANGEYZEL.
M.R.Ry. 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, 1st division	3	3	...
(2) Engineer Subordinate class, 1st division	7	5	2
(3) Draughtsman class, 1st division	8	6	2
(4) Surveyor class, 1st division	5	5	...

Group (b).

	Numbers registered for examination.	Passed.	Failed.
(1) Independent candidates for "Engineer" certificates.	2	1	1
(2) Independent candidates for "Engineer Subordinate" certificates	*5	1	4
(3) Independent candidates for "Draughtsman" certificates	6	6	...
(4) Independent candidates for "Surveyor" certificates.	3	1	2

* One candidate was absent from nearly all the examinations.

Group (c).

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

5. In group (*a*) the results show an improvement upon those of the last year, generally throughout all the classes, but more especially in the 1st division of the Engineer Subordinate class. The excellent work done by some members of this class was not unexpected, for, in Major Baddeley's report on the examinations of 1889, special reference was made to the improvement shown at the term examinations by this section of the College. Private G. E. Brand, Sergeant C. J. Smith and W. T. J. Scaulon have done very well, the first two have proved themselves to be exceptionally good all round men, and all three should become useful members of the Department of Public Works.

6. We are glad to observe that the suggestion, in last year's report, for an increase in the College marks, as compared with those allotted by the Board, has been adopted; and the junior classes now in the College will receive the full benefit of the alteration.

7. In group (*b*) the results are not satisfactory except among the Draughtsmen, who have all done fairly well, though no man has obtained a higher certificate than third class. As the names registered for examination in group (*b*) were College failures, a higher percentage of "passed" was not to be expected, but under the new rules for the employment of Draughtsmen in the Public Works Department, passed men will come up from time to time to endeavour to obtain higher certificates, and the results of this concession should be carefully watched.

8. The subject of "Estimating" was an unsatisfactory feature in the recent examinations, and requires the special attention of the College staff. The marks obtained by the Engineer class, 1st division, in "Science" were very low, but those gained by the 2nd division lead us to expect better results in this branch of study at the next final examination.

9. The term examinations were generally satisfactory, and point to good results at future final examinations.

10. In concluding this report, we would observe that there has been considerable improvement in the results of the examinations since the appointments of Mr. Chatterton and Mr. Middlemast; the new rules appear to work well, and we have no doubt that future years will, under the present system of education in the College, show still better results.

The above papers relate to the working of the College during 1890-91. The supplementary report should have referred to the results of the last B.C.E. Degree examination and the general financial position of the institution.

2. *Staff.*—Captain Love held charge of the office of Principal till the 27th February 1891, when on being relieved by Major Smart, he proceeded Home to complete his course at Chatham. The Professorial staff remained undisturbed and the changes in the subordinate staff were fewer than usual. The post of Second Assistant Instructor in Drawing was filled during the year, while that of the First Assistant Instructor in Drawing, which fell vacant on the retirement of Mr. Pope, was not filled.

3. *Strength.*—Excluding the 27 students in their practical course, the strength of the College at the end of the session was 136 against 109 at the close of the previous session. On the 31st March last the number stood at 166, not including the two Victoria Technical Institute scholars. The average attendance was injuriously affected by the bad condition of the public health during the year. It is satisfactory to note that, in spite of these disturbing elements, the stringent rules regarding leave to students introduced during the year with a view to check continued absence without permission resulted in raising the percentage of average attendance from 94 to 97 in the College and from 92 to 94 in the School department.

4. *Distribution of Students.*—The distribution of students among the different classes during the past two years is given in the margin. The total number rose by 40, and the Engineer class excepted, all the classes participated in the increase, notably the Draughtsman and Engineer Subordinate classes. There is every reason to hope, if the present rate of advance is kept up, that the latter class will ere long regain its former popularity. The raising of the limit of admissions in article IV lately sanctioned by Government, may lead to further improvement in the strength of the several school classes, as the value of the theoretical and practical instruction now imparted in the institution is better appreciated by employers of skilled labour than it was. The present activity in railway and building construction in several parts of the Presidency is probably influencing students in the adoption of Engineering, or of branches of technical knowledge subsidiary thereto, as their profession. The Maistry and Artisan class is numerically as strong as it can be under existing arrangements, but the Director has under consideration a plan for developing the class and extending its usefulness. Of the 28 students in this class at the end of the session 1890, only four were artisans, two of them being employed as sub-maistries on Government buildings under construction, one a bricklayer and the other a tailor. From one point of view this is not satisfactory, but from another the tendency of all classes to devote themselves more and more to industrial pursuits is very encouraging, for it shows that the non-artisan classes are beginning to press for a share in the artisan employment of the country either as maistries or as workers. The tendency should be encouraged in the interests of the artisan class as well as of all classes of the community. The Engineer class continued small, and the numbers stood at 12 on the 31st March 1891 against 13 on the corresponding day in 1890. Of the six candidates who appeared for and passed the entrance examination for admission to this class held in December 1890, only three joined the College. The smallness of

	Strength on the 31st March	
	1890.	1891.
Engineer classes	13	12
Engineer Subordinate classes	28	38
Military Probationers ...	1	5
Draughtsman's class ...	25	43
Surveyor's class	29	33
Artisan class	30	35
Total ...	126	166

this class, which is less than a third of its normal size, is solely attributed to the limited prospects of employment for passed students. There is no likelihood of the number of guaranteed appointments being increased ; but the spread of technical knowledge, the growth of a scientific knowledge of the resources of Southern India, the opening to a larger extent than hitherto of railway and other departments to young men trained in the College, the development of the mining industry; the establishment of manufacturing mills and other enterprises requiring engineering knowledge are calculated to bring about a marked improvement in this direction. But the Director is assured that these circumstances will never have their full effect on this branch of education until the system of education itself is made much more practical, though not less theoretical, than it is at present. The existence of a really practical Engineering school in the country will enhance greatly the demand for skilled engineering labour.

5. *Classes of Community represented at the College.*—Information has not been furnished in the supplementary report regarding the classes of the population to which the pupils on the 31st March last belonged. The following figures are taken from the annual returns and include the two Victoria Technical Institute scholars :—

Classes.	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Europeans and Eurasians ..	...	13	1	14
Brahmans	10	37	7	64
Other Hindus	2	51	2	61
Native Christians	1	11	2	13
Muhammadans	...	...	...	2
Others	...	1	...	2
Total ...	13	113	12	156

It is disappointing to find that not a single Muhammadan has joined the College department. The increase under Native Christians is greater than that under Other Hindus. The increase in the Brahmans in the School department shows that this class of the population is taking to technical pursuits, probably chiefly owing to the pressure of competition in clerical callings. The earnest attention of the Anjumani Mufid-i-Ali-Islam is invited to this absence of Muhammadans from the College department, notwithstanding the fact that article IV of the College rules holds out a qualified precedence to the members of this community, and that encouragement in the way of scholarship is offered in Chapter V of the Grant-in-Aid Code and by the Victoria Technical Institute. The admission of two Muhammadan pupils into the School department is, however, noted with pleasure.

6. *Social and Economic condition of College Students.*—The figures in the margin classifying students according to the chief callings of their parents or guardians show that all the College students belonged to official or landholding classes, whilst in the School department only one pupil in thirty was either a trader's or an artisan's son.

—	31st March 1890.		31st March 1891.	
	College.	School.	College.	School.
Officials	4	46	7	78
Landholders ...	9	29	5	44
Petty officials ...	...	11	...	9
Traders	...	7	...	5
Artisans	...	8	...	6
Others	...	12	...	14
Total ...	13	113	12	156

7. *University Examinations.*—The results of the B.C.E. examination held in January 1889 and 1890 were commented on in the last review. Only one, viz., A. V. Ramalinga Aiyar, B.A., out of the three students from the senior division of the College that appeared for the last B.C.E. examination, was successful, while none passed out of seven students

of the previous years that presented themselves for the examination. From the analysis of failures given in the margin, it is observed that as many as six candidates at the last B.C.E. examination failed in Science and three in Mathematics, and the same number in Constructive Engineering. The heavy failure in Science and the fact that comparatively poor results were obtained by the students in this subject at the final examinations also held by the College Board of Examiners should receive the early attention of the Principal and the Professors concerned in view of ascertaining clearly where the cause of failure lies. Possibly the amount of time given to the subject is insufficient.

Subjects of failure.	Number failed.
Mathematics	3
Science	6
Mensuration and Estimate-making ...	1
Constructive Engineering	3
Architectural and Topographical Drawing	1

8. *Examinations conducted by the College Board of Examiners.*—The final, term and entrance examinations were as usual conducted by a Board of Examiners consisting of the following members appointed by Government :—

Major W. L. C. Baddeley, R.E.—*President.*
Mr. J. H. Stuart, M.A., } *Members.*
,, E. W. Stoney, M.E., M. INST. C.E., }
,, W. N. Pogson, F.S.A., }
Dr. VanGeyzel, } *Assistant Examiners.*
M.R.Ry. P. Vijiarunga Mudaliyar, }

The above Board examined not only the College students, but also batches of independent candidates for certificates of the different grades. The notes, if not the reports, of the individual examiners have again not been forwarded as required. The attention of the President was drawn to this omission in the review of the last report, but the matter seems to have again escaped his attention. It is hoped that he will in future conform to this requisition, as the opinion of each examiner as to the way in which the pupils have acquitted themselves is of importance.

Engineer Class.—All the three students from the senior division passed the final examination for Assistant Engineers. There was an appreciable improvement in the average marks secured by each of the three divisions of the Engineer class. But the tabular results still show some weakness in Science, Mathematics and Engineering.

Engineer Subordinate class.—Five out of the seven students forming the senior division passed the final examination—a considerable improvement over the result of the preceding year, when two passed out of nine entered. Though the total average percentage 61 against 45 is higher, the relatively low percentages in Mathematics, Engineering and Vernacular language indicate that the students were not quite up to the mark. One student, for instance, was able to secure only 94 out of 370 marks in Mathematics. The deficiency may no doubt be partly attributed to the low general attainments of the students comprising this class ; but as under G.O., No. 630, dated 12th September 1890, F.As. and Upper Secondary men will be preferred to Matriculates in future, there is every probability of students of higher calibre entering the College in the near future. At the term examination the second division scored 52 per cent. of the total marks against 61 per cent. of the previous year's batch, while the third division 62 per cent. against 59 per cent. The former division requires to be very carefully worked up to secure suitable results at the next final examination.

Draughtsmen Class.—Six out of the eight students of the senior division succeeded in securing certificates, one of the first, three of the second, and two of the third class. The percentages of marks gained in Machine Drawing and Topographical Drawing are not, however, satisfactory. The results in Estimating are also very disappointing, and as pointed out by the Board of Examiners, this subject demands special attention from the College staff. As in the previous year, the junior division gained 68 per cent. of the total marks.

Surveyor's Class.—It is satisfactory to note that all the five students that appeared for the final examination secured certificates, two of the first, one of the second, and two of the third class, and that the average percentages of marks in the senior and junior divisions rose from 56 and 53 to 68 and 61, respectively.

Independent Candidates.—The numbers registered and passed for the different certificates are noted below : —

	Number registered.	Number passed.
For Engineer	2	1
,, do. Subordinates	5	1
,, Draughtsmen	6	6 in the third class.
,, Surveyors	3	1 do. do.

The results obtained by the Engineer subordinates were very unfavourable. Turning to the Surveyors, the two students who failed fared very badly, more especially in Theodolite Surveying and Topographical Drawing.

9. *Government Higher Examinations in Science, Arts and Industries.*—A good number of the regular students of the College as well as the three scholarship holders of the Victoria Technical Institute competed for the Government examinations in Science and Art, the former in Surveying and Levelling, Building Construction, Applied Mechanics, Machine Construction, Pure Mathematics, Bridge-making, Hydraulics, Mechanical Drawing and Earth and Railway work, and the latter in Mensuration, Surveying and Plan-drawing. The last three passed in Mensuration and Surveying, and most of the former were also successful. Five of them have been awarded scholarships ranging from Rs. 4 to 12 per mensem under Chapter V of the Grant-in-Aid Code. It seems desirable to encourage students to attend these examination as the preparation does not interfere with their regular work, whilst it gives an opportunity to the students to show marked ability in individual subjects, which cannot be so effectively accomplished or so publicly recognized under the College Examination system.

10. *Maistry and Artisan Class.*—Of the 20 students who appeared for the Middle School examination in technical subjects, two passed in Mensuration, six in Building Materials and Construction and four in both subjects—Mensuration and Building Materials and Construction. The system of working the class needs improving before it can be regarded, as it should be, as a school for maistries and persons of that class.

11. *Practical Courses.*—The Survey practice during the year was sufficiently extensive. In the College workshop the students had worked at Carpentry, Fitting and Turning with advantage. Only 46 students, however, were able to receive regular instruction as the workshop could not accommodate a larger number. The Director trusts that Government will be able to accord its early sanction to one of the alternative schemes now before it for providing a permanent workshop.

Under G.O., No. 294, dated 23rd April 1890, Educational, two students—V. Devasikhamani Pillai and V. Rangaswami Aiyangar—underwent training as Mechanical Engineers in the Locomotive Workshops, Perambúr, and are reported to have made considerable progress.

Seven Civil Engineers and three Engineer Subordinates spent the year at the Public Works Workshops. It is satisfactory to note the testimony of the Superintendent that the style of work done by them was generally good.

Three Civil Engineers and 12 Engineer Subordinates were employed in various circles where important public works are under execution. The progress reports received from the several Superintending Officers show that the students have displayed considerable aptitude for the profession and acquitted themselves satisfactorily. No reports have yet been received on the work of three students, which is regretted. The most important feature during the year in connection with the practical work was the doubling of marks with a view to afford sufficient stimulus for greater exertion and improvement.

12. *Library and Physical Education.*—Good use was made of the library. Drill was introduced during the year into the Draughtsman and Surveyor's classes, and the number of marks for Physique in the Engineer class raised. The tabular

results show that the students secured nearly the maximum number of marks in Drill and Exercises. This is very creditable.

13. *Prospects of Passed Students.*—This is the first year in which the students of the Engineer and Engineer Subordinate classes who completed the theoretical and practical courses under the reorganization scheme received their College diplomas. Of the four Engineers, two have secured the guaranteed appointments, and under G.O., No. 364, Public Works Department, dated 9th February 1891, nine Engineer Subordinates will be posted to the Public Works Department. There is a reasonable prospect of the other students gaining suitable berths in the railways under construction. In its order quoted above, the Government was pleased to reserve for the Subordinate Engineers of future years six appointments, which is very encouraging. The Director is glad to find that all the Draughtsmen who passed have succeeded in obtaining employment. The register of passed students maintained in the College does not appear to be complete. It is very necessary that a full history should be kept corrected to date.

14. *Finance.*—The expenditure on the College and School departments aggregated approximately Rs. 15,960 and Rs. 39,485 and the income from fees amounted to Rs. 2,183 in College and Rs. 5,955 in school. The net cost of the College and School departments was thus Rs. 13,778 and Rs. 33,530. The net cost per head was Rs. 1,148 in the College and Rs. 252 in the School department.

15. The record of the past year is one of substantial progress on the practical as well as on the theoretical side, but much remains to be done before the College can be said to provide for the country an amount of technical education in regard to subjects falling within the scope of an institution of the kind fully equivalent to its cost. This object may be secured if it is amalgamated or associated with the School of Arts, and the number of subjects taught practically and theoretically in the combined or associated institution made to correspond with the industrial necessities of the country. Hitherto it has done little more than provide Engineering Assistants and subsidiary employés for a single great department—that of Public Works. This is good service, but it can do much more for the country without unduly increasing its cost.

(True Copies and Extract.)

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

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

ORDER—dated 28th July 1891, No. 580, Educational.

There is but little to add to Mr. Grigg's careful review of the reports upon the progress of the College of Engineering during 1890-91 and the Government agrees generally with his observations.

2. As remarked by the Director of Public Instruction, the year under report was one of substantial progress, the advance over the preceding year in the strength of all departments, except the Engineer classes, being very marked. The figures given below contain particulars of the attendance in each class during the last 3 years :—

Class.	Number in class on 31st March		
	1889.	1890.	1891.
Engineer	17	13	12
Do. subordinate	17	28	38
Military probationers	2	1	5
Draughtsman	18	25	43
Surveyor	13	29	33
Artisan	26	30	35
Total ..	93	126	166

The figures are not so satisfactory if carried further back, for on the 31st March 1887 the total strength of the College was 181 and on the corresponding date in 1886 it was 185, so that the institution cannot be said to have as yet completely recovered from the depression which characterized the years 1887-88 and 1888-89. The steady increase which has taken place since then, in spite of the far longer and more difficult course prescribed since the reorganization in 1886, is, however, a highly satisfactory feature and seems to show that the former decline was attributable rather to the introduction of the revised course of studies than to the difficulty of obtaining employment.

3. The weakness of the Engineer classes is remarkable and the Director of Public Instruction is probably correct in attributing this to the limited prospects of employment. Unfortunately the Government sees no probability at present of any increase in the number of appointments guaranteed to the Engineer classes and for some time to come it is probable that the demand for the members of these classes will be comparatively small. The recent alterations in the system of marking, the construction of the new workshop sanctioned in G.O., dated 25th June 1891, No. 481, Educational, and the contemplated changes in the nature of the practical course, all with a view to increasing the practical character of the instruction imparted, will, however, doubtless have an effect in increasing the demand for the superior grades of men educated in the College.

4. The percentage of the maximum marks obtained on the average by Engineer students at the final examination in December was 57 against 53 in the preceding year; similarly, the Engineer subordinate class obtained 61 *per cent.* against 45, the Draughtsman class 65 against 61, and the Surveyor class 68 against 56. This advance is gratifying, but in certain other respects the results produced by examination were not so satisfactory. Thus the average marks gained by the Engineer students in Science amounted to only 33 *per cent.* of the total and in the case both of these candidates and of the Engineer subordinate class the results obtained in Mathematics were decidedly poor.

The result of the B.C.E. examination was not creditable, only one out of the candidates examined having passed, and he only in the third class; it is, however, observed that three of the candidates examined had been studying privately.

On the other hand, the proportion of students who passed the final College examination was, in the case of each class, decidedly satisfactory.

5. The Government notes with pleasure the highly favourable report upon the conduct and attainments of the Military pupils and the remarks made by officers of the Public Works Department upon the progress of students attached for practical instruction to their divisions. The attention of the Public Works Department will, however, be invited to the absence of any progress reports from the Nellore and Periyár No. I Divisions; the punctual submission of these reports should be insisted upon.

6. 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.
„ Military Department.

Exd. P. L. Pereira.

Govt. of {1891} Madras.

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Recd. *Encl.*

G.O., 28th July 1891, No. 580.

JULY.

College of Engineering.

Reviewing the report upon the working of the — during the year 1890-91 and forwarding copy of Proceedings to the Secretary of State.

No. 2299 W & / 26th Augt 1891

Recorded.

2. The attention of Supdg. Engrs will be drawn to para 5 of the Govt. order with reference to paras 81 C and 101 C P. W. Code.

(Sd) J. P. W

Supdg. Engrs
C. A. to Govt
S. of W P. Project.