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PRESIDENT'S REPORT

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REPORTS

OF THE

PRESIDENT AND TREASURER

PRESENTED AT THE DECEMBER MEETING OF THE CORPORATION

JANUARY, 1916

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Report of the President.

TO THE MEMBERS OF THE CORPORATION:

In accordance with the by-laws I beg to submit to your Corporation a report of the affairs of the Institute, appending, as usual, reports from other administrative officers with reference to the work of their special departments.

CHANGES IN THE CORPORATION AND FACULTY.

Since the last annual meeting your Corporation has suffered severely through the loss by death of Mr. James P. Tolman. Mr. Tolman was a member of the first graduating class of the Institute in 1868, and loyally devoted himself to the interests of his alma mater throughout his active life. Resolutions will be introduced at a later stage of this meeting setting forth the Corporation's appreciation of the value of Mr. Tolman's services so that it would be somewhat out of place for me to make more extended reference to them at this stage of our proceedings. The Corporation has also lost the services of two members through the expiration of their term of service, namely, Messrs. Frank W. Rollins and Edward Cunningham. Mr. Rollins during his term of service showed a special interest in the departments of English and Modern Languages and in addition to this was always ready to give help and counsel in matters affecting the welfare of the Institute as a whole. Before the expiration of his term of office his health had begun to decline and he died recently at an age when most people look forward to many years of activity. Mr. Edward Cunningham's term of service also expired in March last. Immediately after his election to the Corporation he undertook active work in the en-

deavor to secure releases of easements on our property on Boylston Street, and he was, I think, the first to raise money to enable the Institute to move to a new site. His activity was unhappily cut short by a very severe illness and for the latter years of his membership he was too much of an invalid to make it possible for him to attend the meetings of the Corporation.

Having enumerated the losses of the Corporation it is a pleasure to turn to the gains. This body has been strengthened during the year by the election to life membership of Mr. Howard Elliott and Mr. Edwin S. Webster. Mr. Elliott's large experience with railroads, his interest in education and his unselfish devotion to the public good will make him a most valued member of the Corporation. Mr. Webster is a distinguished alumnus of the Institute whose election to life membership of the Corporation followed immediately on the expiration of his term membership. The three term members elected in March last were Messrs. William H. King, James W. Rollins and Jasper Whiting, all actively interested in the welfare of the Institute and all experienced in its service.

During the year the losses both within the Corporation and Faculty have been fewer than usual. In the Faculty the most notable losses are occasioned by the retirement, after twenty-two years of service, of Professor Arlo Bates, Head of the Department of English, and of Associate Professor Harold A. Everett, of the Department of Naval Architecture and Marine Engineering. Professor Bates retires on the score of age with a pension from the Carnegie Foundation for the Advancement of Teaching. During his long term of service he has given himself with unstinted devotion to the difficult task of stimulating the students to think as well as to express themselves forcibly and clearly. Professor Everett resigned to take the position of Professor of Marine Engineering in the Post Graduate School of the Naval Academy

at Annapolis. The most important promotion in the Faculty has been that of Professor Pearson, who has been appointed to succeed Professor Bates as Head of the Department of English. Professor Pearson has had long experience as a teacher and has earned the respect of his colleagues and of the students by his earnest devotion to his profession. I have no doubt that in his hands, while the best traditions of the Department will be maintained, there will be a constant effort to make improvements. There are few professions where clear thinking and clear expression are more needed than in the professions for which the Institute trains its students so that it is of the utmost importance that the Department of English should be strong. To assist Professor Pearson and his colleagues, Professor Frank Aydelotte has been called to the Institute from the University of Indiana. He has been trained in this country and in Oxford and has come to us with the highest commendation from those who know him and his work. Other changes within the Faculty have been made as follows: Associate Professor Archer T. Robinson appointed Professor of English; Assistant Professor Robert P. Bigelow, appointed Associate Professor of Zoölogy and Parasitology; Assistant Professor W. Felton Brown appointed Associate Professor of Freehand Drawing; Assistant Professor H. R. Kurrelmeyer appointed Associate Professor of German; Instructor Henry B. Phillips appointed Assistant Professor of Mathematics.

THE STUDENTS.

The reports of the Dean and the Registrar contain as usual various interesting statements concerning the students. Their number, on November 1st last, was nineteen hundred, the corresponding number in the preceding year being eighteen hundred and sixteen. The rapid growth of the Institute in recent years makes it clear that our new buildings are none too large and that in several depart-

ments we shall very soon have to face the problem of further building or of limitation of numbers. For many years there has been a steady growth in the number of students coming to the Institute from other colleges. This year there are 331 (more than 17 per cent of the whole), who are graduates of colleges, the corresponding number last year being 290, and the number of students who have spent one or more years at some college before entering the Institute is now 559. Thirty-five per cent of our *new* students come from other colleges. Students continue to be attracted from all parts of the Union and from abroad. The supply from the countries at war has, of course, been cut off, but this loss has been partially compensated by the increased numbers coming from neutral countries. The total number of foreigners is now 125, more than $6\frac{1}{2}$ per cent of the whole student body, about twice as large a proportion of foreigners as has any other institution of higher learning in the country. Within the Union, students continue to come from all states, the most notable increase being from the states of the Middle West, particularly Ohio and Illinois and from the southern states. The rapid rise of numbers in recent years is indicated by the fact that more than half the graduates have gone forth from the Institute since 1906.

SOME EVENTS OF THE YEAR.

Excellent work has been carried on within the Institute during the year in spite of the crowded condition of the lecture rooms and laboratories. In a period of expansion such as that in which we now find ourselves, problems of building and equipment loom so large as to over-shadow somewhat the more important work of teaching and investigation. This work is constantly presenting new problems or old problems in a new phase and now that we are beginning to see the end of the first great stage of building operations we can look forward with satisfaction to hav-

ing greater freedom to give less divided attention to the internal needs of the Institute. To keep in the forefront, we must have constantly in view the opportunities for improvement both in teaching and in research, two things which must go on together. Happily, the problems of teaching in such institutions as Technology are receiving unusual attention at this time, owing in part to the investigations that are being carried on under the direction of the Society for the Promotion of Engineering Education and the Carnegie Foundation for the Advancement of Teaching. As to research, the Institute has been fortunate in keeping alive the spirit of investigation in most of its departments, with notable results in several of them. One of the most important developments in recent years has been the establishment of the Research Division within the Department of Electrical Engineering. The rapid growth of the work of this Department indicates what will happen in other branches of engineering when funds are available for carrying on similar work. The Research Division of Electrical Engineering began very modestly two years ago, and this year it has $30,000 available for its work during the year. Excellent results are being obtained in other departments which are much more limited as regards funds available. Some of these are referred to in the reports from heads of departments, for example, the joint theoretical and experimental investigation carried on by request of the Navy Department by Professor Edwin B. Wilson of the Department of Mathematics and Mr. Jerome C. Hunsaker, U.S.N., of the Department of Naval Architecture. This investigation sought to determine the influence of a gyroscopic stabilizer on an aeroplane exposed to gusts of wind, and is now confidential information in the hands of the Department of the Navy.

From time to time during the year, reports of progress with reference to the construction of the new buildings of the Institute have been presented to your Corporation.

By this time these buildings are so far advanced that the simplest report of progress is to invite inspection of the buildings. The exterior is now practically complete, and although the general view is somewhat marred by the temporary obstructions in the main court, it is now practicable to form a judgment of the effectiveness of the architectural treatment. It seems to be generally conceded that the group forms a notable addition to the educational buildings of the world. Boston is peculiarly fortunate in its great educational traditions and it has been a serious responsibility to erect a group of buildings that would be worthy of those traditions and at the same time satisfy the practical needs of the institution and keep within reasonable limits of cost. It seems certain now that the buildings will be finished within the estimate of cost made by the Stone & Webster Engineering Corporation when final plans were adopted. It is a pleasure to add that those who have supplied most of the funds needed for this great undertaking have expressed themselves as thoroughly satisfied with the work and with the way in which it has been carried out. It is planned to have formal exercises for the dedication of the buildings in June next, when they should be finished, except for the installation of machinery which will take place during the summer.

The original plans for these new buildings contemplated housing the whole Institute simultaneously on the new site. Later, the decision of the Supreme Court with regard to the Institute's property on Boylston Street and the necessity of keeping expenses within the limits of funds that were available or in prospect, made a change of plans expedient. It was therefore decided to house the Architectural Department in the Rogers Building as that Department could be separated from the rest of the Institute with less difficulty than the others and the Rogers Building is well placed and readily adapted for the work

of a school of architecture. It was also contemplated that as a temporary expedient the work of the Mining Department should be carried on in the Boylston Street property. It was realized, however, that this separation would be inconvenient and, if protracted, harmful to the Department. It was therefore most gratifying to be able to announce in June last that three alumni — Messrs. T. Coleman du Pont, Pierre S. du Pont and Charles Hayden — had agreed to contribute in equal shares the amount required, according to the estimates, for the erection of a suitable Mining Building. Work on that building began as soon as plans were approved by the Department and the building should be ready for occupancy at the same time as the other educational buildings that are now being erected, that is, in the fall of 1916. The generous benefactors who contributed the large amount of money necessary for erecting the Mining Building expressed the hope that the much smaller sum needed for its equipment would be supplied by other friends of the Institute. Mr. Arthur Winslow has been working to secure the necessary subscriptions, but there is still a good deal needed if the mining and metallurgical laboratories are to be adequately equipped.

One of the many reasons for moving to a new site was the need for improving the living conditions of the students, and the difficulty, if not impossibility, of making adequate provision in this neighborhood. The Institute year by year becomes more and more a national institution, constantly extending its influence and drawing men in large numbers from distant parts. To provide adequately for these men as well as for the large number coming to us from various parts of the state of Massachusetts who can not live at home, it is imperative that dormitories should be provided as soon as practicable. When we enter the new buildings we may expect to have two thousand students and it will involve very consider-

able expenditure to provide dormitories to house the large proportion of those that would avail themselves of such facilities. In the solution of this problem we shall proceed slowly or quickly according as money is provided for the purpose. In view of the very great expense that is being incurred in other directions and the large sums provided by the friends of the Institute to defray this expense, it is not surprising that we are not yet in a position to solve the whole dormitory problem. I am happy to be able to state, however, that we have made a beginning, having broken ground ten days ago and begun the erection on the river front of a dormitory to accommodate two hundred students. A large part of the money needed has been given specifically for this purpose by Mr. T. Coleman du Pont and by an anonymous donor.

Another extremely gratifying gift has been that made by Mr. Charles A. Stone and Mr. Edwin S. Webster, both of the class of '88, who have offered to present to the Institute a house for its President. This will increase somewhat the social obligations of the President but the usefulness and the need of such a house have been proved by a very large number of the colleges and universities in the country. Its need at the Institute of Technology is as great as elsewhere owing to the character and circumstances of the students and the importance of bringing other influences to bear upon their lives than what they get in lecture rooms and laboratories. The President should take an active part in the social life of the students and a suitable house upon the grounds of the Institute should prove a most valuable aid.

When plans for moving were first made the whole scheme contemplated the purchase of a site, the erection of buildings containing lecture rooms and laboratories, the provision of a power house and its appurtenances, the erection of dormitories, of a center for student activities and a gymnasium (Walker Memorial), the provision of lunch and

dining rooms, an Athletic Field and the laying out of the grounds around the Field and buildings. Four years have elapsed since definite plans with regard to these matters were first considered, and I do not think that there can be any serious grounds for complaint of the progress that has been made. When I came to the Institute six years ago a site of twenty-five acres in area was the largest that was talked of and we now have paid for and occupied a site of double that area which is generally recognized to be extraordinarily well-suited to our needs. In addition to that, a group of buildings has been erected greater in scale and nobler in form than any that were dreamed of, as far as I know, at the inception of the plans, and the many millions needed for the erection of these buildings has been subscribed. An admirable Athletic Field has been furnished and a beginning made with dormitories on a scale large enough as a first experiment. In carrying through all this work, the Executive Committee has constantly kept in view the educational needs of the Institute and has been most careful not to permit a policy of expansion to cripple the educational work of the future. It set out with a definite policy of not undertaking anything that could not be paid for by funds that came to the Institute after building began or that were specially subscribed for the purpose or could be made available by the sale of property that was not producing revenue. It has counted amongst its available assets for purposes of expansion the Athletic Field in Brookline, which it has sold, and the Trinity Place property, which it may reasonably expect to sell in the not distant future. The Boylston Street property is subject to such restrictions as to render it unavailable for meeting the needs of the new development. It has perhaps not been fully realized, even by members of the Corporation, what large sums of money have been needed for such purposes as drainage of the grounds, the erection and equipment of the power house, the construction of tunnels for

bringing in water from the river and for the distribution of heat and power, and particularly for the equipment of the buildings with machinery, desks, drawing-tables and furniture. The amount required for these purposes is greatly in excess of what has been subscribed by the alumni in their contributions to the alumni fund. The Executive Committee has reduced these expenditures as far as is consistent with the necessities of the case. When things that are absolutely indispensable have been provided there will be nothing left from the funds at present available or in prospect to make any contribution towards the completion of the "Walker Memorial" which it has been so long the object of the alumni to provide, unless that building can be designed to meet certain needs for which some provision *must* be made. This has led to some disappointment amongst the alumni and has produced some criticism of the policy of the Executive Committee. My responsibility in the matter has not been an undivided one, but, although I am as anxious as any one else to see the "Walker Memorial" completed, I do not see how any other policy could be safely pursued than that which has been followed. I hope, of course, that through the generosity of the alumni and other friends of the Institute we shall not have to delay long in carrying the whole scheme that was outlined a few years ago to a satisfactory completion. The sum now needed is but a very small fraction of what has been obtained in recent years and with united effort we may reasonably hope to see the whole thing finished very soon.

OPPORTUNITIES OF THE FUTURE.

Looking ahead it seems clear that the opportunities presented to the Institute are great and unique. Great opportunities would have come to it anyway through the recognition of its past achievements, but a special opportunity is presented as a result of the war. This, as all

recognize, is bringing about the destruction of capital in Europe on a scale that it is almost impossible to comprehend. At the same time owing to local causes, capital has been piling up in this country and this process instead of being retarded by the war has been accelerated. Great enterprises were formerly carried on in various parts of the world with European capital, greatly to the profit of the countries supplying that capital, and these enterprises must now be carried on, if at all, by means of capital from this country. It must be gratifying to us all that a member of this body, prominently associated with Technology since his graduation, has undertaken the direction of a great corporation formed to deal with this problem of international enterprise. The situation presents an unusual opportunity for Technology, for these enterprises must not only be financed by America but largely carried on under the direction of Americans. This will greatly increase the need of trained men in this country and on the skill of these trained men will largely depend the practical value and the financial success of what is done.

The international situation affects the whole field of profitable enterprises and so should give a stimulus to the work of all our main departments, particularly to the departments of Civil, Mechanical, Electrical, Mining and Chemical Engineering. The position of Chemical Engineering is, however, unique, for the opportunity here is not only to develop chemical industries in other countries with American capital, but to build up great industries in this country. I need not enlarge on the importance of the chemical industry that has been developed within the last generation or two by Germany. For a time at least the competition of that country will be cut off. This has already given an extraordinary impetus to the chemical industries of this country and directed attention to the possibilities of permanent advancement in various directions. In some of the fields that are receiving most at-

tention from the press, there is probably little hope for successful competition, but others are quite promising. Those who have studied the matter carefully know that Germany has not shown any special genius for chemistry as far as the great advances in that science are concerned, but a peculiar genius for patient investigation in the application of scientific knowledge to practical ends and for the organization of her industrial forces. In her chief chemical industries she has now the great advantage of having established a business of immense complexity, the success of which depends very largely on the mutual help that comes from its different parts. It will not be easy to take up any one of these parts and compete successfully, and, of course, it is not practicable to build up the vast complex in its entirety in a day. We have, however, the energy and the capital and certain advantages as far as the supply of our own needs is concerned which serve to offset the disadvantage of greater cost of labor. In special fields we have peculiar advantages with regard to the raw materials required and if we organize our industries with reasonable skill we can place ourselves in a position that we should hold without difficulty even when the cessation of hostilities exposes us to the vigorous competition of our rivals. One indispensable factor for our success is an adequate supply of well-trained chemists. Fortunately, at Technology, we have not been idle in this respect in recent years as is shown in other ways by the steady rise in the number of students pursuing our courses in Chemistry, Electrochemistry and Chemical Engineering. The number of those to-day is about 350, that is, between one-fifth and one-sixth of the whole number of students at the Institute. (I am speaking here of those who are pursuing Chemistry with a view of preparation for the profession of the Chemist, including the Electrochemist, there being of course a far larger number of men taking courses in Chemistry as subsidiary to some other profes-

sional career.) We have a staff of eighteen professors of chemistry and twenty-three instructors and assistants. The number of men of distinction on this staff is high as compared with those in other institutions, indeed, in this respect, according to the impartial testimony of *American Men of Science*, "the Massachusetts Institute of Technology stands clearly first." We have laboratories for research in physical chemistry and industrial chemistry, and much work of importance has been carried on in these laboratories for years. In our new buildings, we have devoted more than two acres of floor space to the Department of Chemistry and are providing equipment that will greatly increase our facilities for the training of men. All this should be helpful, but we realize that it is not enough. The report of the Visiting Committee on Chemistry will be presented to-day and will make important suggestions for the improvement of that Department. I need not therefore pursue the matter further until that report has been considered.

I might examine all the leading departments at the Institute and indicate their possibilities of development and improvement. Undoubtedly, there are great opportunities before them all but inadequate endowment blocks the way of progress almost everywhere. Few realize, even within the Corporation, how we are cramped in this respect. It is doubtless a good thing that every dollar of expenditure should have to be most carefully scrutinized, but it is as clearly a bad thing that the level of the Faculty should be depressed or opportunities for great improvements constantly neglected through lack of funds. I am always pointing out in similar reports that the scale of salaries must be increased, and I am afraid that the constant repetition has made the matter a commonplace to which little if any attention is paid. Commonplace or not, it is a matter of vital importance, for an educational institution is more vitally affected by the character of its

teaching staff than by anything else, and, although there are individual exceptions, it is generally true that low-grade salaries mean low-grade men. Every effort should be made to raise the salaries within the Institute at least to the level of those paid in the School of Applied Science of Harvard University; otherwise, our alliance with Harvard will accentuate discrepancies which are deplorable in themselves.

The reference to our alliance with Harvard suggests that something should be said with regard to what is being done in that matter. Although the formal alliance that was entered into last year does not go into effect until we occupy our new buildings and although certain questions regarding the legality of some of the provisions of our agreement with the University have not yet been settled by the Court to which they have been referred, a good deal is being done to test the practical usefulness of such an alliance. Students who entered the Institute last year and this year were all afforded the opportunities that the agreement presents and this year a considerable amount of instruction at the Institute is being carried on by professors in the University's School of Applied Science. In the Department of Mechanical Engineering there are only two professors in that School and these have had other duties to perform besides taking their part in teaching students of Mechanical Engineering here who are candidates for the University's degrees as well as those of the Institute. In the Department of Mining the number of students is much smaller than in the other courses affected by the agreement, and owing to this and other reasons there has been less active coöperation than in other fields. As a result of this the effect of the agreement on the departments of Mining and Mechanical Engineering has been less marked than it would otherwise have been. However, in the departments of Civil Engineering and Electrical Engineering, the coöperation has been so intimate

and complete that we can see better how the agreement should work out in practice. The heads of the departments concerned report that the results are in every way excellent, that the utmost harmony prevails, and that all concerned are convinced that the combination will prove highly beneficial to the cause of applied science. I may perhaps add that whatever may be said or thought regarding this combination there can be no doubt that it has been singularly well timed. The Institute is about to move to a new site and with enlarged opportunities undertake enlarged responsibilities. Unexpectedly has come the great war to change the whole current of the world and bring about a crisis in the industrial development of this country, a crisis that must force it to organize its industry on a scientific basis. When such great forces are operating, it would be disastrous to pay any attention to petty differences between institutions or to the narrow views of those who can not see beyond the limits of any single institution. In these days of large opportunities our range of vision must be large and the combination of effort of two great institutions should be a powerful aid in training men to meet the responsibilities of the new era that is opening.

RICHARD C. MACLAURIN.

Reports of Administrative Officers.

REPORT OF THE SECRETARY OF THE FACULTY.

Few matters of special importance have come before the Faculty during the year.

Changes have been approved in the schedules of studies of Course III, Mining Engineering and Metallurgy, and Course IV, Architecture, there being in each department a revision of the entire curriculum of the course.

The instruction in Physics and Physical Laboratory, of which a small part had, prior to this year, been given in the first term of the third year, has been put wholly in the second year. This very satisfactory change has been made possible by transferring History II, formerly given in the first term of the second year, to the first term of the third year, excepting for the students in the Department of Architecture who do not take the work in Physical Laboratory and who omit the portion of Physics formerly given in the third year.

In February and September, 1915, 282 new students were admitted on credentials from other colleges, of whom 168 had been graduated from their former college. There has been a marked increase in men coming from other colleges, the majority of whom enter our Junior year, thus finishing the Institute requirements in two years. In 1911, 191 were admitted; in 1912, 202; in 1913, 223; in 1914, 264; and this year, as stated, 282.

The Secretary of the Faculty has charge of the general correspondence of the Institute, which has increased very greatly during the last few years. The amount of correspondence with students from other colleges asking for

information in regard to transferring to the Institute has been very marked, inquiries from over a thousand such students having been replied to during the year.

In June, 1915, the Faculty recommended two students for the degree of Doctor of Philosophy, one for the degree of Doctor of Engineering and thirty for the degree of Master of Science. Two hundred and ninety-three were recommended for the degree of Bachelor of Science, two of whom were recommended for the degree in two departments.

ALLYNE L. MERRILL,
Secretary.

REPORT OF THE DEAN.

The Adviser problem has always been an important one at the Institute. In 1894 the Faculty instituted a system by which each new student on coming to the Institute was assigned an official adviser. The student received a note from the office of the Secretary informing him that a member of the Faculty, or staff of instruction, had been asked to act as his adviser. Over one hundred members of the Faculty and some of the instructing staff thus became the official advisers for all new men, the number assigned to each instructor being about four or five. This method of assigning advisers continued until 1902, and it was not found to give very satisfactory results. In 1902 the Dean, who had just been appointed, was asked to act as the Chairman of a Committee of Advisers, and it was suggested that he appoint for these advisers the younger professors and members of the instructing staff. He did so, and this Committee of Advisers met the new students in the General Library during the two days immediately preceding the opening of the term. This arrangement was somewhat of an improvement on the former plan, as at the beginning of the term the older professors were too much occupied with their regular work to have time to act as

advisers. In 1912 an arrangement was made with the Technology Christian Association to have students help new men in registration, and give advice as to rooms and the general regulations of the school. It was found, as a rule, that the student advisers were more helpful in these matters than the instructors, and in 1914 over one hundred men were selected by the Christian Association to act as student advisers to the Freshmen. These names were sent to the Dean for approval, and as soon as the Registrar could furnish a list of the new men, the student advisers wrote and made appointments to meet them on their arrival in Boston at the opening of the school year. The student advisers have proved to be very efficient in helping in registration and in most matters connected with the first exercises. The Faculty Committee continues, however, to meet the new men in the General Library at the beginning of the term, and Faculty advisers are assigned to students whenever requested.

In connection with the matter of giving advice to students it is important to mention this year a plan that had its origin with the Alumni Association in Rochester, New York. The Technology Club of Rochester raised the sum of $150 for the payment of instructors who should act as special advisers to new students. The Secretary of the Technology Club of Rochester entered into correspondence with the Dean in December, 1914, and an arrangement was made for conducting a series of informal conferences each day in the week, except Saturday, at the noon hour. The Dean was asked to select five instructors who would be specially qualified to act as advisers to first-year men. The men selected were, Professor Moore of the Mathematical Department, Professor Williams of the Chemical Department, Professor Howard of the Civil Engineering Department, Mr. Rogers of the English Department, and Mr. Kennedy of the Drawing Department. A room near the Technology Union was used for the consultations, and

one of the advisers was there every day, except Saturday, between one and two o'clock. The attention of students was called to this Rochester experiment by articles in "The Tech" and by speaking to first-year men whenever there were general gatherings at the social room in the Union. Probably about one hundred men availed themselves of this opportunity of consulting with instructors informally in regard to their work or in regard to general questions of Institute life. If this experiment had been tried during the first term, instead of during the second, I am sure that a much larger number of men would have availed themselves of the privilege. The reports from the different instructors at the end of the term were generally favorable to the experiment, and were forwarded to the Technology Club of Rochester. Up to the time of writing this report we have not heard whether or not the Rochester Club intends to continue this experiment, but if they do not wish to do so it might be a good thing to bring the matter to the attention of other alumni organizations. After the beginning of the term the Dean is the only official adviser whom students feel free to consult in regard to general matters connected with their life at the Institute, and one man is really not sufficient to answer all the questions which are likely to arise. The Rochester experiment provided each day a Faculty adviser who could be consulted by students without their feeling that they were intruding on his regular work.

The student control of undergraduate activities continues to be satisfactory, and the thoroughly democratic principle governing the election and appointment of students is more pronounced each year. The present democratic element in student life at the Institute has been brought about principally by the use of the Technology Union, its dining-hall, and its general social rooms. It is certainly to be hoped that when the instruction is carried on in the buildings across the Charles River there will be

at once some provision made to take the place of the Technology Union. If the Walker Memorial cannot be finished in time I think certain rooms in the main building should be given over to the needs of the social life of the students. Such a sudden change as the loss of any common meeting place would be most unfortunate.

The Dean is *Ex-officio* Chairman of five Faculty committees and the reports of these have already been submitted to the Secretary. It would be interesting, perhaps, to note that the Committee on Recommendation of Graduates for Appointment reports that the number of applications for men received at the Institute last year was forty-seven less than the year before, and the number of men filing appointment blanks was thirty-seven more. The larger number of applications for graduates were received for mechanical engineers, chemical engineers and teachers.

Following is an abstract from the report of the Committee on Physical Training:

The classes in Physical Training were held under the direction of Mr. Frank M. Kanaly, assisted by Mr. George T. Rooney, of the Class of 1915. During the first term 379 men took the required course; in the second term 314. The number excused on account of physical illness was 30. 71 students substituted athletic work for gymnasium exercise; 22 men substituted wrestling for gymnasium work; 6 men swimming; and 5 fencing. 42 students failed to pass satisfactorily in Physical Training and will be required to repeat the course. Physical examinations for all first-year male students under twenty-one years of age were held in October, 1914, and April, 1915. On the basis of these examinations charts were plotted showing the improvement in measurements and strength. Five Cabot Medals were awarded to those students showing the greatest improvement and greatest gymnastic efficiency in class work. The order of these awards was: J. W. Kilduff, '18; P. H. Kennedy, '18; E. Berman, '18; A. B. Miller, '18; and L. A. Stewart,

'18. Five men were given Honorable Mention: W. J. Henry, '18; D. M. McFarland, '18; D. G. Merrill, '18; G. B. Smith, '18; and B. O. Pinkham, '18.

ALFRED E. BURTON,
Dean.

REPORT OF THE MEDICAL ADVISER.

This report includes the care of students as prescribed in the catalogue during the college year of 1914–1915. Location of office and consulting hours on Mondays and Thursdays was the same as in previous years.

In connection with the new buildings I will again draw attention to the necessity for adequate facilities for this work, and would respectfully refer to paragraph two in the report of last year. These accommodations should be well lighted, should have hot and cold water, and such equipment as is in keeping with the demands of the work as found at the Institute. They should include a suitable examining table, a desk, dressing table, chairs, a small sterilizer, cabinet for medicines, dressing materials, instruments, etc.

The suggestion in last year's report of an extra day still seems pertinent in view of the increased work as indicated in the following statistics showing a comparison of the number of students treated in 1914–15 with those treated in 1913–14.

1915.	1916.	1917.	1918.	Graduate, special.	1914–15. Total.	1913–14.
50	39	58	147	19	313	244
Total number of office consultations					672	533
Total number of individual students					313	244
Greatest number seen per day (Nov. 30, 1914) . .					20	16
Least number seen per day (April 15, 1915) . . .					3	1
Average number seen per day					10.8	9
Total number of sessions (consultation periods) . .					62	62

As in previous years the Dean has been notified of cases of illness which come outside of the province of this report,

and minor injuries have been taken care of, as the emergencies demanded, by physicians in the neighborhood. The work in the Medical Adviser's office has gone forward with successful treatment of such cases as came under his care and he is not aware of any deaths or serious complications arising in the fraternity houses or boarding houses where Technology men are to be found.

Four lectures were given to the Freshmen on the topics of

(1) Sex Hygiene.
(2) Physiology and Hygiene of Digestion and Respiration.
(3) Personal Hygiene (hair, teeth, skin, baths, clothing, exercise, etc.).
(4) Physical Training and First Aids, including the demonstration of the "Pulmotor" (a mechanical device for restoring and maintaining respiration, as met with in such conditions as drowning, gas poisoning, shock, etc.).

The lectures of this fall were required and attendance was taken. The hour from 4 to 5, on successive Thursdays during the early weeks of the year was assigned to this course of lectures and a large attendance was present at each lecture. It is hardly necessary to reiterate the suggestion in the earlier reports that this educational work is of the utmost importance. In a few years it is hoped that the upper classmen will have gained enough advice and sufficient interest in these general topics in their freshman year not only to derive immediate personal benefit from their application, but, by virtue of this added equipment, to make themselves more useful in their various professional fields.

A number of complaints have arisen from the fact that certain divisions in the gymnasium classes follow the drill hour at the armory, making the combined exercise more strenuous than some of the students can undertake safely, great fatigue and exhaustion having been experienced in several instances. The Medical Adviser is endeavoring to adjust this difficulty, if possible.

The increased number of sprains and strains prompted the Adviser to investigate the wrestling system, with the

result that greater care is being exercised in the preliminary work of the wrestling squad in the hope that the contestants will be less liable to injuries when actual wrestling begins.

The earlier reference to having a modest infirmary with a trained nurse in constant attendance still seems to be a need which the Institute should make provision for in the near future. Such a policy has just been instituted at Radcliffe College. Last year the students enjoyed the services of a full-time nurse and this year an infirmary has been added to this department.

The work has been a source of great satisfaction to the Medical Adviser and he would welcome any suggestions or criticisms which would tend to make his efforts more satisfactory and efficient.

J. ARNOLD ROCKWELL.

REPORT OF THE LIBRARIAN.

During the year 1914–15 the ordinary receipts in the libraries of the Institute make a total of 5842 pieces, a considerable increase over the previous year when the total was 5556. These receipts may be classified according to their sources, as shown in Table I.

TABLE I. TOTAL ORDINARY RECEIPTS, 1914–15.

By purchase		1185
By binding		1825
By gift, volumes	1423	
pamphlets and maps	1409	2832
Total		5842

These figures include additions to the American Telephone and Telegraph Collection, of which 186 were obtained by purchase, 57 by gift, and 820 are volumes of periodicals which were received in parts, and which we had bound.

The Crafts Collection, consisting of 634 volumes and 353 pamphlets are not included in the table above, be-

cause they have not yet been properly incorporated into the Library of the Institute.

After deducting books lost or worn out, etc., the net increase in the libraries of the Institute is 3073 volumes, 1176 pamphlets and 139 maps. The American Telephone and Telegraph Collection has been increased by 980 volumes and 83 pamphlets, so that on the 1st of July, 1915, the total contents of the libraries of the Institute, including special collections, was 121,711 volumes, 49,614 pamphlets and maps, as shown in Table II.

TABLE II. TABLE OF THE NET INCREASE WITH THE COST OF THE SAME DURING THE YEAR 1914–15, AND THE TOTAL CONTENTS OF THE LIBRARIES OF THE INSTITUTE, JUNE 30, 1915.

Libraries.	Net increase.				Total Contents.	
	Volumes.	Pamphlets.	Maps.	Cost.	Volumes.	Pamphlets and Maps.
General Library:						
General	219	124	....	$310.31	8,973	5,865
English	6	....	....	9.07	3,551	40
Military Science	....	....	....	.....	367	9
Walker Memorial	....	....	....	.....	487	.....
Other Departments	40	....	....	30.26	177	1
Total, General Library	265	124	....	$349.64	13,555	5,915
Architecture	105	4	....	323.76	5,053	310
Aviation	12	....	....	43.06	107	6
Biology	177	100	....	251.67	4,514	1,488
Chemistry	200	122	....	690.28	13,884	3,839
Electrical Engineering	205	33	....	394.72	2,626	186
Engineering	627	334	....	934.06	18,927	6,545
Geology	260	82	125	220.71	5,636	4,225
History and economics	639	196	14	419.28	17,293	4,930
Margaret Cheney Room	2	....	....	29.25	896	15
Mathematics	88	17	....	150.73	2,614	383
Mining	211	62	....	313.71	6,357	1,219
Modern Language	19	....	....	17.60	2,071	61
Naval Architecture	75	21	....	168.17	1,981	560
Physics	188	81	....	328.63	9,992	1,736
Total, Libraries	3073	1176	139	$4635.27	105,506	31,418
Special Collections:						
A. T. & T.	980	83	....	1407.49	13,400	18,083*
Baldwin	....	....	....	.....	2,000	93
Edwin A. Wyeth	....	....	....	.....	805	20
Grand Totals	4053	1259	139	$6042.76	121,711	49,614

* Estimated 18,000 in previous Report.

The total cost of maintaining the libraries of the Institute, exclusive of salaries, is $8120.65. This sum includes expenditures from the American Telephone and Telegraph Library Fund for the purchase and binding of books and for subscriptions to periodicals, but does not include other expenditures from that Fund. The distribution of expenditures is shown in Table III.

TABLE III. BILLS APPROVED, 1914–15.

For Accessions by purchase and binding	$6042.76
For Subscriptions to periodicals	1778.99
For Equipment	3.00
For Office Supplies, etc.	326.31
	$8151.06
Received from the sale of duplicates, etc.	30.41
Total	$8120.65

The number of current periodicals received during the year was 869, including duplicates. There were received also 414 annuals and other serials, making a total of 1283 serial publications, of which 389 were paid for from the Periodical Account, the cost of 314 was charged to departments, and 580 were gifts. The total estimated cost for these subscriptions was $3035.58, of which $1955.59 is chargeable to the Periodical Account, and $1079.99 to the departmental accounts. The distribution of these serials among the several departments and their estimated cost is shown in Table IV.

TABLE IV. PERIODICALS AND OTHER SERIAL PUBLICATIONS RECEIVED DURING THE YEAR 1914–15, CLASSIFIED BY DEPARTMENT AND METHOD OF PAYMENT.

Libraries.	Number Received.				Estimated Cost.		
	Period. Acct.	Dept. Acct.	Gifts.	Totals.	Period. Acct.	Dept. Acct.	Total.
General	33	22	106	161	$ 136.65	$ 57.87	$ 194.52
Architecture	27	4	14	45	131.21	21.20	152.41
Biology	35	15	25	75	329.37	62.03	391.40
Chemistry	32	35	61	128	259.74	149.92	409.66
Electrical Engineering*	22	48	24	94	94.99	156.20	251.19
Engineering	69	62	135	266	258.40	164.43	422.92
Geology	18	10	34	62	141.91	46.93	188.84
History and Economics	45	42	80	167	121.71	93.80	215.51
Margaret Cheney Room	..	9	2	11	.....	25.00	25.00
Mathematics	16	5	8	29	80.56	15.25	95.81
Mining	33	21	48	102	144.50	101.60	246.10
Modern Language	19	..	2	21	82.69	.....	82.69
Naval Architecture †	10	28	7	45	28.80	112.64	141.44
Physics	30	13	34	77	144.97	73.12	218.09
Totals	389	314	580	1283	$1955.59	$1079.99	$3035.58

* Including A. T. & T. Collection. † Including Aviation.

The 869 periodicals proper were published under 815 titles. We received one copy each of 773 titles, 42 periodicals were duplicated, the total number of duplicate copies received being 96. The extent of duplication is shown by Table V.

TABLE V. PERIODICALS: NUMBER OF TITLES AND NUMBER OF COPIES RECEIVED.

Number of Copies of each Title.	Number of Titles.	Total Number of Copies.
1	773	773
2	34	68
3	4	12
4	4	16
Totals	815	869

Table VI shows how the duplicates were distributed among the several departments with reference to the number of copies received.

TABLE VI. DUPLICATION OF PERIODICALS BY DEPARTMENTS AND NUMBER OF COPIES OF SAME TITLE RECEIVED.

Departments.	Number of Copies Received.			Total Number of Copies Duplicated.
Number Receiving Same Title.	2	3	4	
General	8	.....	.....	8
Architecture	3	.....	.....	3
Biology	3	2	1	6
Chemistry	6	2	3	11
Electrical Engineering	10	3	3	16
Engineering	15	2	3	20
Geology	2	.....	.....	2
History and Economics	4	.....	.....	4
Margaret Cheney Room	6	.....	.....	6
Mathematics	.....	.....	.....	.....
Mining	6	.....	3	9
Modern Language	.....	.....	.....	.....
Naval Architecture	1	1	2	4
Physics	4	2	1	7
Totals	68	12	16	96

The work in the Office of the Librarian included the writing of 4953 cards, which we added to the catalogue making a total of 134,813 cards. The orders issued for new books numbered 1645, and for binding there were issued 1190 orders, covering 1766 volumes. The Inter-Library Loans show some increase, 68 volumes having been lent and 4 borrowed.

The circulation of books, as far as records have been kept, total 17,622 volumes and pamphlets. The Architectural Department has also lent 2960 photographs. Records are given in detail in Table VII.

TABLE VII. CIRCULATION OF BOOKS, 1914–15.

	Books.
General Library	1,916
Architectural Library (2960 photographs)	5,266
Biological Library	585
Chemical Library	2,773
Electrical Engineering Library	1,966
Engineering Library	2,483
Geological Library	660
Mining Library	524
Physical Library	1,449
Total	17,622

The General Library, which is open every business day during the year, was open in the evening for 156 days. The total attendance from 5 to 7 P.M. was 2042, and from 7 to 10 P.M. 480; the average attendance for the whole period is 16.5, which is considerably less than that recorded last year.

The resignation of Miss Bernice Clark, for many years assistant in charge of the Chemical Library, was followed by the promotion of Miss Mirian S. Smith to that position, and the appointment of Miss Mildred E. Whittemore, A.B., to be Junior Assistant in the Office of the Librarian.

The work on the American Telephone and Telegraph Collection made real progress during the year covered by this report. During the first part of the year, Mr. E. W. Chapin, Research Assistant in charge of the Collection, was engaged in arranging the binding of volumes selected for that purpose. In order to save time, orders for binding were issued directly by him, in accordance with the arrangements made with the Librarian. There are 130 of these orders covering 820 volumes. Considerable time was spent also in searching catalogues for the titles of books which would be desirable to purchase in order to bring the Collection up to date. Following this the preparation of the final dictionary catalogue of the Collection was commenced. 2035 volumes were selected from the Collection to be kept in the Electrical Engineering Library, but apart from the other books. The cataloguing and the other work essential to placing these volumes properly on the shelves of the Library was completed on the 18th of May, and then Mr. Chapin moved his Office to the Metropolitan Storage Warehouse where the bulk of the Collection is deposited, and with the assistance of one cataloguer, took up the work of cataloguing the rest of the Collection. By the 3rd of July, which is the end of the period covered by this report, 363 volumes more had been catalogued, making a total for the year of 2398.

The most notable gift to the Library during the year was received from James Mason Crafts, LL.D., professor at the Institute from 1871–97 and president from 1898–1900. This Collection was his private library. It includes 322 titles, covering 634 volumes and 353 pamphlets. The Institute is also indebted to many other friends for valuable gifts. A list of the more important ones is given below.

DONOR.	GIFT.
Mrs. Adair	Pearson, James S. Wadsworth of Geneseo.
Alumni Association	*Technology Review*, 1914.
American Scandinavian Foundation	Hovgaard, Voyages of the Norsemen to America.
F. Amory	Harrison, The Locomotive Engine.
L. E. Bertin	Bertin, La Marine Moderne.
A. A. Blanchard	Blanchard & Wade, Foundations of Chemistry.
Civil Engineering Society	24 Books for Summer Camp.
R. A. Cram	Cram, Gothic Quest.
" "	Cram, Impressions of Japanese Architecture.
" "	Cram, Ruined Abbeys of Great Britain.
A. H. Gill	Stillman, Examination of lubricating oils.
Hale Memorial Fund	Mitchell, Biographical Studies in Scottish Church History.
W. T. Hall	Treadwell, Analytical Chemistry — translated by Hall.
G. B. Haven & G. W. Swett	Haven & Swett, Design of Steam Boilers and Pressure Vessels.
W. Hovgaard	Hovgaard, Structural Design of Warships.
Mrs. W. H. Hughes	Cook, Life of Florence Nightingale.
His Excellency, The Japanese Ambassador.	Governor General of Chosen, Results of Three Years' Administration of Chosen, since Annexation.
W. H. James	James & Mackenzie, Working Drawings of Machinery.
" "	James & Dole, Mechanism of Steam Engines.
M. T. Jones	Lehmer, Factor Tables for the First Ten Millions.

DONOR.	GIFT.
R. R. Lawrence	Morse, Storage Batteries.
W. Lindgren	Wilson, Copper Smelting Industries of Canada.
Metcalf & Eddy	Metcalf & Eddy, American Sewerage Practice.
R. Millis	Reeves, Military Education in the United States.
F. J. Moore	Moore, Outlines of Organic Chemistry.
E. Mueller	Holde, Examination of Hydrocarbon Oils — translated by Mueller.
L. C. Newell	Collected Works of Sir Humphrey Davy, Bart.
L. Pearse	Report on Industrial Wastes from the Stock Yards and Packingtown in Chicago.
John Ritchie, Jr.	27 volumes Astronomischer Nachrichten, 1893–1902.
" " "	Withers, P., Egypt of Yesterday and To-day.
" " "	New System of Preventing Collisions at Sea.
H. W. Shimer	Shimer, Introduction to Study of Fossils.
F. W. Sprague	Sprague, Barnstable and Yarmouth Sea Captains and Ship Owners.
P. G. Stiles	Stiles, The Nervous System and Its Conservation.
H. P. Talbot	Moore, Outlines of Organic Chemistry.
J. C. Vail	Vail, A., Early History of the American Electromagnetic Telegraph.
C. H. Walker	Parish Churches of England.
The Honorable J. W. Weeks	National Monetary Commission. 10 volumes.
R. S. Weston	7 Books for the Summer Camp.
A. G. Woodman	Woodman and Norton, Air, Water and Food from a Sanitary Standpoint.
Class of 1916	Technique, 1916.

ROBERT P. BIGELOW,
Librarian.

REPORT OF THE REGISTRAR.

The present registration of 1900 students is the largest in the history of the school. A gain in numbers is shown in each of the four classes except the first year, and the number of candidates for advanced degrees is unusually large; a change from 43 to 67.

The loss in the number of students in the first year is offset by the increased number of students who have entered the Institute from other colleges. Of the students who have entered the Institute from other colleges, more have joined the fourth, third and second year classes, while fewer have joined the first-year class.

The difference in the registration among the several professional courses is greatest numerically in the Course of Engineering Administration, which was opened last year for the first time. The next largest numerical increase is that of thirty in the Department of Electrical Engineering. There also have been gains in the departments of Mechanical, Mining and Chemical Engineering, in Naval Architecture and Electrochemistry. Aside from the Course in Naval Construction, where only graduates are admitted, the greater number of graduates and students from other colleges entered our departments of Mining Engineering, Architecture, Chemistry, Electrical Engineering, Biology and Naval Architecture.

The number of new students who have entered the Institute from other colleges is greater this year than ever before. The number of such new students has risen from 244 to 266. In the student body there are now 331 graduates of other colleges and in addition 228 who have been a year or more at another college, making a total of 559 students, 29 per cent of the student body. Of the students above the first year, the students from other colleges amount to more than 36 per cent. More than half of these men from other colleges are graduates.

In our registration this year, about 40 per cent of the students are new and of the new students 35 per cent, or an increase of one per cent over last year, are students who have come from other colleges.

Last June our list of graduates was raised to about six thousand, and it is interesting to note that one-quarter of these received their degree before 1896, and one-half of them before 1905. The number of advanced degrees now amounts to 286; 262 being Masters of Science, 20, Doctors of Philosophy and 4, Doctors of Engineering.

In the geographical distribution of the student body this year, there is an unusual gain from the North Central States. The number from the South Central States is larger than ever. There is a slight decrease in the number of the students from the Western States. The number of foreign students has risen to 125, the largest number of foreign students in the history of the school. This is slightly more than $6\frac{1}{2}$ per cent of the student body. The delegation of Chinese students continues to be the largest among any of the foreign groups. The number of the students who have come to us from Europe has diminished. We have, however, students who have come to us from Bulgaria, Italy, Norway and Portugal, who were not with us last year.

The women students number eighteen as compared with fourteen of last year. Five of them are classified students: one is in the fourth year of the Department of Chemistry; two are in the fourth year of the Department of Architecture; and two are first-year students. There are two unclassified women students in the Department of Architecture; one in the Department of Mining Engineering, one in the Department of Chemistry; and one in the Department of Chemical Engineering. We have eight special women students of whom two are in the Department of Architecture, and six in the Department of Biology and Public Health.

The total instructing staff of the Institute has this year risen to a maximum in number, 308; last year there were 291. Excluding the 30 lecturers of the current year, the ratio of instructors to students is 1 to 6.8. It is interesting to note that during the past fifty years the increase in the instructing staff has kept pace with the increase of the number of students. In fact, the rate of increase in the instructing staff is slightly greater than the rate of increase in the registration of students.

It is interesting to note that since the publication of the results of last year concerning the relative standing of various fraternities represented at the Institute, there has been a slight rise in the average standing of fraternity students. The average standing of fraternity students this year equals the average standing of the non-fraternity students.

The relative standing of the fraternities at the Institute has presented an interesting study, on account of the changes of relative position that the various chapters have made. One noticeable change is that made by the chapter which held the position at the foot of the list last year, and which now has gained a position above the middle. The head of the list this year is now held by a different chapter than held this position last year.

The amount of undergraduate scholarship assistance given during the school year of 1914–15 from the Institute funds was $24,437.50, and the number of students aided from this was 217. There were 115 students aided by the State of whom 45 received whole scholarships and 70 one-half scholarship: of these 107 students were aided only by the State. Hence, the number of students receiving scholarship aid, either by the Institute, or by the State, or by both, was 324. Then, 17.3 per cent of the students received scholarship aid, or more than 1 in every 6. The largest group of students aided was in the second-year class.

By Faculty rule, the Registrar presents to the Faculty each year, a plot of the percentage of failures in various subjects, together with the percentage of other literal records. The average of the satisfactory and unsatisfactory records is calculated, each term, for each class, and also for all the four classes together. This Faculty rule has been in effect long enough for the report to have been made on this second term standing for four consecutive years. The record made by the class of 1915, at the end of each of its four years, therefore gives the history of one class as it progressed through the four classes of the school.

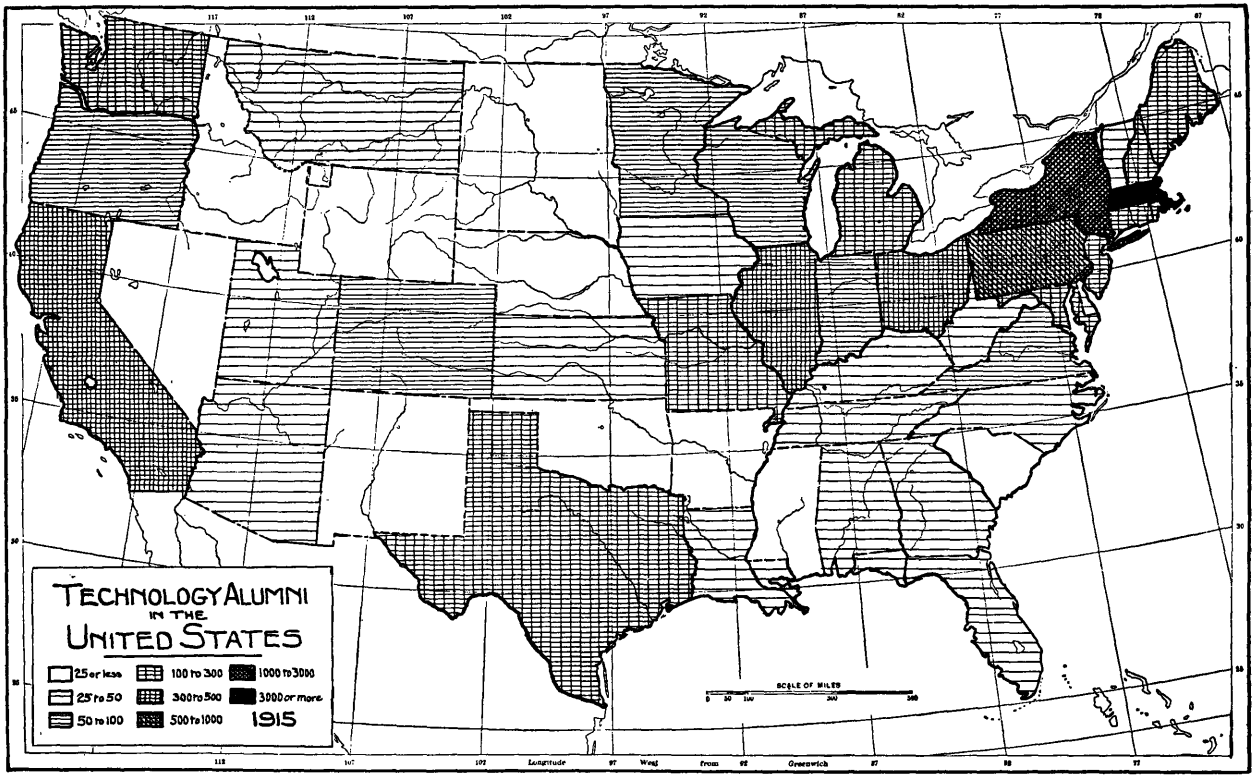
It is interesting to note that the records of the class of 1915 stood at a certain point at the end of the first year, went down slightly at the end of the second year, rose to a point similar to that of the first year at the end of the third year, and at the end of the fourth year reached a point that was highest of all.

The records of the four classes taken simultaneously, if plotted, present a curve similar to that made by the results of the class of 1915, that is, the record of the second-year class is lowest, the record of the first and third classes are almost similar, and the record of the fourth-year class is highest.

The curve made by plotting the standing of the classes of last year agrees not only with the plot of the class of 1915, but with the plot of the four classes of the previous year. This curve agrees with the results of the study of the relative standing of classes made at a few other colleges where such a study has been made.

During the past year, a Register of Former Students has been published, and there are addresses for about 12,000 of the former students. The distribution of the former students among the states of this country is shown graphically on an accompanying plot.

As fifty years of the Institute's history have been com-


TECHNOLOGY ALUMNI
IN THE
UNITED STATES
25 or less
25 to 50
50 to 100
100 to 300
300 to 500
500 to 1000
1000 to 3000
3000 or more
1915
SCALE OF MILES
Longitude
West
from
Greenwich

pleted, other graphic representation of Institute statistics are presented herewith. The usual tables of statistics are presented.

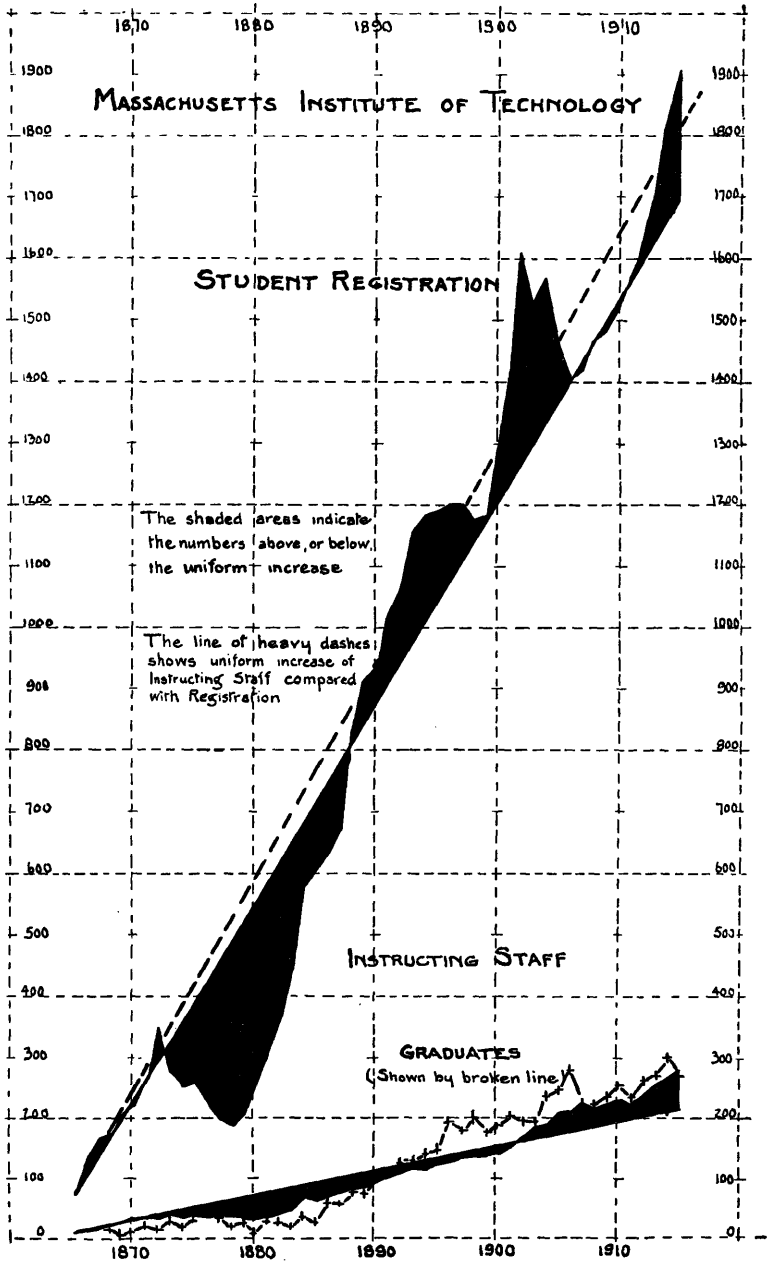
THE CORPS OF INSTRUCTORS.

	1909-10.	1910-11.	1911-12.	1912-13.	1913-14.	1914-15.	1915-16.
Professors	‡44	‡45	‡41	‡56	‡56	‡69	‡73
Associate Professors	14	20	17	16	23	23	24
Assistant Professors	32	31	33	35	34	36	32
	— 90	— 96	— 91	—112	—113	—128	—129
Research Professors	....	....	4	16	18	10	7
					—131	—138	—136
Number counted twice	....	....	....	11	17	10	7
Faculty	90	96	95	112	114	128	129
Instructors	69	66	64	67	74	70	79
Assistants	51	55	50	49	54	52	58
					—128	—122	—137
Faculty, Instructors and Assistants	210	217	200	228	242	250	266
Research Associates	12	8	5	*4	3	§5	§5
Research Assistants	1	5	6	7	*†10	‡16	*12
					—*†13	— 21	— 17
Lecturers	18	21	25	16	19	23	†*30
Total Members of Staff	241	251	245	254	272	291	308

* One is also an instructor.
† One is also an assistant.
‡ Including three non-resident professors.
§ Two are instructors.

YEARLY REGISTRATION SINCE THE FOUNDATION OF THE INSTITUTE.

Year.	Number of Students.	Year.	Number of Students.	Year.	Number of Students.
1865-66	72	1882-83	368	1899-00	1178
1866-67	137	1883-84	443	1900-01	1277
1867-68	167	1884-85	579	1901-02	1415
1868-69	172	1885-86	609	1902-03	1608
1869-70	206	1886-87	637	1903-04	1528
1870-71	224	1887-88	720	1904-05	1561
1871-72	261	1888-89	827	1905-06	1466
1872-73	348	1889-90	909	1906-07	1397
1873-74	276	1890-91	937	1907-08	1415
1874-75	248	1891-92	1011	1908-09	1462
1875-76	255	1892-93	1060	1909-10	1481
1876-77	215	1893-94	1157	1910-11	1509
1877-78	194	1894-95	1183	1911-12	1566
1878-79	188	1895-96	1187	1912-13	1611
1879-80	203	1896-97	1198	1913-14	1685
1880-81	253	1897-98	1198	1914-15	1816
1881-82	302	1898-99	1171	1915-16	1900


1870
1880
1890
1900
1910
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
STUDENT REGISTRATION
The shaded areas indicate the numbers above, or below, the uniform increase
The line of heavy dashes shows uniform increase of Instructing Staff compared with Registration
INSTRUCTING STAFF
GRADUATES
(Shown by broken line)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900

THE STUDENTS.

Registration by Classes.	Classified.	Unclassified.	Total.
Non-resident Fellows	1	.....	1
Other Candidates for advanced degrees	66	.....	66
Fourth Year	346	31	377
Third Year	299	156	455
Second Year	281	200	481
First Year	342	87	429
Special	.....	.....	91
Total	1335	474	1900

CLASSIFIED AND UNCLASSIFIED STUDENTS BY COURSES * FOR THE CURRENT YEAR.

Year.	Without Course Classification.	Civil Engineering.	Mechanical Engineering.	Mining Engineering and Metallurgy.	Architecture.	Chemistry.	Electrical Engineering.	Biology and Public Health.	Physics.	General Science.	Chemical Engineering.	Sanitary Engineering.	Geology.	Naval Architecture.	Naval Construction A.	Naval Construction B.	Electrochemistry.	Engineering Administration.	Total.
Graduates	....	10	4	....	8	11	9	1	1	....	3	1	3	5	3	5	2	....	66
4th C†	....	54	86	6	38	14	62	5	3	2	32	19	...	7	4	2	15	....	346§
4th U	....	4	3	3	4	2	4	1	...	1	6	3	...	...	...	...	...	....	31
Total	....	58	89	9	42	16	66	6	3	3	38	22	...	7	4	2	15	....	377
3rd C	....	32	57	7	15	10	58	5	1	1	45	16	...	5	5	3	15	28	299§
3rd U	7	24	32	5	20	3	25	2	1	....	13	5	...	1	...	...	...	18	156
Total	7	56	89	12	35	13	83	7	2	1	58	21	...	6	5	3	15	46	455
2nd C	....	34	62	10	32	8	39	6	6	....	33	8	...	4	...	...	14	26	281§
2nd U	11	23	31	10	21	6	29	7	2	....	20	7	1	4	...	...	4	25	200§
Total	11	57	93	20	53	14	68	13	8	....	53	15	1	8	...	...	18	51	481
Specials	2	7	4	5	25	5	9	21	...	....	5	1	...	2	...	1	...	2	89
Total C	...	130	209	23	93	43	168	17	11	3	113	44	3	21	12	10	46	54	992§
Total U	18	51	66	18	45	11	58	10	3	1	39	15	1	5	...	...	4	43	387§
Total Sp	2	7	4	5	25	5	9	21	...	....	5	1	...	2	...	1	...	2	89
Total	20	188	279	46	163	59	235	48	14	4	157	60	4	28	12	11	50	99	1468
First year *	....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	431
1 Non-resident Fellow makes	....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	1
																			1900§

* First year students do not elect their courses until after this report is presented.

† C means classified; U means Unclassified.

§ Deducting names counted in two courses.

TOTALS OF THE SAME CLASSIFICATION * FOR TEN YEARS.

Year.	Engineering Courses.										Total of Engineering Courses.	Architecture.	Science Courses.				Total of Science Courses.	General Science.
	Civil Engineering.	Mechanical Engineering.	Mining Engineering.	Electrical Engineering.	Chemical Engineering.	Sanitary Engineering.	Naval Architecture.	Naval Construction.	Electrochemistry.	Engineering † Administration.			Chemistry.	Biology.	Physics.	Geology.		
1906–07	210	214	100	193	55	32	43	18	....	....	865	102	51	10	18	2	81	0
1907–08	210	227	118	202	59	39	37	16	....	....	908	84	53	17	21	0	91	2
1908–09	197	197	104	209	71	52	41	13	....	....	884	91	60	20	19	2	101	4
1909–10	207	204	99	203	84	60	41	14	14	....	926	109	44	22	4	1	71	4
1910–11	220	198	90	210	128	46	26	9	26	....	953	113	44	19	7	0	70	2
1911–12	217	214	79	203	129	57	19	8	35	....	961	112	56	20	4	2	82	3
1912–13	212	243	50	201	149	55	29	6	42	....	987	127	60	33	5	2	100	4
1913–14	209	279	37	196	141	65	31	7	38	....	1003	130	78	36	12	3	129	3
1914–15	197	271	34	205	146	61	25	16	46	57	1057	157	66	44	10	3	123	5
1914–15	188	279	46	235	157	60	28	23	50	99	1165	163	59	48	14	4	288	4

* First-year students do not elect their courses until after this report is presented.
† Only second and third year students in 1915–16.

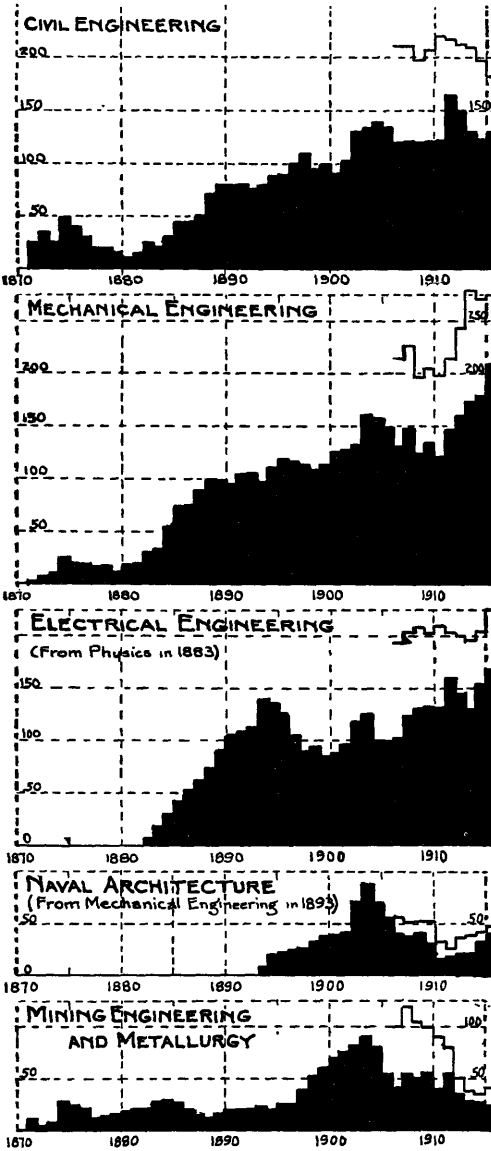
STUDENTS AT THE END OF THE SCHOOL YEAR FOR THE PAST FIVE YEARS.

This table includes first-year students.

	1911.	1912.	1913.	1914.	1915.
Engineering Courses					
Civil	267	276	264	263	251
Mechanical	264	273	331	365	329
Mining	108	91	61	58	49
Electrical	264	255	244	250	271
Chemical	161	183	181	205	192
Sanitary	70	72	80	90	78
Naval Architecture	41	38	42	52	49
Electrochemistry	41	44	57	53	65
Engineering Administration					102
Total Eng.	1216	1232	1260	1336	1386
Architecture	132	145	148	160	183
Science Courses					
Chemistry	57	71	73	82	82
Biology	20	25	31	41	51
Physics	9	9	9	8	16
Geology	7	4	2	3	6
Total Science Courses	93	109	110	134	155
General Science	4	5	3	5	5
Special and No Course Classification	9	11	18	10	18
Grand Total	1454	1502	1544	1645	1747

Registration in the Courses

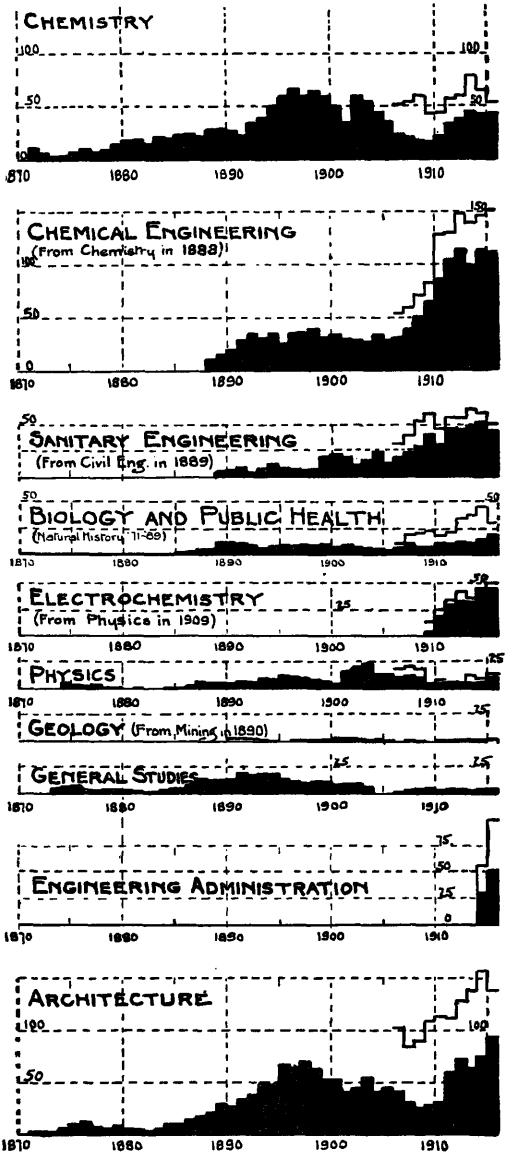
STUDENTS OF THE UPPER THREE CLASSES



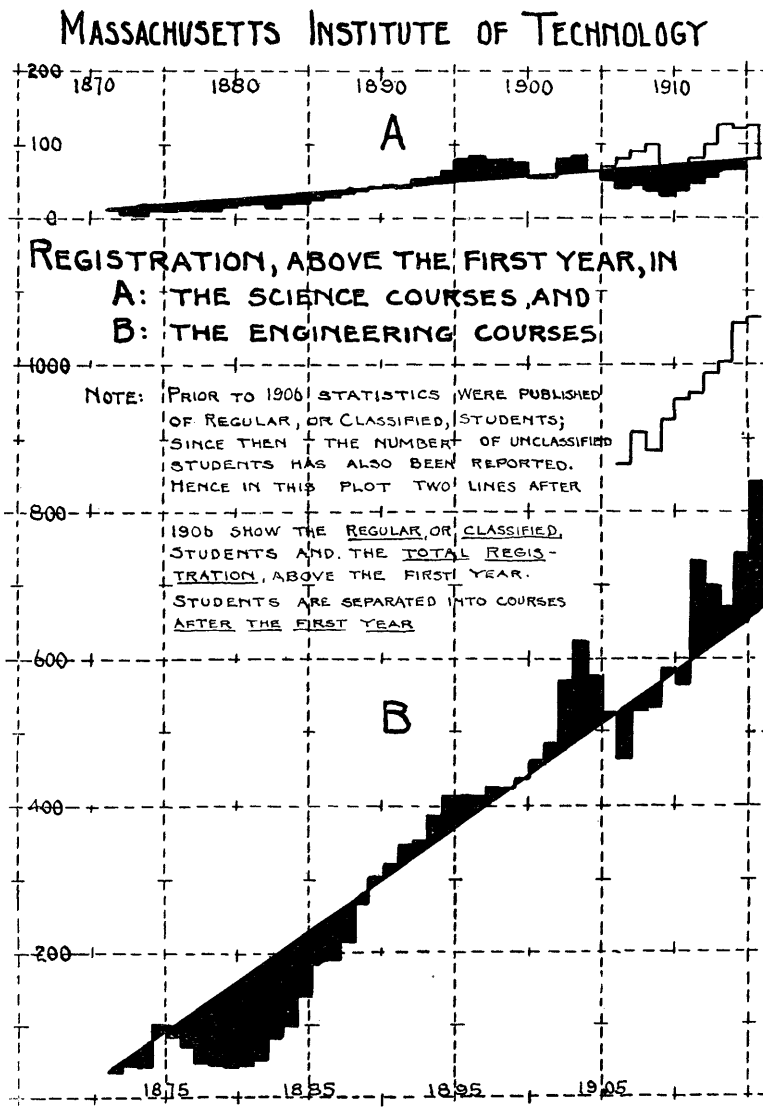
NOTE. PRIOR TO 1906 STATISTICS WERE PUBLISHED OF REGULAR, OR CLASSIFIED, STUDENTS; SINCE THEN THE NUMBER OF UNCLASSIFIED, FORMERLY CALLED SPECIALS, HAS ALSO BEEN REPORTED, HENCE THE UPPER AND LOWER RECORD AT THE RIGHT OF EACH PLOT. THE UPPER RECORD SHOWS THE COMPLETE REGISTRATION ABOVE THE FIRST YEAR. STUDENTS ARE NOT SEPARATED INTO COURSES UNTIL AFTER THE FIRST YEAR. THESE STATISTICS ARE AS OF THE FIRST OF NOVEMBER OF EACH YEAR.

Registration in the Courses

STUDENTS OF THE UPPER THREE CLASSES



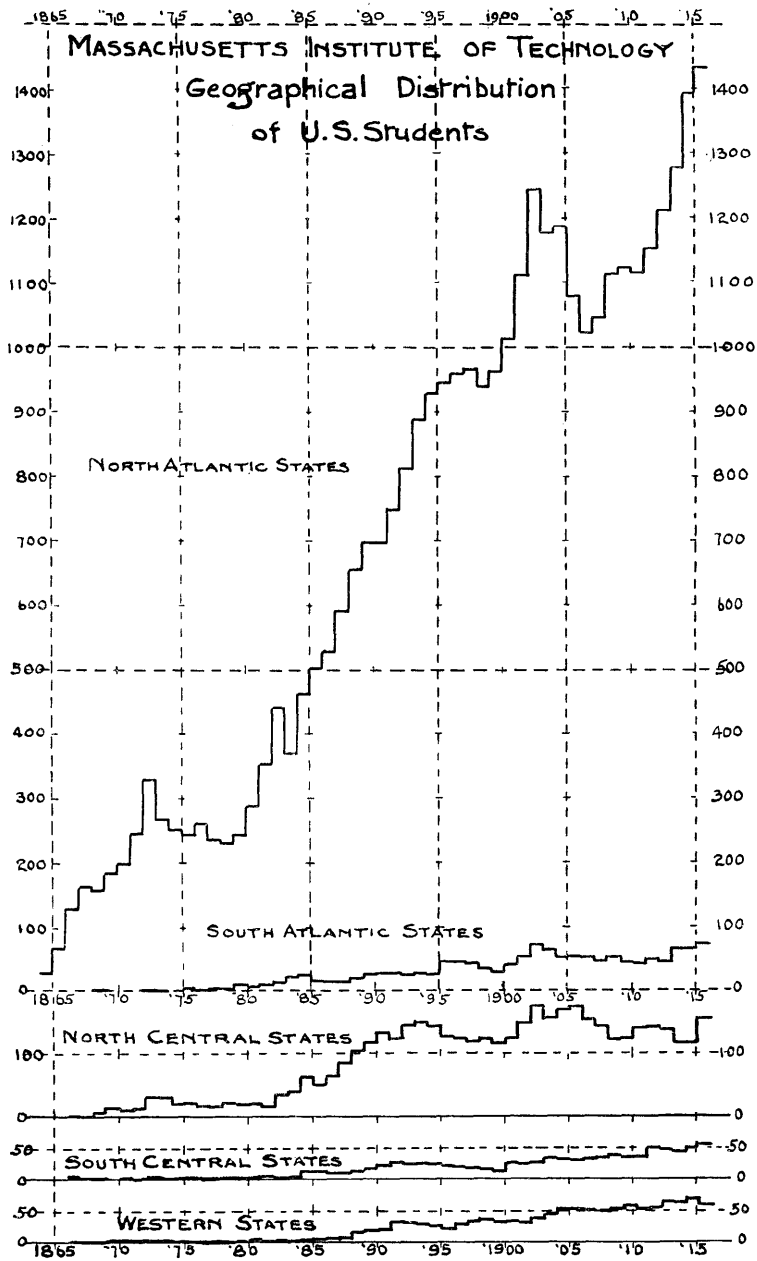
NOTE: PRIOR TO 1906 STATISTICS WERE PUBLISHED OF REGULAR, OR CLASSIFIED, STUDENTS, SINCE THEN THE NUMBER OF UNCLASSIFIED, FORMERLY CALLED SPECIALS, HAS ALSO BEEN REPORTED, HENCE THE UPPER AND LOWER RECORD AT THE RIGHT OF EACH PLOT. THE UPPER RECORD SHOWS THE COMPLETE REGISTRATION ABOVE THE FIRST YEAR. STUDENTS ARE NOT SEPARATED INTO COURSES UNTIL AFTER THE FIRST YEAR. THESE STATISTICS ARE AS OF THE FIRST OF NOVEMBER OF EACH YEAR.


MASSACHUSETTS INSTITUTE OF TECHNOLOGY
200
100
0
1870
1880
1890
1900
1910
A
REGISTRATION, ABOVE THE FIRST YEAR, IN
A: THE SCIENCE COURSES, AND
B: THE ENGINEERING COURSES
1000
800
600
400
200
NOTE: PRIOR TO 1906 STATISTICS WERE PUBLISHED OF REGULAR, OR CLASSIFIED, STUDENTS; SINCE THEN THE NUMBER OF UNCLASSIFIED STUDENTS HAS ALSO BEEN REPORTED. HENCE IN THIS PLOT TWO LINES AFTER 1906 SHOW THE REGULAR, OR CLASSIFIED, STUDENTS AND THE TOTAL REGISTRATION, ABOVE THE FIRST YEAR. STUDENTS ARE SEPARATED INTO COURSES AFTER THE FIRST YEAR
B
1875
1885
1895
1905

RESIDENCE OF STUDENTS.

NUMBER OF STUDENTS IN EACH YEAR, FROM 1905, COMING FROM EACH STATE OR TERRITORY.

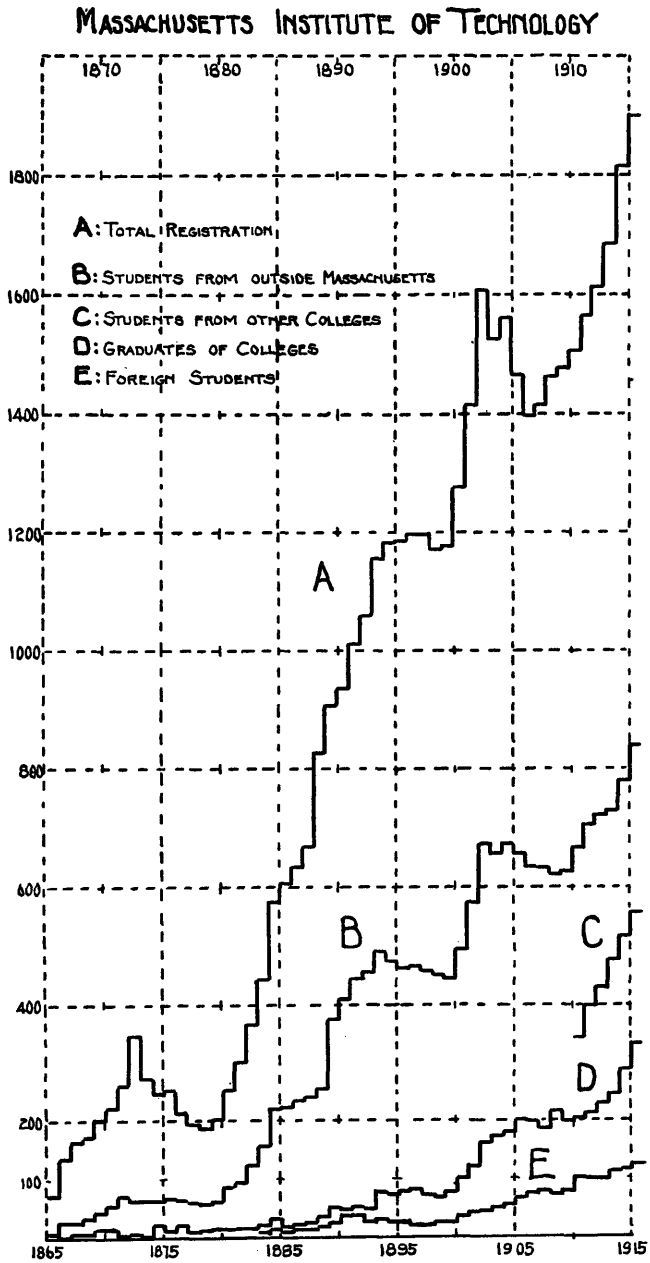
States and Territories.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
North Atlantic.	1080	1025	1049	1116	1126	1118	1152	1212	1279	1394	1434
Connecticut	50	36	29	31	32	33	45	44	45	55	61
Maine	22	18	23	22	20	24	25	24	25	32	23
Massachusetts	807	764	781	839	852	840	860	890	954	1032	1060
New Hampshire	32	26	27	24	27	27	29	28	34	34	27
New Jersey	11	15	17	14	14	18	33	34	38	48	54
New York	71	84	82	99	99	106	90	108	102	113	121
Pennsylvania	58	55	57	53	46	37	39	43	42	42	46
Rhode Island	24	23	28	28	30	27	25	33	34	31	35
Vermont	5	4	5	6	6	6	6	8	5	7	7
South Atlantic.	53	52	48	51	44	41	49	45	66	66	72
Delaware	1	2	1	.....	1	1	1	2	2	3	5
Dist. of Columbia	13	12	10	10	8	5	13	12	21	18	19
Florida	3	3	3	6	5	1	2	3	5	2	5
Georgia	8	4	2	3	4	5	3	3	4	3	5
Maryland	19	17	18	17	12	14	8	8	16	18	13
North Carolina	.....	1	.....	1	.....	.....	1	2	4	2	4
South Carolina	1	3	2	.....	2	1	3	.....	5	6	9
Virginia	7	8	9	11	10	12	15	13	8	11	8
West Virginia	1	2	3	3	2	3	3	2	1	3	4
South Central.	30	32	36	38	37	37	48	46	43	50	54
Alabama	1	2	4	3	5	4	6	3	5	5	5
Arkansas	1	.....	2	1	2	2	2	2	1	2	1
Kentucky	5	5	5	4	4	2	8	7	10	10	8
Louisiana	1	2	.....	3	2	5	4	4	5	5	7
Mississippi	4	5	3	3	3	6	8	7	5	6	5
Tennessee	2	3	6	8	8	5	3	2	2	5	5
Texas	16	15	16	16	13	13	17	21	15	17	23
North Central.	174	153	142	121	123	140	141	137	115	115	152
Illinois	42	37	31	23	24	33	30	25	15	27	37
Indiana	10	15	12	9	11	10	9	10	9	7	12
Iowa	13	14	16	14	5	4	9	8	11	10	12
Kansas	7	6	5	4	6	9	7	8	3	4	2
Michigan	10	7	8	7	10	9	9	7	12	14	15
Minnesota	13	14	8	8	10	8	7	14	15	6	5
Missouri	29	17	14	6	7	13	12	13	3	5	10
Nebraska	4	2	3	2	4	6	8	8	8	5	5
North Dakota	.....	3	4	3	3	3	3	3	2	3	3
Ohio	34	30	26	30	27	33	37	32	25	28	44
South Dakota	.....	1	3	3	5	3	2	2	2	1	3
Wisconsin	12	7	12	12	11	9	8	7	10	5	4
Western.	55	52	49	54	59	53	57	65	63	72	59
Alaska	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....
Arizona	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....
California	23	21	14	20	25	21	23	22	23	30	25
Colorado	17	12	10	5	6	9	11	14	13	14	11
Idaho	.....	.....	.....	1	.....	.....	.....	.....	1	2	1
Montana	3	3	3	2	3	2	2	4	4	3	2
Nevada	1	1	1	1	.....	.....	.....	.....	.....	.....	.....
New Mexico	.....	.....	1	1	1	.....	.....	1	1	1	1
Oklahoma	.....	.....	1	1	.....	.....	.....	1	2	.....	.....
Oregon	5	2	3	4	7	8	11	14	11	10	5
Utah	2	3	3	5	5	3	3	2	2	2	5
Washington	2	5	12	13	11	9	6	6	5	10	7
Wyoming	2	5	1	1	1	.....	.....	.....	.....	.....	2


MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Geographical Distribution
of U.S. Students
NORTH ATLANTIC STATES
SOUTH ATLANTIC STATES
NORTH CENTRAL STATES
SOUTH CENTRAL STATES
WESTERN STATES
1865 '70 '75 '80 '85 '90 '95 1900 '05 '10 '15

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
District.	8	7	6	9	11	15	11	6	6	5	4
Canal Zone	.....	.....	.....	1	1	1	.....	.....	.....	.....	.....
Hawaii	1	2	2	1	2	2	3	2	1	2	1
Philippine Islands	2	3	1	1	1	4	3	1	2	1	1
Porto Rico	5	2	3	6	7	8	5	3	3	2	2
Total for the United States.	1400	1321	1330	1389	1400	1404	1458	1511	1572	1702	1775

Number of Students in Each Year, from 1905, Coming from Each Foreign Country.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Foreign Countries.	66	76	80	72	79	102	101	100	113	114	125
Argentine Republic	.....	1	2	2	4	5	2	1	.....	.....	1
Armenia	3	2	2	2	.....	.....	.....	.....	.....	.....	.....
Australia	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Austria-Hungary	3	3	3	.....	.....	2	1	2	1	2	1
Belgium	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Bermuda	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brazil	1	.....	2	3	1	2	3	5	7	4	1
Bulgaria	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Canada	12	15	9	15	20	18	19	13	14	15	14
Cape Colony	.....	1	1	1	.....	.....	1	.....	.....	1	.....
Central America	.....	.....	.....	1	.....	.....	.....	2	.....	2	.....
Chile	2	1	1	1	1	3	1	.....	1	.....	.....
China	8	7	9	10	11	27	36	37	42	46	49
Colombia	.....	.....	.....	.....	.....	.....	.....	.....	1	3	4
Costa Rica	.....	.....	2	3	2	1	1	.....	1	.....	.....
Cuba	4	4	4	2	7	5	3	6	7	3	2
Cyprus, Island of	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Denmark	1	1	1	.....	.....	1	1	.....	2	1	1
Ecuador	.....	2	2	2	1	1	1	1	1	.....	.....
Egypt	1	2	2	2	1	1	2	1	1	1	1
England	5	6	4	3	.....	1	1	.....	.....	1	1
Finland	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
France	1	.....	.....	.....	.....	2	2	3	4	2	.....
Germany	.....	.....	.....	.....	1	1	2	3	2	2	3
Greece	.....	.....	.....	.....	.....	.....	1	1	1	1	.....
Guatemala	.....	.....	.....	.....	.....	1	.....	.....	1	1	1
Honduras	.....	1	.....	1	3	3	2	.....	1	1	2
India	2	1	1	2	1	.....	.....	2	1	2	2
Ireland	2	2	3	1	.....	.....	.....	.....	.....	.....	.....
Italy	2	.....	2	1	1	1	.....	.....	.....	.....	1
Jamaica	.....	1	.....	1	1	1	1	.....	.....	.....	.....
Japan	3	5	3	4	4	4	3	.....	1	1	6
Korea	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....
Mexico	7	12	12	6	10	9	5	4	7	7	10
Newfoundland	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....
New Zealand	.....	.....	.....	.....	1	1	2	1	.....	.....	.....
Nicaragua	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Norway	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	2
Panama	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Paraguay	.....	.....	1	1	1	1	1	1	1	1	.....
Peru	1	1	2	2	1	2	1	.....	2	3	3
Poland	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Portugal	.....	.....	.....	.....	.....	1	.....	.....	1	.....	1
Russia	.....	.....	2	2	2	2	3	4	4	5	2
Salvador	.....	.....	.....	.....	.....	1	.....	.....	1	.....	3
Scotland	1	1	1	.....	.....	.....	.....	.....	1	1	.....
Siam	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
South African Republic	.....	.....	.....	.....	.....	.....	.....	1	1	.....	1
Switzerland	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....
Syria	.....	.....	.....	.....	.....	1	2	3	2	2	.....
Transvaal	3	3	3	2	1	2	.....	.....	.....	.....	.....
Turkey	1	1	2	1	2	2	1	5	3	6	8
Uruguay	2	1	1	1	.....	.....	.....	.....	.....	.....	.....
Total in school	1466	1397	1410	1461	1471	1506	1559	1611	1685	1816	1900


MASSACHUSETTS INSTITUTE OF TECHNOLOGY
1870
1880
1890
1900
1910
1800
1600
1400
1200
1000
800
600
400
200
100
A: TOTAL REGISTRATION
B: STUDENTS FROM OUTSIDE MASSACHUSETTS
C: STUDENTS FROM OTHER COLLEGES
D: GRADUATES OF COLLEGES
E: FOREIGN STUDENTS
A
B
C
D
E
1865
1875
1885
1895
1905
1915

NUMBER OF STUDENTS PURSUING CERTAIN LEADING BRANCHES OF STUDY.

	First Year.	Second Year.	Third Year.	Fourth Year.	Total.
Chemistry	451	174	218	140	983
English	412	452	51	.....	915
Geology	.....	25	111	7	143
History and Economics	.....	116	455	84	655
Languages	490	235	89	.....	815
Mathematics	462	453	133	25	1073
Physics	.....	517	350	64	931

STATISTICS OF ADMISSION.

	Classified.	Unclassified.	Special.	Total.
Admitted clear	203	.....	.....	203
" with one condition	53	29	.....	82
" with more than one condition	36	39	.....	75
" on examination	292	68	.....	360
Total First-year Class	342	87	2	431

Admitted but did not enter	40
Candidates at June Entrance Examinations	676
Candidates in September for Entrance and Advanced Standing Examinations	339
Certificates of the College Entrance Examination Board submitted	149

TOTAL REGISTRATION AND NUMBER OF NEW STUDENTS.

Year.	(1) Total No. of Students.	(2) No. of Students in the Catalogue of the previous year who remain in the Institute.	(3) No. of New Students entering before issue of Catalogue.	(4) Of those in column (3) the following number are classified First-year Students.	(5) No. of New Students not of the regular First-year Class.
1903–1904	1528	1042	486	249	237
1904–1905	1561	986	575	295	280
1905–1906	1466	984	482	213	269
1906–1907	1397	862	535	272	263
1907–1908	1415	888	527	273	254
1908–1909	1462	868	594	323	271
1909–1910	1479	890	579	317	262
1910–1911	1506	944	562	283	279
1911–1912	1559	932	627	312	315
1912–1913	1611	984	627	310	317
1913–1914	1685	1049	636	295	341
1914–1915	1816	1084	727	348	379
1915–1916	1900	1146	754	321	433

GRADUATE STUDENTS.

American Colleges and Universities Represented.

	1911-12.	1912-13.	1913-14.	1914-15.	1915-16.
Alabama	1	2	2	2	1
Alabama Polytechnic Institute	...	...	1	...	1
Albany Medical	...	...	...	...	1
Allegheny	...	1	1	1	...
Amherst	2	3	7	8	6
Baldwin	...	...	1	...	...
Baltimore Medical	...	...	...	1	...
Bates	1	3	3	3	...
Baylor	1	1	1	2	1
Bellevue	...	...	...	1	...
Bellevue Hospital, Medical	...	...	...	...	1
Beloit	...	2	3	2	1
Boston College	2	4	2	2	...
Boston University	3	3	2	...	1
Bowdoin	2	2	4	2	...
Brown	3	3	4	2	1
Bryn Mawr	1	1	...	...	...
Bucknell	...	...	1	...	...
California	2	...	1	2	3
Canisius	...	2	...	...	...
Carnegie Institute of Technology	...	...	...	1	...
Case School of Applied Science	...	1	...	1	...
Catholic University of America	...	...	...	1	...
Central	1	...	...	...	...
Charleston	...	...	1	1	2
Chicago	...	1	1	1	...
Cincinnati	...	...	...	1	1
City of New York	3	4	1	2	2
Clark	...	1	4	3	2
Clemson Agricultural	...	...	1	1	...
Colby	1	1	2	1	1
Colgate	...	...	1	1	2
Colorado Agricultural	...	...	...	...	1
Colorado College	2	1	...	1	1
Colorado School of Mines	...	1	...	2	...
Colorado University	...	...	...	1	...
Columbia	...	1	2	3	4
Cornell	2	1	...	1	2
Cornell (Iowa)	...	...	...	...	1
Creighton	...	...	1	1	1
Dakota Wesleyan	...	...	...	...	1
Dartmouth	6	9	7	7	4
Denison	2	2	2	2	4
De Pauw	1	...	...	...	...
Doane	...	...	...	1	...
Drake	1	2	1	...	...
Earlham	...	...	...	1	...
Franklin and Marshall	...	1	1	...	...
Furman	...	...	1	1	1
Georgetown	2	1	2	1	1
George Washington	1	...	...	...	...
Georgia	1	...	1	...	1
Georgia School of Technology	...	...	2	1	1
Gonzaga (Spokane)	...	1	1	2	2
Grinnell	2	...	...	...	2
Grove City	1	1	...	...	...
Hamilton	2	3	3	3	3
Hamline	...	1	1	...	...
Harvard	8	8	11	23	44
Haverford	1	...	...	...	...
Highland Park	...	...	1	...	...
Hobart	...	...	1	...	1
Holy Cross	1	1	3	1	1
Hospital College of Medicine	...	...	...	1	...
Illinois	1	2	2	2	3
Iowa State	1	...	1	...	1
Jefferson Medical	...	...	...	1	...
Johns Hopkins	2	2	3	1	2
Juniata	...	...	...	1	...
Kansas	1	2	...	...	1
Kentucky	...	...	...	1	1
Kenyon	...	...	...	1	...
Lafayette	1	2	1	2	...
Lake Forest	...	...	...	...	1
Lehigh	1	...	...	...	...
Leland Stanford Junior	3	1	...	1	1
Lombard	...	...	...	...	1
Loyola	...	...	...	1	1
Maine	1	...	1	...	3
Marietta	2	...	...	1	1
Maryland Agricultural	1	...	...	...	...
Maryville	...	...	...	...	1
Massachusetts Agricultural	...	...	...	1	1
Mass. Institute of Technology	6	17	22	32	3
Miami	...	...	...	1	2
Michigan	2	3	6	3	4
Michigan Agricultural	...	1	...	1	1
Michigan College of Mines	...	...	...	...	1
Middlebury	1	1	3	2	1
Minnesota	...	2	1	1	2
Mississippi	1	1	...	...	...
Mississippi Agricultural and Mech.	1	...	2	3	3
Missouri	1	...	...	...	1
Missouri Sch. Min. & Met.	1	...	...	...	...
Monmouth	...	...	...	...	1
Montana	1	1	1	...	...
Moore's Hill	...	...	...	...	1
Mount Holyoke	...	...	...	2	...
National Univ. Law School	...	...	...	...	1
Nebraska	1	2	1	...	...
New Mexico	...	1	1	1	...
New York University	...	3	3	1	...
North Carolina	2	1	2	...	2
North Dakota Agricultural	2	2	1	...	...
North Western	...	...	1	1	...
Oberlin	4	3	3	1	2
Occidental	2	2	2	...	1
Ogden	...	...	1	1	2
Ohio Northern	...	...	...	1	...
Ohio State	...	1	...	...	2
Ohio University	...	...	...	...	2
Ohio Wesleyan	...	...	...	1	1
Oklahoma Agr. & Mech.	...	...	1	...	...
Oregon	2	1	1	1	1
Oregon Agricultural	1	1	...	1	1
Otterbein	1	1	...	...	...
Park	...	1	1	1	...
Pennsylvania (Gettysburg)	...	...	...	...	1
Pennsylvania Military	2	2	1	1	...
Pennsylvania (Pittsburgh)	...	...	...	...	1
Pennsylvania State	2	1	1	1	1
Pennsylvania University	...	...	...	3	2
Pittsburgh	...	1	...	1	...

GRADUATE STUDENTS — *Continued.*

American Colleges and Universities Represented.

	1911-12.	1912-13.	1913-14.	1914-15.	1915-16.
Pomona	1	...	...	...	...
Princeton	7	3	6	6	6
Purdue	...	...	3	3	3
Radcliffe	...	...	1	...	2
Randolph-Macon	...	...	...	1	...
Reed	...	...	...	...	1
Rhode Island State	...	...	...	...	1
Richmond	1	...	...	...	...
Rochester	2	...	...	1	3
Rutgers	1	...	...	...	...
Saint John's	...	2	2	2	3
Saint Louis	6	3	...	...	...
Saint Mary's	1	1	1	1	...
Saint Olaf	...	1	1	1	...
Saint Xavier	3	1	...	...	...
Sacred Heart	1	...	...	...	...
Simpson	...	2	2	2	...
Smith	...	1	2	1	2
South Carolina Military	1	...	2	1	3
South Dakota State	...	1	...	...	...
Southern California	...	...	1	1	...
Southwestern	...	...	1	1	...
Spring Hill	4	4	4	2	3
Stevens Institute of Technology	...	...	...	1	...
Syracuse	...	1	1	3	1
Tarkio	...	1	...	...	...
Tennessee	...	1	1	2	2
Texas	2	4	3	4	2
Texas, Agr. & Mech. Coll. of	...	1	1	...	4
Trinity	...	...	...	3	2
Trinity (Washington, D. C.)	...	...	...	...	2
Trinity (N. C.)	...	...	...	...	1
Tufts	...	...	...	3	1
Tulane	1	...	...	...	1
Union	...	...	...	1	1
U. S. Military Academy	2	1	1	...	...
U. S. Naval Academy	9	6	8	10	15
Ursinus	...	...	1	1	1
Vermont	...	...	1	...	...
Valparaiso	1	...	...	1	...
Virginia	2	2	1	5	4
Virginia Military	1	1	...	3	7
Virginia Polytechnic Institute	...	...	1	...	1
Wabash	1	1	...	...	...
Washburn	1	2	...	1	1
Washington	...	1	...	1	...
Washington & Jefferson	3	2	1	1	...
Washington & Lee	1	2	1	1	2
Wellesley	...	2	...	...	1
Wesleyan	...	...	...	1	1
Western Reserve	...	...	...	1	...
West Virginia	...	...	...	...	1
Whitman	2	1	1	1	1
Whitworth	1	...	...	...	...
William Jewell	...	...	...	1	1
William and Mary	1	1	1	2	1
Williams	5	11	11	10	12
Wisconsin	1	...	2	1	2
Wittenberg	...	...	...	...	1
Wooster	...	1	2	2	3
Worcester Polytechnic	1	...	1	...	...
Wyoming	...	...	...	...	1
Yale	7	7	8	19	25
Yankton	1	1	...	...	...

NEW STUDENTS FROM OTHER COLLEGES BY YEARS.

Class Joined at Institute.	Years Spent at College.				Total.
	One.	Two.	Three.	Four, or more.	
First Year	14	3	3	4	24
Second Year	31	23	6	18	78
Third Year	2	7	34	54	97
Fourth Year	.....	1	15	33	49
Graduate Year	.....	.....	3	15	18
Total	47	34	61	124	266

Foreign Colleges and Universities Represented.

	1911-12.	1912-13.	1913-14.	1914-15.	1915-16.		1911-12.	1912-13.	1913-14.	1914-15.	1915-16.
Anhui Provincial (China)	2	2	2	...	...	London University	...	...	...	...	1
Cambridge (England)	1	...	...	...	...	Maimi (China)	1	...	...	...	...
Central Technical	...	...	...	...	1	McGill (Montreal)	1	2	1	...	...
Central Turkey	...	...	1	1	1	Manitoba	...	...	...	2	1
Chile	...	...	1	...	...	Melbourne (Australia)	1	1	...	...	...
Chi-li Provincial (China)	1	1	1	1	1	Nanking (China)	3	3	...	...	...
Chinese Naval	4	4	4	4	4	National (Paraguay)	...	...	1	1	...
Colegio Mayor de Unestra del Rosario	...	...	...	...	1	Naval College (Canton)	...	...	...	...	3
Dalhousie	1	...	1	1	...	Naval College (Cheetoo)	...	...	...	...	1
Durham	...	...	...	...	3	New Brunswick	2	...	...	...	...
Ecole Polytechnique (Montreal)	1	...	...	...	1	Oxford	1	1	...	...	...
Escuela Industrial (Buenos Ayres)	2	1	...	...	...	Pekin	...	...	...	...	1
Euphrates (Turkey)	...	1	...	...	...	Philippines	...	...	...	1	...
France	1	1	1	...	...	Presidency (Calcutta)	...	...	1	1	1
Greece (Athens)	1	...	...	...	...	Queens (Canada)	1	...	...	...	...
Gymnasium of Salonica	...	...	...	1	...	Royal Military (Canada)	1	1	...	...	...
Havana	1	3	2	...	...	Royal Tech. (Copenhagen)	...	...	1	...	...
Heidelberg	1	...	...	...	...	Santa Clara (Cuba)	...	...	...	1	1
Imperial Polytechnic (Shanghai)	8	8	8	7	2	Scientific & Lit. Inst.	...	1	...	...	...
Institute National Central (Salvador)	...	...	...	...	2	Shantien (China)	1	...	...	...	...
Japanese Naval Engineering (Tokio)	1	1	1	...	...	Syrian Protestant	3	4	3	3	4
Kiang Nan Provincial	...	...	1	1	1	Tokio Imperial	...	...	...	...	4
Köng. Techn. Hochschule	...	...	...	...	1	Tomsk Institute of Technology	...	...	...	1	...
Kyoto Imperial	...	...	...	...	1	Toronto	...	...	1	2	...
						Tsing Hua	...	...	...	2	2
						Union Medical (Pekin)	...	...	...	...	1
						Universidad National	...	...	...	...	1
						Wuchang (China)	1	1	1	1	...

Graduates who are candidates for Advanced Degrees	64
Graduates who are pursuing undergraduate work	266
Colleges and Universities represented	137

COLLEGE STUDENTS AMONG THE COURSES.

Graduates and Students from Colleges. 29% of the Total Student Body.	1st Year.	Civil Engineering.	Mechanical Engineering.	Mining Engineering.	Architecture.	Chemistry.	Electrical Engineering.	Biology and Public Health.	Physics.	General Science.	Chemical Engineering.	Sanitary Engineering.	Geology.	Naval Architecture.	Naval Construction A.	Naval Construction B.	Electrochemistry.	Business Administration.	No Course Classification.	Total in the Courses.
Graduates	5	35	38	12	37	17	77	19	1	1	36	9	3	8	12	9	5	5	2	331
Non-graduates	16	31	47	10	41	9	29	4	0	0	14	4	0	5	0	1	5	11	1	228
Total	21	66	85	22	78	26	106	23	1	1	50	13	3	13	12	10	10	16	3	559
Proportion in per cent of these students in the courses	5	33	30	48	48	44	45	48	7	25	32	22	75	46	100	91	20	16	....	36

AGES OF STUDENTS.

CLASSIFIED FIRST-YEAR STUDENTS, OCTOBER, 1915.

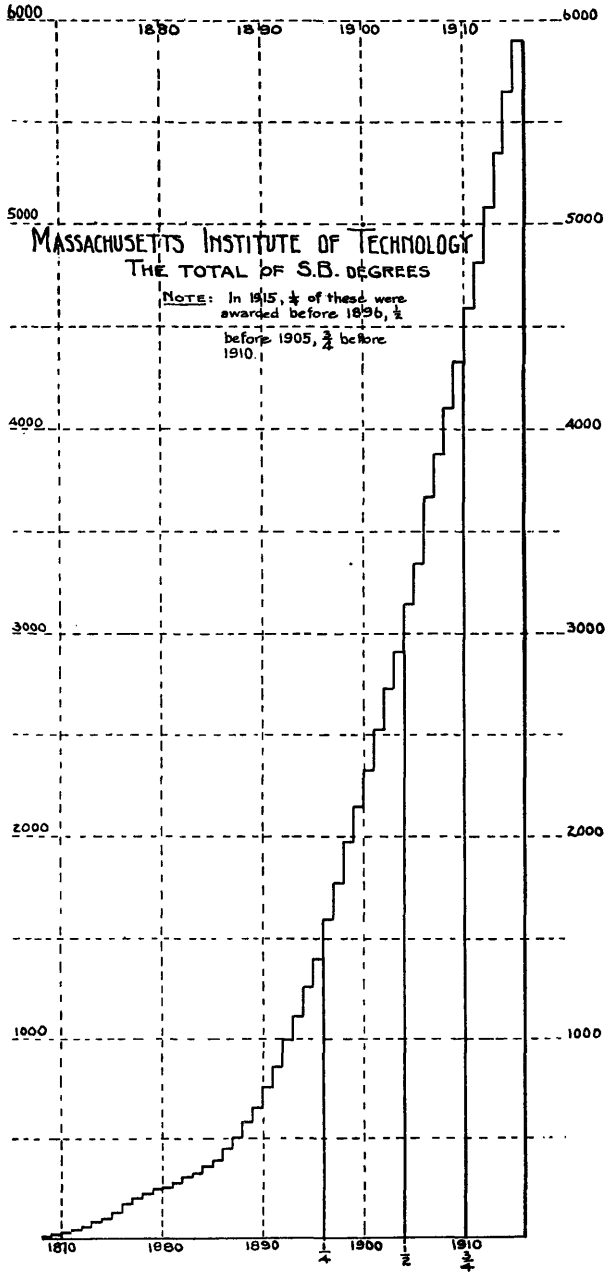
Period of Life.	1914-1915.		1915-1916.	
	Half-year Groups.	Yearly Groups.	Half-year Groups.	Yearly Groups.
Under 17	9	9	6	6
17 to 17½	23	.....	18	.....
17½ to 18	31	54	44	62
18 to 18½	73	.....	61	.....
18½ to 19	62	135	58	119
19 to 19½	62	.....	48	.....
19½ to 20	27	89	30	78
20 to 20½	24	.....	22	.....
20½ to 21	5	29	17	39
21 to 22	16	16	12	12
	332	332	316	316

Repeating the first year 21
Students of unusual age 5
Average age, omitting these 26 . . . . . 18 years, 11 months

THE GRADUATING CLASS, JUNE, 1915.

Between 20 and 21	9
" 21 " 22	41
" 22 " 23	88
" 23 " 24	58
" 24 " 25	39
" 25 " 26	26
26 and over	32
Total	293

The average age was 23 years and one month.


MASSACHUSETTS INSTITUTE OF TECHNOLOGY
THE TOTAL OF S.B. DEGREES
NOTE: In 1915, ¼ of these were awarded before 1896, ½ before 1905, ¾ before 1910.
6000
5000
4000
3000
2000
1000
1810
1880
1890
1900
1910
¼
½
¾

GRADUATES BY YEARS AND COURSES.

Year.	Civil Engineering.	Mechanical Engineering.	Mining Engineering and Metallurgy.	Architecture.	Chemistry.	Electrical Engineering.	Natural History or Biology.	Physics.	General Course.	Chemical Engineering.	Sanitary Engineering.	Geology.	Naval Architecture.	Electrochemistry.	Total.	Total by Decades.
1868	6	1	6	....	....	.....	.....	....	1	.....	.....	....	.....	.....	14	
1869	2	2	.....	....	1	.....	.....	....	.....	.....	.....	....	.....	.....	5	
1870	4	2	2	....	1	.....	.....	....	1	.....	.....	....	.....	.....	10	29
1871	8	2	5	....	2	.....	.....	....	.....	.....	.....	....	.....	.....	17	
1872	3	1	5	....	3	.....	.....	....	.....	.....	.....	....	.....	.....	12	
1873	12	2	3	1	7	.....	.....	....	1	.....	.....	....	.....	.....	26	
1874	10	4	1	1	....	.....	.....	....	2	.....	.....	....	.....	.....	18	
1875	10	7	6	1	1	.....	.....	1	2	.....	.....	....	.....	.....	28	
1876	12	8	8	....	5	.....	2	3	4	.....	.....	....	.....	.....	42	
1877	12	6	8	4	2	.....	.....	....	.....	.....	.....	....	.....	.....	32	
1878	8	2	2	3	3	.....	.....	....	1	.....	.....	....	.....	.....	19	
1879	6	8	3	1	3	.....	1	1	.....	.....	.....	....	.....	.....	23	
1880	3	.....	3	....	1	.....	.....	....	1	.....	.....	....	.....	.....	8	225
1881	3	5	6	3	8	.....	1	....	2	.....	.....	....	.....	.....	28	
1882	2	5	5	3	6	.....	1	1	1	.....	.....	....	.....	.....	24	
1883	3	7	5	1	3	.....	.....	....	.....	.....	.....	....	.....	.....	19	
1884	5	6	13	....	12	.....	.....	....	.....	.....	.....	....	.....	.....	36	
1885	4	7	8	2	4	2	.....	....	1	.....	.....	....	.....	.....	28	
1886	9	23	7	1	7	10	1	....	1	.....	.....	....	.....	.....	59	
1887	10	17	8	1	9	8	1	1	3	.....	.....	....	.....	.....	58	
1888	11	25	4	5	10	17	3	1	1	.....	.....	....	.....	.....	77	
1889	14	24	5	3	8	17	1	1	2	.....	.....	....	.....	.....	75	
1890	25	28	3	5	13	18	3	2	6	.....	.....	....	.....	.....	103	507
1891	18	26	4	6	11	23	3	3	1	7	.....	1	.....	.....	103	
1892	22	26	4	13	7	36	6	1	7	4	6	1	.....	.....	133	
1893	25	30	5	2	8	41	2	....	6	8	.....	2	.....	.....	129	
1894	21	31	4	14	11	33	1	3	5	12	3	....	.....	.....	138	
1895	25	30	3	15	14	33	.....	2	4	11	4	....	5	.....	144*	
1896	26	34	10	24	17	48	3	3	7	7	4	3	5	.....	190*	
1897	25	40	7	16	20	33	2	3	7	12	4	1	9	.....	179	
1898	32	41	7	29	25	33	3	4	6	9	3	....	7	.....	199	
1899	30	37	9	22	22	32	2	2	1	10	1	....	8	.....	173*	
1900	32	34	21	21	19	23	3	3	5	11	4	....	9	.....	185	1573
1901	37	39	18	21	17	25	1	1	6	14	4	1	16	.....	200	
1902	24	46	14	18	14	35	5	3	3	9	7	...	14	.....	192	
1903	26	37	27	15	13	39	1	3	1	10	4	1	12	1†	190	
1904	34	45	32	24	15	34	3	5	5	7	2	1	17	8†	232	
1905	46	54	26	12	23	31	3	....	3	13	5	1	24	3†	244	
1906	47	69	38	22	21	37	2	4	.....	10	6	....	19	3†	278	
1907	37	52	22	21	10	32	.....	.....	.....	14	3	2	10	5†	208	
1908	48	61	19	19	16	38	4	.....	.....	15	2	....	5	2†	229	
1909	51	41	30	18	12	42	5	3	.....	13	9	....	5	3	232	
1910	57	57	24	18	10	36	3	....	2	18	12	....	11	3	251	2256
1911	46	49	17	10	12	49	1	1	2	19	15	....	6	5	231*	
1912	55	47	21	21	7	52	4	2	1	31	14	....	3	3	260*	
1913	58	50	20	25	12	43	2	1	.....	30	15	....	4	8	268	
1914	60	65	17	19	9	50	6	1	4	37	19	....	8	8	300*	
1915	48	68	5	28	21	41	3	3	2	33	11	....	7	9	277*	
Totals .	1107	1307	518	482	475	987	82	62	107	364	157	14	204	61	5908*	

Names counted twice, students graduating in two different years	22
Bachelors of Science	5886*
Masters of Science, not including 129 counted above	133
Doctors of Philosophy and of Engineering, not including 9 counted above	15
Total	6034*

* Deducting names counted twice (students graduating in two courses).

† Prior to 1909 this Course was designated as Option 3 (Electrochemistry) of Course VIII.

STATISTICS OF GRADUATION, CLASS OF 1915.

Number receiving degree after one year at the Institute	2
" " " " two years at the Institute	44
" " " " three years at the Institute	40
" " " " four years at the Institute	169
" " " " more than four years at the Institute	38
Total number of degrees of S. B. awarded	293
Number entering from other colleges	102
" of graduates among these	54
" of non-graduates among these	48

FURTHER STATISTICS OF THE STUDENTS FROM OTHER COLLEGES OF THE GRADUATING CLASS, JUNE, 1915.

Years at the Institute.	Graduate.	Non-graduate.	Total.
1	2	.....	2
2	32	12	44
3	18	19	37
4	1	10	11
More than 4	1	7	8
	54	48	102

SUMMER SCHOOL.

	1914.	1915.
Number from other colleges and schools attending	77	82
Number not referring to any other school or college	4	6
Number from Massachusetts Institute of Technology	392	460
	473	548
Registrations for failures or deficiencies	262	254
Registrations to anticipate work	563	632
Number who attended Summer School but did not return for Registration	77	71

NUMBER OF STUDENTS REGISTERED IN EACH OF THE COURSES OF THE SUMMER SCHOOL FOR THIS YEAR AND THE YEAR BEFORE.

	1914.	1915.
Algebra B.	0	12
Applied Mechanics	28	21
Carpentry	3	2
Chemistry, Inorganic and Analytical	113	147
Descriptive Geometry	35	70
Design	22	28
Elect. Eng. Lab.	0	16
Electrical Engineering, Prin. of	11	7
Electrical Measurements	1	0
English	9	19
Forging	9	10
French	18	19
German	43	36
Hydraulics, Theoretical	9	10
Industrial Chemical Laboratory	22	18
Machine Tool Work	19	19
Mathematics (1)	34	26
Mathematics (2)	19	29
Mathematics (3)	14	9
Mechanic Arts 297	0	19
Mechanical Drawing	15	13
Mechanical Engineering Drawing	11	23
Mechanism	31	20
Metal Turning	4	2
Organic Chemical Laboratory	15	7
Pattern Work	3	2
Physical Laboratory	7	16
Physics	35	24
Precision of Measurements	16	18
Reinforced Concrete	0	1
Shades and Shadows	5	9
Solid Geometry	0	12
Structures	7	20
Surveying	7	17
Vise and Bench Work	7	7
Wood Turning	3	2
Woodwork and Pat. Making	10	8
Surveying Camp.		
Railroad Field Work 120	95	93
Plane Surveying 107	95	93
Hydrographic Surveying 160	95	93
Geodetic and Topographic Surveying 108	95	93

MASSACHUSETTS CITIES WHICH SEND FIVE OR MORE STUDENTS.

Boston	239	Medford	10
Cambridge	81	Springfield	10
Newton	49	Andover	9
Brookline	41	Chelsea	9
Melrose	30	Hyde Park	8
Malden	29	Lexington	8
Lawrence	27	Milton	8
Somerville	27	Salem	8
Lynn	25	Concord	7
Lowell	22	Needham	7
Brockton	21	Swampscott	7
Newburyport	19	Watertown	7
Quincy	15	Wellesley	7
Taunton	15	Woburn	7
Waltham	13	Holyoke	6
Winthrop	13	New Bedford	6
Arlington	12	Wakefield	6
Fall River	11	Beverly	5
Gloucester	11	Danvers	5
Haverhill	11	Milford	5
Winchester	11	Natick	5
Everett	10	Revere	5
Framingham	10	Walpole	5
Marlboro	10		

WALTER HUMPHREYS,
Registrar and Recorder.

Reports of Departments.

CIVIL AND SANITARY ENGINEERING.

The putting into operation, so far as instruction is concerned, of the co-operative agreement between the Institute and Harvard University constitutes the most important event of the year. By its enforcement the Department has been strengthened by the addition to its instructing staff of four full professors of eminent ability as teachers and engineers, Professors George F. Swain, Lewis J. Johnson, George C. Whipple and Hector J. Hughes. The corps of instructors now numbers twenty-five and consists of ten full professors, two associate professors, two assistant professors, four instructors and seven assistants. This increase in the size of the staff has made it possible to offer additional undergraduate and graduate courses of high character, and to divide some of the larger classes into smaller sections. It has also relieved certain members of the instructing staff from the undue amount of work which they have carried in recent years, thus increasing materially the teaching efficiency of the staff.

A large number of students are taking advanced work in the department this year, among whom are one candidate for the degree of Doctor of Engineering, and ten candidates for the degree of Master of Science. A number of these advanced students are men of considerable experience in active engineering work who are anxious to perfect themselves along specific lines. The fact that the Department staff now includes specialists in all the important branches of civil engineering makes the Institute particularly attractive to such men.

The Highway Option inaugurated last year for third

year students under the supervision of Professor Hughes became fully operative this fall. The number of registered students in the option is thirty-two divided equally between the third and fourth years. A considerable number of students not registered in the option are also taking some of the highway engineering subjects offered.

Members of the instructing staff have continued to participate actively in engineering affairs during the past year, thereby keeping in close touch with professional practice. So far as connection with public affairs is concerned, attention may be called to the fact that Professor Swain is Chairman of the Boston Transit Commission, Professor Whipple is a member of the Council of the State Department of Health, Professor Breed is a member of the State Wide Committee upon the Prevention of Fires in Schools, and Professor Spofford is a member of the newly established State Terminal Commission. Other positions of a public nature but of less important character have been filled by various professors on the staff.

No resignations have occurred during the last year among the more permanent members of the corps of instructors, but at the close of the year all the assistants except Mr. W. C. Eberhard resigned after a year's service to engage in professional work. One of them, Mr. Estus H. Magoon, went to Serbia with the relief expedition conducted by Dr. Richard P. Strong of the Harvard Medical School, and at last accounts was still engaged in sanitation work in that country. It is perhaps worthy of note that the sanitary engineering work of this corps was under the charge of Mr. Edward Stuart, a graduate of Course XI, Class of 1910, and that several of the recent graduates of this course were included in the corps.

The only new appointments made during the year were those of assistants to fill vacancies left by the resignations previously mentioned, and to increase the total number of assistants to seven as authorized by the Executive

Committee. The following six men, graduates of the class of 1915, were appointed to these positions: Messrs. John Hyneman, S.B., Percival J. Munn, S.B., George W. Simons, Jr., B.S., S.B., Howard C. Thomas, S.B., Ellis Tisdale, S.B. and Andrew N. Wardle, S.B.

The fourth session of the Surveying Camp was held during the last summer between July 27 and September 17 inclusive. The attendance consisted of ninety-three students. Seventy-six of these students were from courses I, XI, and XV, Option 1, in which attendance is required, the remainder coming from miscellaneous courses at the Institute and from other institutions. The instructing staff included the same professors as last year with the addition of Mr. Howard B. Luther, Instructor in Civil Engineering. The assistants included Messrs. Walter C. Eberhard, H. F. Clark, Martin W. Cowles, Percival J. Munn, Howard C. Thomas and Andrew N. Wardle, all of whom except Mr. Eberhard were graduated in the class of 1915, and all except Mr. Clark and Mr. Cowles are now assistants in this Department. The resident physician was Dr. G. F. Dwinell, a graduate of the Harvard Medical School.

The camp session this year lasted three days longer than that of the previous year but the cost per student was increased by only 18 cents. The total charge per student for meals and miscellaneous expenses necessary for the operation of the camp, including a small charge for depreciation but exclusive of transportation between Boston and East Machias and personal laundry, was $48.46, which is equivalent to 91.4 cents per day. The fact that the health of those in attendance was excellent and that an average increase in weight of seven pounds occurred in spite of the laborious daily work is evidence of the wholesome life afforded at the camp.

An important addition was made to the buildings at the camp during the year by the construction of a house for the caretaker who had previously occupied a tempo-

rary camp built by the contractor who constructed the main buildings. The construction of this new house was a much needed improvement as the camp had deteriorated so as to be nearly uninhabitable.

The gifts to the camp during the season included a new upright piano which was presented by the members of the instructing staff in residence during the season, and a bubbling fountain given by the members of the class attending the camp during the summer of 1914.

An interesting feature of the camp life which was first established this summer was the wireless receiving outfit which enabled the camp to keep in close touch with outside affairs, and made it possible to determine the exact longitude of the camp site. This outfit was installed largely through the efforts of Mr. Chester R. Gardner, a member of the class of 1916, who attended the camp during the season.

The demand for our graduates continues satisfactory. Last spring, in spite of the prevailing dull times, practically all the members of the graduating class secured positions either before or immediately after graduation, and so far as the writer is informed, none of our recent graduates are now idle.

Special courtesies have been received during the year from the Holyoke Water Power Company which permitted the graduate class in Water Power Engineering to conduct an informal test of a water turbine at its plant, and from the Proprietors of Locks and Canals at Lowell for permission to occupy their steam gaging station. The Department is also indebted to Messrs. Henry E. Warren, Sanford E. Thompson and Frederick J. Hoxie for lectures given to our students free of charge.

CHARLES M. SPOFFORD.

MECHANICAL ENGINEERING.

In the President's Report for 1914, figures were given which showed the rate of growth of the Mechanical Engineering Department alone. Inasmuch as the numbers in the classes in the drawing rooms, in the laboratories, and in the work in Mechanic Arts, are affected by the growth of nearly all of the engineering departments, a similar comparison showing the increase in the numbers in these branches is of interest.

With the exception of the numbers given for the second term 1915–16, which have been determined by making a reasonable deduction from the number now in these classes, the figures were obtained from the instructors' records.

The increase in the number attending the Engineering Laboratories in 1915–1916 over the average from the period 1906–1907 to 1912–1913 is 39 per cent; that of the Mechanical Laboratories and drawing rooms 43.6 per cent.

The increase in the fourth-year drawing room is 58 per cent compared with 43.9 per cent for the third year and 37 per cent for the second. This is explained by the fact that men entering the Institute from other colleges start here, in either the third or the fourth year.

There are at the present time 98 students, either regular fourth-year students or students who are candidates for the master's degree in the fourth-year drawing room. The new building is to have 107 drawing tables for the fourth-year students in Mechanical Engineering.

The records of attendance in the Engineering Laboratories in the following table are based on the number of men registered per year. The records of attendance at the Mechanical Laboratories and drawing rooms are based on the maximum number of men registered per term.

Year.	Engineering Laboratories. Steam, Gas and Hydraulics. Number of Men, Fourth Yr., 1st Term.	Number of Men, Fourth Yr., 2nd Term.	Number of Men, Third Yr., 2nd Term.	Total Second Term.	Total for Year.	Testing Materials. Total Men for the Year.	Mechanical Laboratories. Number of Men Taking Machine Work.	Number of Men Taking Vise and Bench Work.	Number of Men Taking Woodwork.	Number of Men Taking Foundry.	Number of Men Taking Forging.	Total Number of Men Taking Shop Work.	Drawing Rooms. Second Year.	Third Year.	Fourth Year.
1906–1907	129	183	141	324	453	219	90	99	103	55	120	467	...	...	59
1907–1908	142	197	129	326	468	226	123	142	97	7	100	469	131	...	79
1908–1909	194	175	137	312	506	367	114	118	93	2	104	431	141	162	59
1909–1910	212	199	118	317	529	240	108	93	85	100	76	462	129	177	65
1910–1911	176	181	133	314	490	192	147	133	67	64	98	509	162	190	56
1911–1912	219	191	120	311	530	310	177	175	65	92	238	747	152	193	53
1912–1913	221	199	141	340	561	241	170	148	77	89	137	621	129	220	62
1913–1914	259	225	144	369	628	286	182	168	52	133	143	678	125	236	79
1914–1915	253	218	151	369	622	320	202	167	85	129	124	707	142	239	82
1915–1916	265	235	180	415	680	370	236	178	78	135	130	757	196	259	98

	Steam, Gas, Hydraulics.	Testing Materials.	Engineering Laboratories.	Machine Work.	Vise and Bench Work.	Woodwork.	Foundry.	Forging.	Mechanical Laboratories.	Second-year Drawing Room.	Third-year Drawing Room.	Fourth-year Drawing Room.	Total Students in Drawing Rooms.	Institute Registration.
Average No. of men from 1906–1907 up to 1912–1913 . . .	496	259	755	126	127	85	54	123	515	143	180	62	385	1469
Number of men 1915–1916. . . .	680	370	1050	236	178	78	135	130	757	196	259	98	553	1875
Increase in men over above average . . .	184	111	295	110	51	−7	81	7	242	53	79	36	168	406
Percentage Increase. .	37.1	42.8	39.0	87.3	40.7	−8.2	150	5.7	47	37	43.9	58	43.6	27.7

The numbers 367 and 310 which appear in the column marked "Testing of Materials" at the years 1908–1909 and 1911–1912 were due to a change in one of the course schemes which made it necessary to carry two classes each of these years.

By dividing the senior class into two sections, which must be done if efficient instruction is to be given to classes in the drawing room much larger than those we now have, each drawing desk may be made to accommodate two men.

Although many students take Machine Tool Work in the summer school, the increase as noted, not counting these students, is 87 per cent.

At the beginning of the present term Professors Lionel S. Marks and Alfred E. Norton, who came to us from Harvard University, took up active work in the Department. This addition to the staff has made possible the subdivision of certain classes in Heat Engineering into sections of twenty-five; it has also by relieving some of the instructors in Mechanical Engineering Drawing from lectures in Mechanism, enabled them to give more time to the drawing room.

Space for the equipment used for Testing Road Materials was obtained in the Strength of Materials Laboratory by dismantling and moving to the new site, apparatus used in determining the time modulus of elasticity of timber.

The instruction in the use of this new equipment was given by the regular staff of the Testing Laboratory working under the general direction of Professor Hughes of the Civil Engineering Department.

In addition to the regular summer school in Mechanic Arts, attendance at which is optional, instruction was given to about twenty men in Course XV, attendance for these men being compulsory. This course was given in advance of the regular summer school work. In the time allotted it was possible to give these students only a gen-

eral knowledge of Machine Tool Work, of Pattern Making and of Foundry Work.

During the first term of the present year, students in Chemical Engineering began work in the Foundry. This is the first time students in this Course have had such work. Later these students are to be given Vise and Bench Work and Machine Tool Work.

During the past year, the Department has put into operation a cost system by means of which it is possible to tell what the average expenditure from the Department funds is for each student taking the regular work in the laboratories; the expenditures for repairs; for thesis work, etc. The Department now has, on a card catalogue system, a complete inventory of all experimental apparatus, instruments, tools, shop equipment and tool-room equipment.

The Department is giving a course of instruction in Aero-Engines to graduate students in Aeronautical Engineering. The work covers a detailed study of the motors now in use for aeroplanes and airships, and of the principles involved in their design. More than half of the students now taking this course have had practical experience in flying and are more or less familiar with the engines which they have operated. It is hoped that in the Institute's new plant at Cambridge a laboratory can be provided for demonstrating aero-engines and for investigating them scientifically on the testing block.

The fourth-year course in Dynamics of Machines has been gradually changed during the past three years with the object of making it a closer application of principles already learned in the course in Applied Mechanics which precedes it. Many new problems have been introduced, all of which were taken from recent practice in mechanical design.

The equipment of the Testing Materials Laboratory has been increased by the addition of a mechanical sifter with

a set of sieves, a Keep hardness testing machine, a small torsion machine and several measuring instruments. The sifter is of the latest and most efficient type. A set of standard Tyler sieves is used with this machine. The Keep machine is used to study the machining hardness of metals and also to determine their uniformity and freedom from blow holes. Apparatus for determining the transmission of heat through radiators has been installed in the Steam Laboratory.

The Department has received during the past year from L. S. Starrett Company, a complete set of micrometer gauges from $\frac{1}{2}$ inch through 12 inches; a 1700 H.P. Curtis type marine turbine from Bertram H. Borden and Howard S. Borden; a 150 H.P. DeLaval steam turbine with stage centrifugal pump and a 16 H.P. DeLaval steam turbine with single stage pump from the Ellicott Machine Corporation; a $\frac{1}{2}$ H.P. residence cleaner equipped with universal 110-volt motor, together with complete equipment of tools. This apparatus was presented by the Spencer Turbine Cleaner Co; a Harrington adjustable pipe die from the manufacturers; also sample drawing tables, benches and minor pieces of apparatus.

Mr. Horatio W. Brown, a graduate of the Architectural Department, has been appointed to fill a vacancy caused by the resignation of Mr. Ellis W. Brewster.

EDWARD F. MILLER.

MINING ENGINEERING AND METALLURGY.

The most important fact of the past year to be recorded is the decision to erect on the new site at the northeast corner of the main building a separate wing for the Department of Mining and Metallurgy. With regard to this Department the general plan for the distribution of instruction during 1916 and the following years had been that the laboratories for mining and metallurgy should

remain in the Rogers Building or be transferred to the Rotch or Pierce Building of Harvard University, and that most of the class-room instruction should be provided for on the new site. When this matter was presented last December to the Visiting Committee of the Department, the new plan was heartily approved by the Committee. The funds necessary for this purpose were subscribed by Messrs. Charles Hayden, T. Coleman duPont, and Pierre S. duPont. The building is secured through the generosity of these alumni of the Institute. There remains still the task of obtaining the money necessary for an adequate equipment. One part of the present apparatus will be transferred to the new laboratories; a second has to be replaced, as it is worn out and not suited for a new plant; a third division includes the machinery, furnaces, and leaching apparatus which we do not possess at present, but ought to have in our laboratories. The plans of the building with details of equipment have been worked out to meet the present needs and those of the near future. They include a provision for a special research division.

Though a considerable amount of research work is being carried on in the Department (this year, *e.g.*, upon flotation, the extraction of nickel from oxide ore, the electrodeposition of gold from cyanide solutions with the regeneration of the solvent), original investigation will be greatly helped if it is officially recognized and assisted by a special fund or appropriation.

The new schedule of courses referred to in last year's report was officially adopted last April. Option 1 remains the general option which aims to cover evenly both mining and metallurgy; a few minor changes have been made in the program to meet present needs. Option 2, the metallurgical option, has been entirely revised; metallurgical and metallographical studies have been greatly strengthened, the time necessary having been obtained by transferring Qualitative Analysis to the Summer be-

tween the first and second years. Option 3, representing mining and geology, replaces the older geological option of the same number. As its title indicates, it lays special emphasis upon the studies of mining and geology.

The course in Surveying required in Options 1 and 3 has been changed so that the whole subject, class-room exercises and field-work, is covered during six weeks in June and July, and has to be taken between the first and second, or second and third years. Last summer four students attended the Summer School of Surveying at South Strafford, Vt., where is situated one of the old copper mines of New England.

Under the new schedule, a student makes his choice of option at the end of the first year. The second-year class has started in with the new program; the present junior and senior students follow the old program, which will terminate at the close of the academic year 1916–1917.

The number of undergraduate students is 41; in the second year there are 20; in the third, 10; in the fourth, 11. The increased number of students in the second year over that in the third and fourth indicates that the sudden decrease of mining students all over the country has ceased, and that we may look forward from now on, to an increased attendance. The number of students in the fourth year is larger than expected; this is due to the presence of graduate students from other colleges. There are in the Department seven college graduates, of whom three from Japan and one from Yale University are doing special work, while the others, coming from the Colorado School of Mines, Harvard and Yale universities, are taking one of the regular courses. One college graduate who entered the Department as a candidate for a degree but who could not arrange his studies to fall in line with the studies given at the Institute, has been taken care of by allowing him to attend some courses in the Harvard Graduate School of Applied Science. Of the two Russian graduate students

who were with us last year, one has gone in the service of his government on a six-months trip through the United States to study mining schools and mining and metallurgical plants; the other has been called home to serve his country in the war. We have one candidate for the degree of Master of Science, Mr. P. C. Loo, who came to us from the Michigan College of Mines.

Again, as in former years, students have gone into practical work during the summer. There has been no difficulty in finding places for them. This opportunity, as well as the requirements of the Summer Schools of Surveying and Qualitative Analysis, has pushed into the background the Visiting Summer School, which was prominent a few years ago. Inquiries for placing our graduates are numerous; in fact, we have not been able to meet all the demands for them.

There have been a few changes in the instructing staff. Professor Charles H. White has been advanced to the rank of full professor. Mr. Louis W. Currier, S.B., '14, who spent a year at the University of Idaho teaching mining and geology, is acting as Assistant in Metallurgy in place of Mr. B. S. Mann, and is devoting his spare time to special geological work. Mr. Frederick O. Stillman, who spent the last summer in mining work in Nevada, has returned to take up his work as Assistant in Ore-Dressing.

Emeritus Professor Robert H. Richards continues his active interest in the Department and still maintains there his headquarters. By special request he has occasionally met the senior class and given them talks on his specialties. At the beginning of the year Professor Richards was awarded a gold medal by the Mining and Metallurgical Society of America for his contributions to the science and practice of ore-dressing. Professor Hofman was retained in or near Boston by the exigencies of the new building; he has started upon the complete revision of his Metallurgy of Lead. Professor Charles E. Locke spent the sum-

mer in the West visiting mines and ore-dressing plants, studying especially oil-flotation. Professor Edward E. Bugbee has made three professional trips to Canada, examining mines in Nova Scotia and Ontario. Professor Carle R. Hayward visited the leading copper and lead smelteries at San Francisco, Salt Lake City, and Chicago, and spent one month at Pittsburgh for the study of iron and steel.

The Department constructed or acquired by purchase the following apparatus: two laboratory riffle samplers with pans; twelve flux-balances with agate bearings; one soft-coal muffle furnace; one set of Tyler special shallow testing screens; one hand-jig frame to be used interchangeably with all our screens in power- and hand-jigs; one Callow pneumatic flotation apparatus; one Janney mechanical flotation apparatus; one Embrey vanner belt; one electrolytic depositing apparatus with new sets of electrodes; one electric resistance muffle furnace, 8 by 16 inches and 2 inches high, and one Fulton gran-annular carbon resistance furnace.

We have been again favored with a number of gifts. Professor Robert H. Richards has continued to turn over to the library his copies of the *Mining and Scientific Press*, and of the *Journal of the Mining and Metallurgical Society of South Africa;* the Pensacola Tar and Turpentine Co. has presented a set of flotation oils; Mr. Charles Hayden has supplied the Ore-Dressing Laboratory with a Janney flotation apparatus of laboratory size; the American Blower Company, Detroit, donated a Pitot tube and two inclined manometers. We are also indebted to Messrs. J. M. Callow and A. F. Townsend for considerable discounts on our new Callow flotation apparatus and the new vanner belt.

HEINRICH O. HOFMAN.

ARCHITECTURE.

For the Department of Architecture the past year has been one of gradual development. There have been comparatively few changes. Through the resignation of Mr. Eleazer B. Homer we have lost a member of the staff who has been connected with the Department since 1887. Mr. Homer was admitted to the Faculty in 1890; he resigned his professorship in 1901 to take up active practice, but still kept in touch with the Institute by continuing his lectures in Architectural History until the present year. In his place we have secured the services of Professor H. Langford Warren of the School of Architecture at Harvard University, who now has charge of the courses in Architectural History. Professor Warren's reputation as a lecturer on this subject is too well known to require comment. Mr. Russell W. Porter, a former student in the Department, has been added to the staff in Design as instructor for the first term. Miss Ida D. Loring has been appointed Assistant in Architectural History. Dr. Lacey D. Caskey has been appointed Lecturer in European Civilization and Art.

It is with deep regret that mention must be made of the death of two former members of the instructing staff. Professor William R. Ware died at Milton, Mass., June 9, 1915, in his eighty-fifth year. Professor Ware organized the Department of Architecture at the Massachusetts Institute of Technology, the first school of its kind in America, and acted as its Head from 1865 to 1881. He was widely known as an educator. His keen judgment, his skill, his inspiration and sympathy will always be remembered by his former associates and pupils.

Mr. Ross Turner died at Nassau, Bahama Islands, February 12, 1915. Mr. Turner had been connected with the Department as Instructor in Water Color since 1884. By his kindly help and genial personality he endeared himself to all who had been associated with him.

The registration in the Department remains the same as last year, being one hundred and sixty. There are five candidates for the Master's degree in general Architecture, three in Architectural Engineering; twenty-six candidates for the Bachelor's degree in general Architecture, and twelve in Architectural Engineering. Only nineteen out of the total number are special students not working for the Institute degree. Thirty-eight of the students already hold college degrees, and forty-six others have had from one to three and a half years in college before coming to the Institute.

The course scheme adopted by the Faculty in December, 1914, is year by year replacing the old schedule, but will not become fully operative until 1916–1917.

The status of the special student in Architecture has been given careful consideration. Through Faculty action the entrance requirements for such students have been strengthened by the addition of examinations in English and Ancient History. Most of these students enter at once the second-year courses in Architectural History and European Civilization and Art, and it has been found not unusual for them to be quite unprepared for this work. Pressure is also being brought by the Department to induce the special student to take a sufficient number of related subjects to make his course a broad and rational one.

During the past year the problems in Design taken jointly with the Architectural School of Harvard University and the Boston Architectural Club proved of great interest both to the students and to the members of the instructing staff of the three schools. The joint exhibitions which afford opportunities for judgment, comparison and friendly criticism of the work have been a source of inspiration to all concerned. It is most gratifying that the dangerous element of competition among the schools was successfully eliminated. The experiment proved so

satisfactory that the practice is being continued with little change except that the number of problems will be somewhat reduced.

The point system, which was introduced for the first time last fall, has been slightly modified in the light of experience gained during the year. The number of points required for advancement from one grade of Design to the next higher has been increased so that only the really brilliant men will be able to advance before the end of the school year. No student who has a failure or deficiency incurred in a previous year will be recommended for advancement until such failure or deficiency has been made up and until his records in all subjects approved for the term in which advancement is desired are satisfactory to the instructors in charge. It is believed that thus safeguarded the point system will have a tendency to improve the general standing of the student in his non-professional work.

The *Technology Architectural Record*, formerly published as a quarterly, was issued last year as an annual. It is serving admirably the double purpose of a year-book and circular of the Department.

During last summer a very generous gift of fifteen thousand dollars was made to the Department by Mrs. Harriet A. Henshaw, of London, in memory of her brother, the late Frank W. Boles. The gift will constitute the Frank Walter Boles Memorial Fund. Its income, which will be available at once, will be devoted to the purchase of fine art material suitable for supplementing the instruction in Design. The resources of the Department for such purposes have been very limited, and the gift will prove most valuable.

The Department has also received during the year a collection of about one hundred and fifty lantern slides from the Boston Society of Architects, and thirty slides from Mr. Guy Lowell.

In the report of last year mention was made of the increasing interest of the American Institute of Architects in the schools throughout the country. At the annual convention of the Institute held in December of last year a student-medal was created, to be presented each year at each of the schools having membership in the Association of Collegiate Schools of Architecture to the member of the graduating class having the best record for his entire course. The medal for the Massachusetts Institute of Technology was awarded to Mr. Henry P. Sabin.

The 1915 Traveling Fellowship in Architecture was awarded to Mr. William Tallman. The Rotch Prize for the classified student was presented to Mr. Henry P. Sabin; the Rotch Prize for the special student was withheld there being no eligible candidate. The Boston Society of Architects' Prizes were awarded to Mr. Elwin P. Norberg, classified student, and Mr. Ludvig T. Bengston, special student. The Chamberlin Prize was won by Mr. Donald des Granges; the F. W. Chandler Prizes by Messrs. William Tallman, H. C. Stearns, James M. Brown, Sumner M. Spaulding and Thomas D. Brophy; the "Class of 1904" Prizes by Messrs. William W. Dodge, Jr., and Arthur L. Guptill.

WILLIAM H. LAWRENCE.

CHEMISTRY AND CHEMICAL ENGINEERING.

No considerable changes have been made in the schedules of the courses in Chemistry or Chemical Engineering during the past year. The modified schedules mentioned in the last two Reports are now in operation throughout the four years, and appear to justify our expectations of efficiency. The instruction in Chemical Engineering now extends through three terms, beginning with the course in the third year given by Dr. Walker for the first time last year, and continued through the fourth year by Dr. Lewis.

These courses, which are closely associated with those in the laboratory of Industrial Chemistry, have been most carefully developed, and certainly rank among the most successful efforts to combine chemistry and engineering in such a way as to constitute a new entity which can properly be designated as Chemical Engineering. They have already attracted much attention, and it is the expectation of Drs. Walker and Lewis that the courses can be further perfected and extended under the more favorable conditions of our new laboratories.

Dr. Lewis is also giving a new course of Problems in Applied Chemistry to a part of the fourth-year students in the Course in Chemistry, and Dr. Robert S. Williams will give a new course in Metallography to the same students this year.

As a consequence of changes in instruction in the Department of Biology and Public Health, the instruction in Municipal Sanitation has been dropped from the Course in Chemistry, and a new subject, Sanitation of Chemical Industries, given by Dr. John F. Norton, has been substituted for it. He is also offering a new graduate course in Biological Chemistry.

The instruction in Theoretical Chemistry is now continued through one extra term in the Course in Chemical Engineering, and two extra terms in the Course in Chemistry. The work of the first term is under the direction of Dr. Noyes, and is an extension of the instruction given in the third year. The second term of new work will deal mainly with the chemistry of colloids and will be given by Dr. Walter A. Patrick. Laboratory practice accompanies both of these new courses.

The chemical instruction given to the students in the Highway Engineering Option of the Course in Civil Engineering has been extended, under the direction of Dr. Gill, and has necessitated increased laboratory equipment for this purpose.

There are at present seven candidates for the degree of Doctor of Philosophy, and eight candidates for the degree of Master of Science in the Department. Of the former, three are graduates of the Institute, two of the University of North Carolina, one of Harvard, and one of Ohio State University. The increasing demand for graduate courses will soon necessitate the appointment of additional instructors whose sole duty it shall be to care for such work.

The required summer course in Qualitative Analysis was again successfully completed under the direction of Professor Fay, with Professors Hall and Mueller as associates, and Mr. Hamilton as instructor and Mr. Venable as assistant. The number of students taking the course was 78. The other optional summer courses were offered as in recent years, with about normal attendance. In addition, it was found possible to arrange for a trip of nine days' duration, open to a limited number of students, to visit manufacturing plants. The trip lasted from June 10th to June 18th, inclusive, and was under the direction of Professor Thorp, accompanied by Professor Lewis. Professor Thorp reports as follows concerning it: "In all, fourteen different plants were visited, no two of which were producing materials of a similar kind. Thus an exceptional variety of chemical operations were inspected in the course of this relatively short trip. Our reception at all of these plants was exceedingly cordial, and we had ample evidence of the high esteem in which the Institute is held by the individual managers. Everywhere noticeable efforts were made to make the trip both instructive and pleasant, and at several plants we were the recipients of various courtesies of a social nature.

The plants visited were the following: — National Lead Co., Brooklyn, N. Y. (Lead products); Carl H. Schultz Co., New York City (Mineral waters and beverages); B. T. Babbitt Co., Babbitt, N. J. (Soaps and glycerine); Warner Sugar Refinery, Edgewater, N. J.; Tide Water

Oil Co., Bayonne, N. J. (Petroleum products); Murphy Varnish Co., Newark, N. J.; Belmark Pottery Co., Trenton, N. J. (Sanitary earthenware and plumbers' supplies); Atlas Portland Cement Co., Northampton, Pa.; Whitall-Tatum Co., Millville, N. J. (Chemical glass-ware and druggists' supplies); Millville Manufacturing Co., Millville, N. J. (Cotton goods and dye-works); Alan Wood Iron and Steel Co., Conshohocken, Pa. (Blast-furnace and open-hearth steel furnaces and rolling mills); Harrison Bros. & Co., Philadelphia, Pa. (General chemicals, acids, paints, etc.).

The party was made up of students from courses in Chemistry, Chemical Engineering and Electrochemistry. The cost to each student was estimated at $70, which proved to be ample for all legitimate expenses. The frequent courtesies in the way of entertainment and transportation afforded us at several of the plants were considerable factors in the lessening of the cost to the individual members of the party. Dinners were provided for the party at the plant of the Tide Water Oil Co., at the Atlas Portland Cement Co., at the Alan Wood Iron and Steel Co., and at Millville we were the guests for the day of the Millville Manufacturing Co. and the Whitall-Tatum Co., as joint host, this including the freedom of the recreation park controlled by the first mentioned company, where summer sports and boating were offered. Transportation courtesies were extended by Mr. E. C. Stover of the Belmark Co., by Mr. G. E. Barton of the Whitall-Tatum Co., and Mr. D. C. Lewis of the Millville Manufacturing Co.

Six conferences were held during the trip, at which members of the party reported upon their observations in the works, for the purpose of elucidating obscure points in the processes and to fill in any gaps in the notes. It was requested that each student write out a complete report upon the whole trip, and submit it for examination before December 1st. Up to the present time three of these re-

ports have been received. The interest of the students was well sustained at all times, and it is felt that each of them benefited much from the experience."

The following changes have occurred in the instructing staff of the Department: Messrs. Ross H. Dickson and Leicester F. Hamilton were promoted to instructorships. Messrs. Duncan MacRae, William F. Odom, Robert D. Bonney and Arthur E. Bellis resigned instructorships. Dr. F. Hastings Smyth, a graduate of Hamilton College, who received his doctor's degree from the Institute last June, was appointed Instructor in Inorganic Chemistry. Dr. Walter A. Patrick, who has just returned from study in Germany and England, was appointed Instructor in Theoretical Chemistry, and Mr. Clark S. Robinson, a graduate of the Institute who has taken up teaching after having had technical experience, also receiving the degree of Master of Science last June, was appointed Instructor in Inorganic Chemistry. The following assistants resigned: Messrs. Richard O. Bailey, Robert T. Gookin, Bertrand H. Hale, Frederick W. Lane, W. H. McAdams, Percy G. Savage, William A. Simpson, Robert V. Townend, Charles S. Venable, Roger Williams and Henry M. Wylde. The new appointments to assistantships are as follows: Messrs. Allen Abrams (Washington and Jefferson College), Francis C. Atwood, Donald Belcher, Lucius A. Bigelow, Alton A. Cook, Martin W. Cowles, John N. Dalton, Roscoe G. Dickinson, Burnham E. Field, Clifton N. Jacobs, and Elwyn E. Snyder, Jr.

Miss Ruth M. Thomas has been promoted to be Research Associate in Organic Chemistry, this appointment being made possible by the continued generosity of Professor F. J. Moore.

It has become necessary to incorporate the instruction in Sugar Analysis with that of Food Analysis under Professor Woodman. As a consequence, the services of Mr. George W. Rolfe as Instructor in Sugar Analysis termi-

nated in June. Mr. Rolfe has for a considerable number of years given a portion, or the whole, of his time to the students in the Course in Chemistry, always with great earnestness, and with an intimate knowledge of his specialty, both on its theoretical and technical sides.

The Department is most fortunate in retaining the services of Dr. Warren K. Lewis, in view of the flattering inducements offered him during the year to enter the technical field.

The monthly conferences of the Faculty members of the Department have continued to be highly profitable. Conferences which included all of the members of the instructing staff have also been held at which the aims and work of the Department were first stated by the senior members, and then frankly criticized and discussed by the junior members, and subsequently by all, with helpful results.

The appointment of Mr. Arthur C. Melcher as Purchasing Agent of the Department was noted in the last Report. During the year Mr. Melcher has been able to systematize the accounting of the Department, and to increase greatly the efficiency in purchase and distribution of supplies, which will result in a saving to both the students and the Institute. The remodeling of the system of accounting and of the storage and distribution of apparatus and chemicals has been most laborious and has been undertaken with such zeal and conscientiousness that a surprising amount has already been accomplished, and there is every reason to expect that we shall enter our new laboratories with an effective system in full operation.

The research work in the Department has been satisfactory in amount, if the constant demands upon the staff are considered. Drs. Moore, Mulliken and Fay are notably engaged in research, and Dr. Norton and Professor Woodman are carrying on investigations under grants from the Ellen H. Richards Research Fund. Dr. Norton re-

ports that "during the past year the work begun in the summer of 1914 has been continued by Mr. Pei H. Hsu. This has developed into a study of the physical chemistry of disinfection. A considerable amount of fundamental data was obtained during the past year, and this has been assembled and accepted for publication. This year Mr. Hsu has been appointed full-time assistant and is continuing his work by further developing the theories concerning the mechanism of disinfection, formulated from the preliminary work." Mr. Norman D. Doane (Allegheny College) who was appointed Research Assistant in Food Analysis, is working under Professor Woodman upon the detection of spoilage in tomato ketchup, with particular reference to the development of methods by which it can be shown whether this food material, as sold, was made from spoiled or unsuitable material, not so much to the methods of detecting spoilage after manufacture.

The Department has been called upon for assistance by several municipal and state interests, and has been able and glad to respond.

The present is a period in which chemistry and chemical engineering stand at the forefront of national progress. The demand for our graduates is doubtless somewhat artificially stimulated by the various activities resulting from the critical conditions in Europe, but quite aside from this, there is a significant call for men trained along chemical lines, which exceeds our ability to respond with competent men, and it is evident that the Institute must carefully weigh all measures which can maintain and increase its prestige in the equipment of its graduates in the Courses in Chemistry and Chemical Engineering for most efficient service.

HENRY P. TALBOT.

ELECTRICAL ENGINEERING.

The progress of the Department in teaching and research is bringing us the ideal association of these two activities for the purpose of training undergraduate and graduate students. Our class-room and laboratory activities have gained inspiration and fertility from the research carried on by our own staff, and I think we all feel that the research has not been injured by the teaching activities. It is obvious that both our undergraduate and our graduate students receive a certain amount of inspiration and enthusiasm for the highest type of professional study, from the effect of the research which they observe carried on or engage in themselves.

This effect is in some degree enlarged by the research meetings which are held once a month, where the progress of the various researches is described and discussed. Graduate students are made a part of these meetings, and senior students are invited to attend.

Of the changes in staff this year, the most important consists in the fuller participation of the Harvard University men in the work of the Department. We were pleased to welcome Professor Harrison W. Smith back to his duties after his year of absence, but this did not add to the number of men in the staff, as Professor Harry E. Clifford is absent on leave. The other changes in the staff are as follows: Mr. Harry F. Thomson, who had been Instructor and Secretary of the Research Division, resigned, and Mr. Otto R. Schurig, who had been holding the place temporarily, was permanently appointed Secretary of the Research Division and Instructor in Electrical Engineering. Messrs. Russell E. Leonard, Chester A. Corney, Alfred E. Hanson, Walter Haynes and George K. Perley, assistants in Electrical Engineering, resigned, — two of them to take up work for advanced degrees, — and Messrs. Philip L. Alger, Hilding N. Carlson, Albert V. DeBeech, George

C. Eaton and Vernon C. Kennedy were appointed assistants in Electrical Engineering. Mr. Allen S. Dana was appointed Research Assistant and Assistant in Electrical Engineering. Four research assistants, Messrs. F. H. Achard, A. A. Prior, P. H. Pierce and A. C. Brown resigned, and Messrs. Rupen Eksergian, Leon H. Webber, Dr. Robert J. Wiseman and Henry J. G. Rudolph were appointed research assistants. Of the foregoing, Mr. Brown had been employed only temporarily, and Mr. Rudolph was given temporary employment. In addition thereto, Mr. T. Buell was employed in some research work for a brief time during the year.

At the last Commencement, besides forty-five men being granted the Bachelor's degree in Electrical Engineering (one receiving the degree in two courses), nine were given the degree of Master of Science, and one, Mr. Robert J. Wiseman, was given the degree of Doctor of Engineering with his major in Electrical Engineering. There are now three candidates studying for the degree of Doctor of Engineering, with their majors in Electrical Engineering.

The Electrical Engineering Laboratory was operated last summer in association with the regular Summer School for the first time, and the plan proved to be a success, and will be continued.

At the present time, our laboratory and class-room facilities are tremendously crowded, but we hope that this condition will be somewhat relieved by moving to the new site. An instance of the congested condition is shown by the fact that in the Dynamo Laboratory undergraduate students are at work this term in regular exercises every week-day morning and afternoon, with the exception of Monday morning and Saturday afternoon, and in several days of the week there is no cessation of the work even over the noon hour, as one section will continue work until one o'clock and another section take up the work at that hour for the afternoon.

Some further improvements have been made in our undergraduate Electrical Engineering curriculum, and we have a committee which has been now for over a twelve-month studying our curriculum and the work done by our staff in Course VI in comparison with the work done by the staff of other courses, and this committee hopes to make some improvements. Along with this has gone a study of improved methods of dealing with the steadily increasing classes, for the purpose of adapting our methods of instruction so that the increasing size of our classes will not reduce the efficacy of the class-room and laboratory work. For this purpose we have tried dividing the class in Principles of Electrical Engineering for third-year Course VI men so that the men are grouped in sections according to aptitude as carefully as the exigencies of the tabular view will permit. This makes it practicable to allow the more capable men to go on through as much work as they can accomplish, and the slower men to cover sufficient ground in a thorough and satisfactory fashion. It will not be possible to realize the full results of this system until there is greater latitude in the room assignments, and therefore in the tabular view arrangements, — which we hope will come to pass by moving into larger quarters on the new site.

Additions to our laboratory equipment are now made particularly with a view to increasing the number of alternative experiments which can be assigned to the students, so that greater diversity can be given to the laboratory work, and the various students may do collectively a larger number of experiments, although individually each man may do fewer. There being no one experiment which is sole arbiter of the principles of nature, it seems desirable to illustrate the principles in as many ways as possible, assigning to different students experiments illustrating different aspects of the same fundamental principles, and therefore bringing the students to a thoughtful consider-

ation of the possibilities of numerous experiments, rather than limiting them to measurements made along purely traditional lines. We hope that the greater room in the new quarters will give us a larger opportunity for these developments.

The fourth-year students of Course VI are given a considerable opportunity for choice between subjects in a small part of the time allotment. The alternative subjects this term are Central Stations, Dynamo Design, Electric Wiring and Lighting of Buildings, Elements of Electrochemistry, — the latter given by Professor Thompson of the Physics Department, — Illumination and Photometry, and Storage Batteries. Of the total number of Course VI men, the proportion choosing these subjects is 88 per cent, 14 per cent, 42 per cent, 10 per cent, 12 per cent, and 45 per cent. These selections of subjects by the students is again an indication of the desirability of giving a certain degree of flexibility to the curriculum after the students have become matured and are working in lines of definite professional endeavor

College graduates, as heretofore, have considerably increased the numbers of our third-year and fourth-year classes.

The research activities of the Department, under the enthusiastic leadership of Professor Kennelly, are showing a gratifying advance. A new research problem this year consists of a study of the resistances offered by different level road surfaces to a 1000-lb. electric truck operated at different speeds within commercial range. This was carried out by the aid of a fund contributed by Mr. Thomas A. Edison and by the Gould Storage Battery Company, and the courtesy of the General Vehicle Company made available for this investigation a suitable truck equipped with solid rubber tires. The results will be shortly published in a bulletin.

The Electric Railway Traffic Research has been con-

tinued in the investigation of changes in receipts, expenses, investment, rate of return, and other factors for a number of street railway companies since the time of their electrification. By gathering a large amount of statistical data of this sort, it is hoped that it will be possible to trace the effects of important changes in operating conditions, and the effects of growth of population and suburban expansion of cities, upon the finances of the street railway companies in question.

The study of sound waves and the relation of sound waves to the vibration of telephone diaphragms has continued, and two serviceable bulletins have been published. These are listed in the accompanying list of publications by members of the staff.

The study of skin effect in non-magnetic conductors carrying alternating currents has been continued, and a detailed article has been published, but the work is being continued at higher frequencies up to 100,000 cycles per second. The experiment on the skin effect in the case of steel rails is being continued with results that we believe will prove of interest and value to the electrical engineering profession. Progress is also being made in respect to the analysis of core-losses in electrical machinery, the insulation of cables, and the physical qualities of transmission lines. One of the interesting new research problems relates to the computation of the depth of the equivalent plane of zero electrical potential with respect to the surface of the ground with different conditions of the soil. This work is being carried out in connection with the large transmission span erected for experimental purposes on the new site. The results of our researches are reflected in the number of publications emanating from the Department staff.

The cataloguing of the splendid library presented by President Theodore N. Vail of the American Telephone and Telegraph Company is being continued, and we expect it

to be ready to go into the library space on the new site in a classified and catalogued condition.

We look forward with satisfaction to moving from the quarters which the Department has now occupied for over twelve years into the quarters on the new site. It is a matter of some interest to see that the actual departmental activities are now as large as, or perhaps larger than was anticipated when the quarters for the Department were outlined in the new plans three years ago. We therefore will move to larger and more satisfactory quarters than we now have, but, at the same time, we will reasonably well fill all of the new accommodations which have been allotted to us.

DUGALD C. JACKSON.

BIOLOGY AND PUBLIC HEALTH.

The work of this Department has gone forward as usual, the most noteworthy events having been those grouped about the personal activities of the members of the staff.

Professor Sedgwick, because of other demands upon his time and strength especially in connection with the Council of the State Department of Health, has, to his great regret, been obliged to relinquish the teaching of the beginners in Biology which he has maintained continuously since joining the Institute staff in 1883. For the year 1914–15, he served as President of the American Public Health Association, and he retains as heretofore his membership in the Advisory Board of the Hygienic Laboratory of the United States Public Health Service.

Professor Prescott, besides doing a large amount of teaching, has continued to render useful public service in attacking numerous practical problems in industrial microbiology, and is still prosecuting his investigation of the diseases of certain important tropical fruits.

Associate Professor Bigelow, in addition to thorough and stimulating work as our teacher of Comparative Anatomy and Parasitology, spent the larger part of the summer in the biological laboratories of the United States Bureau of Fisheries at Wood's Hole, doing there original work upon Stomatopoda from the Philippine Islands.

In May, Associate Professor Gunn was appointed by the State Commissioner of Health, Director of the Division of Hygiene of that Department, the Institute releasing for this purpose, one-half his time. In order to undertake this new work Professor Gunn resigned from the State Board of Labor and Industries, of which he had been for a year a member and for a brief period Acting Commissioner. He retains however for the present the important position of Secretary of the American Public Health Association and Editor of the *American Journal of Public Health.*

Mr. Ingham, Instructor in Biology and Public Health, has carried on with success the elementary teaching formerly given by Professor Sedgwick, and has also undertaken charge of the work in Advanced Bacteriology.

Mr. Turner, Research Associate on the Sewage Experiment Station Staff, has taken charge of the classes in Cryptogamic Botany and Theoretical Biology and has proved an effective teacher of these subjects.

Valuable instruction was also given at various times by our lecturers: *viz.*, Mr. Bolling, Director of the Board of Health Laboratory of the City of Brockton; Dr. Frederick A. Woods on topics in Theoretical Biology; Mr. W. Lyman Underwood on Industrial Biology; Dr. William W. Walcott, Mr. Robert N. Hoyt and Mr. J. Scott MacNutt, on various aspects of Public Health Administration.

Some important additions have been made to our equipment, among which may be mentioned seven microscopes for the General Laboratory and four of higher power for

the Anatomical Laboratory. This last is now well equipped with microscopic power of good range for embryological and histological work of a quantitative character; but dissecting microscopes, especially binoculars, are still much needed. Other additions to the equipment of the Anatomical Department are a number of microscopical preparations for the permanent collection used in teaching our third-year students and in their laboratory work. A portable stereopticon of simple construction but remarkable efficiency has also been added to our general equipment.

WILLIAM T. SEDGWICK.

SANITARY RESEARCH LABORATORY AND SEWAGE EXPERIMENT STATION.

The continued generous support of an anonymous Donor who more than ten years ago enabled us to begin work upon sewage purification and to place at the disposal of our students unusual facilities for familiarizing themselves with this and some other serious sanitary problems, remains happily unabated, and is hereby gratefully acknowledged.

There are now many methods for the "treatment" of sewage, but very few for its complete purification. Hence it has come about that the output of sewage works when passed into a stream or the sea, generally undergoes a further, and a kind of natural, purification, which sometimes imposes upon the hospitable stream a burden greater than it can bear. For the last two years our studies have been devoted to such a stream which receives the incompletely purified effluent of the sewerage works of the City of Brockton. The object in view is the determination of the capacity of a natural water to deal with the effluents of sewerage works, and the conditions, — physical, chem-

ical and biological — affecting that capacity. The problem is highly practical, since with our growing population almost every river, lake and estuary is now more or less burdened with sewage or sewage effluents.

We are indebted chiefly to Professor Weston, who first mapped out for us this particular problem, for guiding the work, and to Mr. Clair E. Turner for intelligently supervising its details. Others engaged upon it for longer or shorter periods, have been Mr. R. D. Bates, Mr. A. L. Gammage, Mr. Everett B. Johnson, Mr. Walter H. Junkins and Mr. G. S. Fowler, all of whom have our thanks for services faithfully rendered.

To the Sewerage Commission of the City of Brockton who have kindly placed at our disposal sufficient laboratory space and many other facilities; to the City Engineer of Brockton; and especially to Mr. Frank H. Kennedy, Superintendent of the works, we are under special obligations.

Seven sampling stations were established on the stream, the first just above the point where the partially purified effluent from the Brockton Sewage Disposal Works enters, and the last about three miles below that point. Weekly samples have been taken at each of these stations and the usual chemical, physical and bacteriological tests involved in a complete sanitary water analysis, together with counts of microscopic organisms. A careful watch has also been kept on the higher plant and animal life of the stream, and extensive biological surveys have been made at different points, about two hundred species of plants and animals having been already identified. The forms discovered include a wide variety of both plants and animals, from the lowest to the highest groups. Careful records of stream-flow, rainfall, and temperature have been kept, and an attempt has been made to collect all available data which bear upon the problem. A thorough study and correlation of the data is being made to ascertain the effect of

seasonal changes, the relation of plant and animal life to various conditions, and the rapidity and efficiency of the self-purification process.

An interesting and important series of experiments has also been made at the Calf Pasture Sewerage Works of the City of Boston upon the so-called "Miles process" of sewage treatment, which in brief consists in adding to the sewage sulphurous acid, thereby precipitating the sludge and at the same time clarifying and disinfecting the sewage. The sludge obtained contains most of the sewage grease which, after drying the sludge, is extracted, the residue being employed as "fertilizer base." In view of the possible importance of the process from various points of view, an arrangement was made with the authorities of the City of Boston to take part in certain trials, some of which were made in July, and another only recently. The results are nearly ready for publication. It may be said, meanwhile, that the process appears to be worthy of testing on a much larger scale, and it is greatly to be hoped that such a test may be arranged for in the near future.

Other researches have also been made by Professor Gunn and his associates upon ozone as a disinfectant of the air of confined spaces, and by Mr. Ingham, Research Associate, upon the organization, expenditures, and possible improvement of the smaller Boards of Health throughout the State of Massachusetts. Mr. Ingham's results were reported upon at the October Meeting of the Massachusetts Association of Boards of Health.

WILLIAM T. SEDGWICK,
Director.

SCHOOL FOR HEALTH OFFICERS.

The second year of this School was if possible more successful than the first, and it is a matter of congratulation that the number of students remains about the same, thus

giving the Administrative Board opportunity for gaining added experience and for further study of the field to be occupied.

An unexpected call was made upon us by the authorities of the Red Cross in Washington in April for properly trained physicians and sanitary inspectors to go to Serbia and there serve under Dr. R. P. Strong, Director of the American Red Cross Sanitary Commission in that country. Volunteers were immediately called for and Mr. Edward Stuart, S.B., M. I. T., 1910, a graduate of the Course in Sanitary Engineering, and a member of the School for Health Officers, was appointed Sanitary Engineer, while Dr. Stanley H. Osborn, Dr. Harold H. Mitchell, and Dr. Albert F. Cornelius, all members of the School, together with Dr. Ralph W. Mendelson, a former member, were also selected. These men, together with Mr. H. E. Berger, Jr., Mr. R. S. Lyman, Mr. E. H. Magoon, Mr. E. H. Gage, Mr. A. W. Buck, Mr. G. W. Bakeman, Mr. R. D. Bates (late of the Staff of our Sanitary Research Laboratory and Sewage Experiment Station), Mr. J. E. Harrington, Mr. Carl E. Buck and Mr. C. E. Fox, all present or former students of the Department of Biology and Public Health or of the Department of Sanitary Engineering, were selected as Sanitary Inspectors.

This group, together with some not from the Institute, sailed in May and proceeded at once to Serbia, via the Mediterranean, Athens and Salonica.

It is a great pleasure to be able to report that according to Dr. Strong all have done excellent work and have shown the results of superior training. Several have already returned home and most of the remainder are at this writing on the way. Drs. Cornelius and Osborn have, however, elected to remain in service at the Lady Paget Hospital in Skolpje (Uskub), which city was recently taken by the Bulgarians. After Dr. Strong's departure Mr. Stuart was placed in charge of the remaining work of the

Commission, and, as far as we know, all have, happily, escaped infection and are in good health.

WILLIAM T. SEDGWICK,
Chairman, Administrative Board.

PHYSICS.

The course of this Department during the past year has been one of quiet progress, not marked, however, in any particular direction.

Most important as far as the students as a whole are concerned, is the operation of the change in the scheme of instruction by lectures in General Physics which is pursued by all regular students. By the new arrangement, this whole subject is brought forward so as to be completed within the second year instead of being prolonged into the third year. The nature of these changes and the reasons for them have been explained at length in the Report of the Department to the President of 1914.

The new scheme involves the introduction into the lectures of ten upon Heat transferred from the third to the second year and the cutting out of the same number from the subject of Mechanics to make room for them, the number of lectures in the second year not having been increased, while the topics omitted are taken up in the class room exercises whose number is increased by fifteen. The time allotted to Heat under the new scheme is somewhat less than heretofore, but it is purposed to remove from these lectures certain of the more purely technical details. There will now, however, be recitations in that subject which it has not been possible to have while the subject was studied in the third year.

It is expected to institute a new optional course of advanced lectures on Applied Heat to be given by Professor Norton in which the technical portions of the subject will be discussed at length.

This new arrangement of studies had been put into effect during the present term. The course of lectures and recitations has been completed up to the close of Mechanics, and "on schedule time" so that the remaining lectures of the year are as fully provided for as heretofore, with an addition of a number of recitations. So far as can be judged, the results are satisfactory. Gain also results from the increased number of recitations as this enables them to be kept more closely in accord with the lectures.

The change under consideration also involves an earlier beginning of the work in the Physical Laboratory, it being finished in the second year. This has necessitated giving instruction during the present year to the larger part of the Junior and Sophomore classes, a total of almost six hundred students per week. To take care of this excessive number it has been necessary to divide the laboratory work into two parts and to provide apparatus in such quantity that continuous instruction could be given from nine o'clock Monday morning till one o'clock Saturday noon without intermission during the hours of the session. Thanks to the coöperation of all members of the instructing staff who have assisted in carrying this unusual load, the work has been done as well as could be expected under the trying circumstances.

We shall now proceed to plan the laboratory equipment in the new building and begin work next year on the basis of the readjusted course. The beginning of the laboratory course at the opening of the term will necessitate some modification and revision of the present experiments together with the introduction of new ones in order to keep the work as far as is feasible in line with the other instruction in Physics. As the laboratory course, however, aims primarily to teach physical measurements, a close coördination between lectures and laboratory work for classes of over 400 is impossible at least without so great a duplication of costly apparatus as would make it impracticable

for that reason if for no other. It is, however, planned to have the laboratory instruction in Mechanics, Electricity, Optics, and Heat given concurrently with class-room work in these subjects as has been done heretofore.

The Option in Industrial Physics has now been in operation so long that there are students in its second, third, and fourth years. There has been a considerable percentage increase in numbers, there being eight in the second year, though, as might be expected, the absolute number thirteen is small. For these several new courses are being given for the first time. The laboratory courses should be particularly mentioned, as these are requiring now and will require still more in the future, a considerable increase in delicate and costly apparatus.

The advanced course in Photography by Professor Derr has this year on the whole been of a tentative character, most of the experiments being really short researches such as the study of various well-known and obscure photographic effects, examination and criticism of processes and the like.

To avoid the immediate purchase of apparatus which might not prove to be perfectly fitted for use in our new quarters, the instructor giving the course has placed various pieces of his own at the disposal of the present class; but this will obviously be inadequate to meet the needs of a larger class. With the increased number of students in sight, an appropriation of several hundred dollars a year for several years will be needed for new apparatus.

For the same reasons, a similar appropriation, but somewhat smaller, will be needed for the work in Applied Optics.

The work of the Optical Laboratory has been materially enlarged in view of the fuller consideration called for in the line of matters of illumination and the like. For this purpose a number of new instruments for optical measure-

ment were called for, one of which a Leeds & Northrup illuminometer of the most approved type has been purchased from the departmental appropriation.

The newly introduced laboratory course on Electrical Discharge in Vacua given by Dr. Hollnagel assumes a knowledge on the part of those taking it of the matters discussed in the lecture course on the same subject which has been given for a number of years past.

The course under consideration aims to give a thorough training in the experimental study of electronic phenomena. The earlier portion includes a study of the chief classical experiments in the subject while the latter is devoted principally to the more important industrial applications as for example those employed in certain illuminants and the uses of the Roentgen rays.

The number of students receiving instruction in the Laboratory of Heat Measurements, a large majority of whom belong to the various engineering courses has steadily increased, and the facilities of the Department have been severely taxed to meet their requirements. Especially to be noted is the desire which increases each year that the thesis work of such students may be carried on in this laboratory under the charge of its staff in certain cases in which the nature of the subject is of a distinctly physical character. The Department is glad to favor such work to the extent of its ability.

As predicted in the report last year, the capacity of the Electrochemical Laboratory is now exceeded by the present graduating class and temporary facilities have had to be improvised to carry us through the year. The facilities for research work for two students who have returned for advanced degrees are, moreover, entirely inadequate. Although the space allotted to the Laboratory of Electrochemistry in the new building provides for a 50 per cent increase in desk room over that in our present quarters; it appears from the present registration as if the

capacity of the new laboratory will be reached in the near future. If this proves to be the case, it would seem advisable to adopt the policy of announcing in the Catalogue that a greater number of students will not be admitted to the Course than can be properly accommodated in the laboratories equipped for the special advanced instruction demanded.

In pursuance of the same policy followed during the last few years, no changes of a temporary character have been made in the laboratory except those absolutely essential to the carrying on of the work. All new equipment bought has been of such a character as to be equally useful in the new buildings.

During the past year, two Leeds & Northrup potentiometers and various pieces of platinum apparatus for thermoelectric and electrolytic work have been added to the equipment.

CHARLES R. CROSS.

GEOLOGY.

Instructing Staff: — During the past year no change in the personnel of the instructing staff has taken place. In April 5–16, 1915, however, the Department was fortunate in securing, in coöperation with the Department of Geology of Harvard University, the services of Dr. Ralph Arnold for ten lectures on the "Geology of Petroleum Deposits." Doctor Arnold has long been considered one of the foremost geologists in this country in the interpretation and exploitation of petroleum deposits. He gained his experience, first, as geologist in the United States Geological Survey and the Mining Bureau, and later in extensive private enterprises. Five of the lectures were given at Harvard and five in the Geological Department of the Institute.

Course Scheme: — Extensive changes have been introduced in the Mining Engineering Course. As far as this Department is concerned the changes which affect it most fundamentally are those in Options 1 and 3. In Option 2, the metallurgical engineers will now have a brief lecture course of thirty hours on "Ore Deposits."

The principal changes in Options 1 and 3 are as follows: The course in Mineralogy has been moved back to the second year in which it is given together with Geology. This is considered a great improvement for it has always been a difficult question how to teach geology without previous instruction in mineralogy, and the result has hitherto been that considerable valuable time is consumed in imparting some preliminary instruction in mineralogy during the comparatively few hours allotted to geology. Economic Geology is, as before, given in the fourth year, and Course I receives the same instruction as before, forty-five hours being allotted for the course. In Option 3, however, the time is increased to seventy-five hours in the first term, and forty-five hours in the second term. The short course of fifteen hours of Introductory Economic Geology, given in the second term of the third year, has been omitted coincident with the much greater time given to the subject in Option 3. More time in Petrology than before is also allotted to Option 3 of the Mining Engineering Course.

Two courses previously required in Option 3, namely, Index Fossils and Geology of North America, no longer form part of that curriculum, but are required for students in Course XII, or may be elected by graduate students.

Conferences for the presentation of geological investigations by instructors and advanced students have been held at intervals throughout the academic year, and have also been well attended by instructors and students from Harvard University and Tufts College.

Advanced Students: — During the year the Department has had three candidates for the degree of Doctor of Philosophy. These are Messrs. John D. MacKenzie, Walter L. Whitehead and Victor Dolmage. The two first named students graduated from the Institute of Technology, while Mr. Dolmage comes to the Institute from the University of Manitoba.

Students: — As usual the majority of students in the Department are those from the Civil Engineering Course. During the present term ninety-seven students attended this Course. The number of mining students has become smaller, and during the present academic year the senior class of Options 1 and 3, of the Mining Course number only five. It is gratifying to observe, however, that this condition is in process of change. The adverse conditions affecting the mining industry during the last few years, and especially the disturbed conditions in Mexico, have deterred many young men from entering the profession of mining engineering. That more favorable conditions are now prevailing is indicated by the fact that the second-year class of mining students now number twenty-one, so that it is expected that within a year or two the normal figures will be reached.

Collections and Instruments: — A number of donations have been received for the collections of the Geological Department. Valuable specimens for the Economic Collection have been received from the United States National Museum, Messrs. Arthur Winslow, J. C. Watson, J. D. Irving, R. H. Richards, K. Tsujimoto and E. E. Bugbee. The collection presented by Mr. Arthur Winslow comprises one hundred and fifteen specimens fully illustrating the mineral occurrences of the Telluride region, Colorado. Collections of crude oils have been received from the Tide Water Oil Company, the Texas Company, and from Messrs. C. Naramore, G. M. Seybolt, and A. H. Gill. The Paleontological collections received from Professor W.

O. Crosby, a large suite of Cretaceous fossils from Alabama and another of Permian fossils from Texas, and from Professor P. E. Raymond a number of lower Paleozoic fossils from Sweden and Quebec. No important accessions have been obtained for the instrumental equipment of the Department, although a petrographic microscope of the newest type has been ordered from Ernest Leitz to be delivered as soon as conditions permit.

Professional Work: — During the first half of the present academic year Professor Lindgren devoted considerable time to the completion of a report on the Tintic Mining District, Utah, for the United States Geological Survey. This report was transmitted for publication on July 1st.

Professor Warren has continued his studies on the igneous rocks of the North Shore, but has not been able, as yet, to complete any considerable portion of this work, owing to the fact that much of the material for thin sections has been held up in Germany owing to the war. Considerable research was also done on a number of technical products, chiefly, abrasives, and several reports were made regarding them. During the summer he carried out an investigation on the asbestos deposits of Somerset County, Maine.

Professor Shimer gave two courses at the Columbia University Summer School: "Historical Geology" and "An Introduction to the Study of Fossils." During the year he was at work upon a paleontologic report of a section in Alberta for the Canadian Geologic Survey.

Doctor Lahee devoted a part of the year, including the summer, in the preparation of a textbook on "Field Geology." In the early winter a geological examination was made of Mount Sunapee, New Hampshire, the result being presented as a chapter in the Manual of Mount Sunapee, printed for the Society for the Protection of New Hampshire Forests. Several weeks were devoted to a petrographic study of a group of schists from the Ammo-

noosuc district, New Hampshire. A report, entitled "Origin of the Lyman Schists of New Hampshire" has been accepted for publication.

Mr. MacKenzie, in continuance of his work for the Geological Survey of Canada, during the summer commenced the investigation of the Hazelton-Aldermere district in northern British Columbia. This region has attracted considerable attention during recent years, and is now rendered easily accessible by the Grand Trunk Pacific road. The examination undertaken by Mr. MacKenzie is for the purpose of furnishing information in regard to the geologic relations and prospective value of the mineral deposits of the district. During the past summer his party completed the areal geologic mapping of about 700 square miles in the Telkwa river drainage.

Publications. — During the past twelve months fifteen papers on scientific subjects have been published by members of the Department, most of these representing original investigations on geological, petrographic or paleontological subjects.

WALDEMAR LINDGREN.

NAVAL ARCHITECTURE AND MARINE ENGINEERING.

The present urgency of demands on the shipbuilding establishments of the country is reflected by the increase in the number of students taking Course XIII, so that our classes are of normal size. As has been reported, there has always been a fair demand for graduates from the Department and now the demand is urgent.

Professor Harold A. Everett has resigned to take the position of Professor of Marine Engineering at the Post-Graduate School of the Naval Academy at Annapolis, where instruction is given to officers of the Navy who are assigned to special duties such as Civil Engineering and

Naval Engineering; officers assigned to take our Course XIIIA for naval constructors now have six months residence at that School before reporting at the Institute. Professor Everett was appointed Assistant in Naval Architecture in 1903, Instructor in 1905, and Assistant Professor in 1911; last June he was appointed Associate Professor of Naval Architecture. His appointment to a leading position in the Post-Graduate School is a recognition of his attainments in naval architecture, marine engineering, and steam engineering including his experience in trials of ships and with the experiments carried on by the Department with the *Froude* and *Fulton*.

Assistant Professor George Owen, S.B., of the Class of 1894, was appointed to the position vacated by Professor Everett; his wide experience in the design of passenger and freight ships and of yachts brings to the Department a welcome influence which may be depended on to correct any tendency toward an academic treatment of design by the students. Other resignations were Mr. Arthur L. Todt, Assistant in Naval Architecture, who was succeeded by Mr. Evers Burtner; and Mr. Donald W. Douglas, Assistant in Aeronautical Engineering succeeded by Mr. Thomas H. Huff.

The residence of officers, designated for Course XIIIA, at Annapolis previous to reporting at the Institute, provides an opportunity for a better articulation of our own Course with their previous training and for instruction at the Post-Graduate School in certain branches, such as chemistry, applied mechanics and steam engineering which have hitherto been given them at the Institute. Professor Everett's acquaintance with our methods will be available for this purpose.

In consequence of the arrangement just stated the Bureau of Construction and Repair now propose a revision of our Course XIIIA with the object of introducing extensive instruction in business and industrial management. At

the same time provision will be made in selected cases, for certain officers to do individual and advanced work in such subjects as naval construction, aeronautical engineering, and electrical engineering.

In consequence of certain political conditions the Chinese Government has not found it convenient to maintain a succession of classes of officers from their navy to take our Course XIIIB as was proposed when this Course was started. One class will be ready for graduation next June; now another class has been detailed to the Course, these latter having had a course of instruction in naval architecture at the University of Glasgow are able to undertake the completion of our Course in two years. In addition to the officers mentioned there have been other students taking this course either privately or on the Indemnity Fund.

Professor Hovgaard has published his work on the Structural Design of Warships, representing the substances of that portion of his theory of warship design as given to Courses XIIIA and XIIIB. This important work provides for the designer of warships an equivalent of the rules for building merchant ships given out by registration societies, but with the advantage of a systematic and logical presentation which allows it to be applied directly to new problems as they arise in the progress of naval construction.

As was reported last year the Graduate Course in Aeronautical Engineering in charge of Assistant Naval Constructor Jerome C. Hunsaker, U.S.N., was established; it is pleasant to report an eminently successful year both of instruction and of research. In particular may be mentioned a joint theoretical and experimental investigation carried on by request for the Navy Department, to determine the probable influence of a gyroscopic stabilizer on an aeroplane when exposed to a gust of wind. The mathematical investigation of this difficult new problem

was made by Professor Edwin B. Wilson, Ph.D. of our Department of Mathematics; the data for this theoretical investigation was obtained by Mr. Hunsaker by aid of an oscillating model of an aeroplane in our wind tunnel. The report of this investigation is now confidential information for the Navy Department, but it is hoped that the report may be published hereafter.

In addition to research work the wind tunnel has been used for private investigations for builders of aeroplanes. Such work is directly useful in keeping the Institute in contact with the progress of the theory and cost of aeronautics and the compensation from the companies interested has afforded means for further investigations.

It may be interesting to mention that the Emperor of Japan has conferred on Professor Peabody the Order of the Rising Sun, Third Class, in recognition of opportunities provided by the Institute to officers of the Japanese Navy, and to Japanese professors and students.

CECIL H. PEABODY.

DRAWING AND DESCRIPTIVE GEOMETRY.

On account of the death of Professor Charles L. Adams just at the beginning of the school year, a number of changes became necessary in the Department of Drawing, but it was found possible, owing to the efficient way in which Professor Adams had laid out the work for the ensuing year, to continue the instruction for one year without an increase in the staff. Professor Kenison took the place of Professor Adams in the instruction of Mechanical Drawing and Descriptive Geometry, and Professor W. Felton Brown took entire charge of the instruction in Freehand Drawing in the Architectural Department.

One change in the conduct of the Course in Descriptive Geometry was the omission of a final examination in the

second-year work. At the beginning of the term an announcement was made that all those obtaining a sufficiently high grade in the entire course would be allowed to omit the final test. The effect of this announcement was to create a greater interest in the term's work, and a better application, with the result that a very considerable number were excused.

A number of new plates, and new wire models have been constructed for the Course in Descriptive Geometry, and important changes in teaching the elementary part of the subject have been planned. In this connection it may be stated that a text-book is being prepared by members of the Department, with the expectation that it will be ready for the first-year students next year.

In the Mechanical Drawing a new course for students taking Architecture was planned and carried out by Mr. Frederick H. Kennedy with very satisfactory results.

In the first-year Freehand Drawing Mr. Gracey introduced some important changes in the method of teaching object drawing, and is preparing a brief text-book to be used in connection with Professor Adams' Lettering Plates.

The attendance at the courses offered by the Department in the summer schools was the largest we have known. A considerable number of the men attending were students from other colleges anticipating first-year work.

At the close of the school year Mr. Frederick H. Kennedy resigned to accept a position in Throop College of Technology in California. The two new assistants appointed for this year were Mr. Walter J. Hauser, who graduated from the Department of Architecture in 1914 and received the Master's degree in 1915, and Mr. Herbert H. Whitcomb, a graduate of the Mechanical Engineering Department in 1915.

ALFRED E. BURTON.

ENGLISH.

The end of the academic year was marked by the retirement of Professor Arlo Bates after twenty-two years of service as the Head of the Department. Of the present staff, one member has served under him during all of that period; another for nineteen years; another for fourteen years; and two others for thirteen and eleven years respectively. These all wish to put upon record their indebtedness to him for the help that he has so constantly given them, and for the high standards that he has ever kept before them; they desire also to express their appreciation of the great contribution that he has made to the life of the Institute.

Another vacancy in the Department was created by the resignation of Mr. David Carb.

The appointment of Professor Frank Aydelotte as Professor of English has brought to the staff of the Department a man who possesses a distinguished record as a scholar and a teacher and who is especially interested in the problems connected with giving instruction in English to men who are receiving professional training. Other additions to the staff are Thomas G. Goodwin, A.M., Harvard, who began his work here last February, and Percy Marks, A.M., Harvard, who was appointed at the beginning of the present term.

Still another appointment is that of William Green as Instructor in Report Writing. Mr. Green graduated from the Institute in 1906, and was given the Master's degree in 1915. His experience in industrial management, as well as his interest in the presentation of technical material in good form, peculiarly fit him to organize the work in Report Writing, both for the students in Course XV for whom the subject is required, and for any of the professional departments that may request such service of the English Department. In this work he is assisted by Mr. Goodwin.

The main work of the Department consists in giving instruction in the two courses required of first-year and second-year students. The first-year course, in which 408 students are enrolled, is divided into 16 sections; the second-year course, in which there are 452 students, is divided into 14 sections. The two-fold object of these courses is to train men to such degree of ability in expression as shall serve them best in their professional careers and to develop in them through the study of English Literature the broader interest in life which they need as the complement of their technical training. The immediate problem which engages the Department is that of correlating these two ends in such a manner as to obtain the most satisfactory result possible, considering the conditions under which the work is to be done. One of the chief limitations at present is the small amount of time allotted to work in English, particularly in the second term of the first year. It is greatly to be hoped that Faculty action may be taken during the present year to remedy this difficulty, and to give to English a time allotment more nearly commensurate with its importance.

HENRY G. PEARSON.

ECONOMICS AND STATISTICS.

A further extension has been made in the Department of Economics by the appointment of Dr. Harry R. Tosdal as instructor with the special responsibility of developing the new course in Industrial Organization given to third-year students in Engineering Administration. Dr. Tosdal also shares in the instruction of sections in elementary Political Economy. Through this increase in the staff it has been possible this year to divide the latter class into twelve sections. Another important change has been made in the instruction in this course. For many years the

weekly teaching has been given by two lectures, and for a third exercise the class was divided into sections. As the class has increased in size the value of the lecture exercise has declined, and the Department has long wished to make a change. The increase in our teaching force now makes it possible to readjust the instruction, so that only one lecture a week is given; and, for each of the other two hours, section exercises with small numbers of students are provided. Under the present arrangement it has also been possible to assign Course XV second-year students in Political Economy to a separate section, thus giving them instruction better adapted to their subsequent studies in the course of Engineering Administration. This section is under the special care of Professor Doten.

About fifty students in the second year have elected the course in Engineering Administration. If the numbers entering this course persist, further division of classes into sections will have to be made.

For the class in Banking a syllabus of notes has been printed and for other classes a generous amount of cyclostyled notes is furnished the student. A Burroughs Adding Machine has been purchased to aid the class in Accounting. Special efforts are being made to secure reports of business corporations, investment circulars, manuals and books relating to business affairs.

Professor Doten has been serving as Chairman of the Retail Store Wage Board, appointed by the Massachusetts Minimum Wage Commission to determine minimum rates of wages for the women and minors engaged in that industry in the Commonwealth. The Board made its report on August 5, and the scale of wages recommended was adopted and embodied in a decree of the Commission, issued September 15th, to become effective January 1, 1916. Through the courtesy of Stone and Webster and other firms, Dr. Tosdal was given opportunity to add to his preparation by a first-hand study of the organiza-

tion and operation of several representative enterprises. Mr. Shugrue during the past year has made personal examination of about fifteen local accounting and statistical systems including those in use at the Simplex Wire and Cable Company, Fore River Ship Building Corporation, Boott Mills, City of West Newton, New England Telephone and Telegraph Company, and Stone and Webster. During the past summer Mr. Shugrue was engaged by the firm of D. C. and Wm. B. Jackson, Engineers, who had charge of the appraisal of the Philadelphia Electrical Company, and for this purpose was stationed at Philadelphia.

DAVIS R. DEWEY.

MODERN LANGUAGES.

The past year has seen but few changes from the plan pursued during the last three or four years in the work of the Department of Modern Languages. More life and interest has been brought into the work by the frequent use of interesting selections neostyled from new foreign books and current magazines, which are then distributed to the class for sight reading or study. The stimulating effect has at once become apparent, and it is hoped, eventually a broader interest in scientific progress will thus be developed. The optional courses of the third year are continuing to maintain their previous high average in interest as well as size.

Mr. Paul R. Lieder who had been with us as instructor for the past three years, obtained a Ph.D. at Harvard last June, and was called to the Department of English at Smith College. By his resignation our Department suffered a great loss. It has now become possible, through the appointment of two new instructors in the Department to make a better assignment of classes and provide more satisfactorily for the large enrolment, also to avoid the overcrowding of classes of the past few years.

The work in German is distributed among seven instructors in forty-two sections, averaging twenty-two students per section, with fifteen hours of instruction per week for each instructor, one instructor giving part time to Spanish in addition. There are four sections in French, assigned to one instructor, giving eleven hours of instruction per week, with an average of twenty-one students in each section. Owing to the additional assistance, Spanish is this year offered in two sections by Mr. Erhardt giving four hours of instruction per week with an average of twenty-six students in each section.

It is worthy of note that nearly all the applicants for admission from other colleges are able to satisfy either wholly or in great part the entire requirement in Modern Languages of the Institute course which they wish to enter.

During the past ten years or more Professor Vogel has served as Examiner, Chief Reader, or Chief Examiner in German for the College Entrance Examination Board. Last June Mr. Meister also served the College Entrance Examination Board as Reader in German.

At the beginning of the present school year our staff was increased by the appointment of Mr. Otto E. Plath, A.M., and Mr. Charles Ganson Cook, A.M., as instructors. They come to us with credentials and experience which add strength and dignity to the Department.

FRANK VOGEL.

MATHEMATICS.

The experimental use of new text books, mentioned in the report for last year, has come to an end with the second-year work of the Class of 1917. For the present second year we are using Osborne's Calculus again; for the present first year, a new Analytical Geometry by Professor

Phillips. Professors Woods and Bailey are actively engaged in a revision of their "A Course in Mathematics," which should be ready for the Class of 1920 or 1921.

The special classes conducted by members of the Department during the term included Least Squares by Professor Bartlett, Fourier's Series by Professor Bailey, Mathematical Laboratory by Dr. Lipka, Hydrodynamics, Fluid Dynamics and Dynamics of Rigid Bodies, by Professor Wilson, Advanced Calculus and Differential Equations by Professor Woods, and Theory of Functions by myself.

The larger classes numbered:

	Students.	Sections.
In the first term:		
Trigonometry	408	19
Analytic Geometry	471	23
Calculus	429	19
Differential Equations	97	4
In the second term:		
First-year Analytic Geometry and Calculus	445	21
Calculus	393	19
Differential equations	61	3

The average size of all sections for the two terms was, therefore, between twenty-one and twenty-two. This term the first year is a little smaller, the others a little larger.

Questions connected with the admission of graduates and students transferring from other colleges require increasing attention from year to year. At the instance of officers of Harvard University, a study has been made of the records of seventy-five students who have entered the Institute from there during the past five years. It has seemed particularly important to discriminate between good, fair and weak records presented, and to be careful not to give much weight to work anticipated with low records. Occasionally it turns out that students rejected at our entrance examinations enter some other college which admits on certificate and after a year apply for ad-

mission to our second-year class. It need hardly be added that results of such admission cannot be expected to be satisfactory either from their point of view or from ours.

It seems likely that there will continue to be a moderate number of college men each year who having had no calculus would probably find it necessary to spend four years here unless provisions were made for them in the special class which has been conducted outside of tabular-view hours by Professor Woods.

The Department has been strengthened by the appointment of Dr. George Rutledge, of the University of Illinois, as instructor, in succession to Dr. Kircher, who has accepted an appointment at Harvard University, and by Mr. B. B. Libby, a graduate of Princeton University, as an additional instructor. Without this addition the size of sections this fall would have been excessive.

H. W. TYLER.

Society of Arts.

During the Season of 1914–15 six new members were admitted to the Society. Three lectures have been given in Huntington Hall, Massachusetts Institute of Technology, as follows:

690th meeting, February 3, 1915. "The Horse and its Progenitors." By Dr. W. D. Matthew, Curator of the Department of Vertebrate Paleontology, American Museum of Natural History, New York City.

691st meeting, February 15, 1915. "Submarines." By Professor William Hovgaard, Professor of Naval Design and Construction, Massachusetts Institute of Technology.

692nd meeting, March 4, 1915. Experimental Lecture in Physics on "Magnets and Magnetic Phenomena." By Professor Louis Derr, Professor of Physics, Massachusetts Institute of Technology.

In addition to the lectures timely articles have been published in the five numbers of *Science Conspectus*. Each one of these articles is in effect equivalent to a lecture. In addition to its circulation among the society the magazine is in much demand by libraries and learned bodies.

The Executive Committee elected for the coming season is as follows: The President, Elihu Thomson, Arthur D. Little, Theodore N. Vail, James P. Munroe, Frederic H. Fay and I. W. Litchfield.

I. W. LITCHFIELD
Secretary.

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HAROLD K. BARROWS. — Discussion of paper on "Power Plant at Wachusett Dam." *Journal Boston Society of Civil Engineers*, 1915.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

TREASURER'S REPORT

FOR THE YEAR ENDED JUNE 30, 1915

Treasurer's Report.

To the Corporation of
The Massachusetts Institute of Technology:

I have the honor to submit herewith statements showing the financial condition of the Massachusetts Institute of Technology as of June 30, 1915, as well as the financial transactions during the fiscal year ended on that date.

The following gifts and legacies have been received during the year.

Capital Gifts:

Anonymous Donor, account of New Site	$500,000.00
Anonymous Donor, account of New Site	100,000.00
M. I. T. Alumni, account of New Site	75,620.92
George Wigglesworth, account of New Site	10,000.00
Otis Elevator Co., account of New Site	3,000.00
Prof. H. P. Talbot, account of New Site	200.00
Newton High School Com., account of New Site	106.26
Estate Eben S. Draper	100,000.00
Estate Seth K. Sweetser	25,061.62
Estate Morrill Wyman, for Relief	12,500.00
Estate Thos. W. Bailey, for Relief	2,172.24
Estate Hannah B. Abbe, for Bourne Scholarship	10,000.00
George H. May, for Scholarship	4,250.00
Estate Louis Weissbein, for Scholarship	4,000.00
George H. May, for Chemical Dept.	4,250.00
Estate Chas. Choate	1,783.09
Margaret E. Maltby, for E. H. Richards Fund	30.00

Gifts for Research (Schedule B–1, Gifts for Minor Funds):

Anonymous Donor for Sanitary Research	3,000.00
Henry A. Morss, for Seismological Fund	500.00
Mrs. W. Scott Fitz, for Seismological Fund	250.00

Gifts for Research (Schedule B–1, Included in Minor Funds Earnings):

Am. Tel. and Tel. Co., for Research	7,947.64
Am. Tel. and Tel. Co., for Library	3,796.78
R. H. Macy Co., for Research	870.64
Berlin Mills, for Applied Chemistry	1,431.20
Corona Co., for Applied Chemistry	80.00
B. J. Bean, for Applied Chemistry	100.00
H. J. Keith, for Egg Investigation	500.00
General Electric Co., for Ozone Fund	150.00
Sprague Electric Works, for Ozone Fund	525.00
Stone & Webster Eng. Cpn., for El. Ry. Tr. Fund	1,000.00
General Electric Co., for El. Ry. Tr. Fund	1,000.00
Public Service Ry. Co., for El. Ry. Tr. Fund	1,000.00
Edison El. Illum. Co., for Edison Research	510.00
Allis-Chalmers Mfg. Co., for Commercial Research	40.00
Submarine Signal Co., for Commercial Research	20.00
Technology Club of Rochester, Experiment Fund	150.00

Miscellaneous Gifts:

Prof. F. J. Moore, for Salaries 1915–16	750.00
Estate F. E. Weston, for Scholarship	400.00
H. E. Fales, for General Purposes	250.00
C. W. Eaton, for Summer Camp	224.99
Anonymous Donor, for Summer Ind. Chem. School	200.00
Class of 1916, for Summer Camp	59.61
Guy Lowell, for Architectural Dept.	45.00
Glen L. Martin, for Aeronautics 1915–16	40.00
	$877,814.99

In addition to the above the following gifts have been received:

Chas. E. Ellicott, for M. E. Dept., two De Laval turbine centrifugal pumps.
B. H. and H. S. Borden, for M. E. Dept., one 1700 h.p. marine turbine.
L. S. Starrett Co., for M. E. Dept., one full set of micrometers.
Estate of Geo. H. Pratt, portrait of the late President, Francis A. Walker.

Of the above total, $877,814.99, the sum of $23,450.86 was given for current expenses or research, and has been carried into the income for the year and $790 has been set aside for next year's expense.

Respectfully submitted,

FRANCIS R. HART,
Treasurer.

November 1, 1915.

Schedule A.

FINANCIAL RESULT OF THE YEAR ENDED JUNE 30, 1915, COMPARED WITH THE PREVIOUS YEAR.

	1914–15.	*1913–14.*
Current Income, Schedule B–1*	$721,703.79	$705,823.89
Current Outgo, Schedule C–1	678,782.18	659,905.32
Excess of Income	$42,921.61	$45,918.57
Gifts for general purposes, Schedule B–1	250.00	250.00
Net income for year	$43,171.61	$46,168.57
LOSSES AND GAINS DURING YEAR.		
Gains and credits, Schedule S	$4,379.77	$5,658.56
	$47,551.38	$51,827.13
Losses and charges, Schedule S	11,540.43	12,718.80
	$36,010.95	$39,108.33
Income transferred to Funds — net	†19,805.20	31,936.30
Increase of current surplus	$16,205.75	$7,172.03

* Does not include capital gifts to amount of $853,574.13 in list on preceding page.

† Excess income of "Research and Funds" — see Schedules B–1 and C–1.

Schedule B–1.

INCOME.

	Regular courses.	*Research and funds.*	*Total.*
INCOME FROM STUDENTS:			
Tuition Fees	$410,450.79		
Entrance examination fees forfeited	845.00		
Locker fees	537.20		
Supplies, chemicals, laboratory materials, etc.	17,111.18		
Sale of lecture notes, etc.	924.50		
Registration fees	95.00		
	$429,963.67		$429,963.67
INCOME FROM INVESTMENTS:			
Endowments for general purposes, Schedule P	55,363.56	$1,468.96	
Endowments for scholarship purposes, applied	23,497.50		
Endowments for other designated purposes, Schedule Q recapitulation	11,272.88	37,560.54	
	$90,133.94	$39,029.50	
From Real Estate for general purposes, Schedule H	7,646.32		
Other Income not applied to Funds	2,944.99		
	$100,725.25	$39,029.50	
Less: —			
Accrued interest on purchases	2,944.99	1,707.86	
Net	$97,780.26	$37,321.64	135,101.90
GRANTS BY NATION AND STATE:			
Annual grant from Commonwealth of Massachusetts	$100,000.00		
Federal Aid Income from land grant,			
Act 1862	5,306.68		
Act 1890	16,666.67		
	$121,973.35		121,973.35
GIFTS FOR			
Minor Funds:			
Sanitary Research Fund		$3,000.00	
Seismological Fund		750.00	
		$3,750.00	3,750.00
Other Purposes:			
Salaries	$600.00		600.00

	Regular courses.	*Research and funds.*	*Total.*
MINOR FUNDS EARNINGS:			
Aerodynamical Laboratory		$135.00	
American Tel. & Tel. Research Fund		8,074.29	
American Tel. & Tel. Library Fund		3,796.78	
Commercial Research Fund		60.00	
Dormitory Fund		51.76	
Edison Electric Vehicle Fund		510.00	
Egg Investigation Fund		500.00	
Electric Railway Traffic Fund.		3,000.00	
Jacques Fund		14.56	
Letter Box Fund		26.62	
Macy Research Fund		900.64	
Naval Architectural Fund		35.00	
Ozone Fund		675.00	
Physico-Chemical Research Fund		141.36	
Research Laboratory of Organic Chemistry		31.62	
Research Laboratory of Applied Chemistry		1,625.03	
Rochester Experiment Fund		150.00	
Roentgen Ray Experiment Fund		13.41	
Sanitary Research Fund		551.65	
Vehicle Research Fund		75.00	
		$20,367.72	$20,367.72
INCOME FROM OTHER SOURCES:			
Interest	$4,386.08		
Rents, Huntington Hall	3,500.00		
Sales of electricity	829.64		
Bursar's Fund reimbursements.		385.93	
	$8,715.72	$385.93	$9,101.65
INCOME FROM SOCIETY OF ARTS:			
Dues	845.50		845.50
Total Income, Schedule A	$659,878.50	$61,825.29	$721,703.79
GIFTS FOR			
General Purposes, Schedule A.	$250.00		$250.00

Schedule C–1.

OUTGO.

	Regular courses.	*Research and funds.*	*Total.*
SALARIES OF TEACHERS:			
Professors	$148,834.10	$433.32	
Associate Professors	50,557.45	625.00	
Assistant Professors	55,987.10	2,240.00	
Instructors	78,472.02	30.00	
Lecturers	2,070.00		
Librarian	1,750.00		
Assistants	34,437.03	14,279.48	
	$372,107.70	$17,607.80	$389,715.50
WAGES ACCESSORY TO TEACHING:			
Stenographers	6,986.61	1,311.49	
Assistants	4,382.84		
	$11,369.45	$1,311.49	12,680.94
DEPARTMENT SUPPLIES AND REPAIRS (Schedule C–2):			
Supplies $47,542.99			
Wages 3,382.06	$50,925.05		50,925.05
ADMINISTRATION AND GENERAL EXPENSE;			
Salaries of officers	26,322.86		
Salaries of assistants, stenographers, etc.	25,826.06		
Lecture notes	697.48		
Advertising and printing	15,961.84		
Insurance	6,366.48		
General expense	20,313.11		
	$95,487.83		95,487.83
OPERATION AND MAINTENANCE OF PLANT:			
Mechanicians' wages	$5,855.55		
Janitors', etc.	49,963.21	849.81	
Light, heat and power	33,356.45		
Repairs (Schedule C–3) viz.:			
wages $4,440.04			
stock 3,967.89	8,407.93		
	$97,583.14	$849.81	98,432.95
EXPENSES OF MINOR FUNDS (excluding salaries):			
American Tel. & Tel. Research Fund		1,247.51	
American Tel. & Tel. Library Fund		2,471.55	
Cabot Medal Fund		1.31	
Commercial Research Fund		9.75	
Edison Research Fund (Electric Vehicle tests)		67.28	
Electric Railway Traffic Fund.		278.03	
Macy Research Fund		97.95	
Naval Architectural Fund		15.00	
Ozone Fund		10.00	
Physico-Chemical Research Fund		506.26	
President's Fund		519.09	

	Regular courses.	*Research and funds.*	*Total.*
EXPENSES OF MINOR FUNDS — *Continued.*			
Research Laboratory of Applied Chemistry		$554.12	
Rochester Experiment Fund		150.00	
Sanitary Research Fund		857.09	
Seismological Research Fund		1,250.00	
Terminal Research Fund		143.95	
Traveling Scholarship in Architecture		250.00	
Vehicle Research Fund		1.03	
		$8,429.92	$8,429.92
AWARDS:			
Arch. Society Fund Awards		50.00	
Edward Austin Fund awards		4,170.00	
Teachers' Fund awards		4,556.56	
Bursar's Fund awards		469.00	
Fellowship awards		1,550.00	
Architectural Prizes		400.00	
		$11,195.56	11,195.56
MISCELLANEOUS EXPENSES:			
Premiums charged off —			
General Investments	$1,471.05		
Rogers Memorial Investments	300.50		
Draper Fund Investments	24.00		
T. W. Bailey Fund		250.76	
Edna Dow Cheney Fund		255.84	
Whitney Fund		1,000.00	
Summer Camp expense (net)	864.98		
Aerodynamical Laboratory	335.55	1,118.91	
Phys-Chem. Research Fund	2,800.00		
Tech Union (net)	679.52		
	$6,475.60	$2,625.51	9,101.11
INTEREST	187.97		187.97
SOCIETY OF ARTS. Expenses	2,625.35		2,625.35
Total Outgo, Schedule A	$636,762.09	$42,020.09	$678,782.18

Schedule C–2.

DETAIL OF DEPARTMENTS.

Dept.	Expense. Supplies.	Expense. Salaries and wages.	Repairs. Stock.	Repairs. Wages.	Total.	Overdraft.
Architecture	$1,414.48	—	$240.55	$194.97	$1,850.00	$118.09
Biology	1,477.25	$1.25	37.61	54.77	1,570.88	—
Chemistry	14,661.24	10.00	480.94	700.82	15,853.00	—
Civil and Sanitary Eng'g	2,836.11	—	44.38	77.83	2,958.32	—
Drawing	112.08	—	38.76	74.16	225.00	3.70
Economics	628.70	235.45	—	—	864.15	65.56
Electrical Engineering	3,432.22	39.38	218.45	309.95	4,000.00	533.56
English	150.00	—	—	—	150.00	8.37
General Library	2,374.60	—	2.50	4.30	2,381.40	—
Geology	1,337.99	137.50	7.98	16.53	1,500.00	22.99
History	248.90	451.10	—	—	700.00	9.21
Mathematics	256.66	414.14	—	—	670.80	—
Mechanical Engineering	6,370.49	414.48	311.20	283.83	7,380.00	64.90
Military Science	880.81	—	—	—	880.81	—
Mining	1,837.59	12.50	31.38	34.11	1,915.58	—
Modern Language	58.00	252.00	—	—	310.00	0.89
Naval Architecture	460.08	643.93	36.12	12.46	1,152.59	66.96
Physical Culture	2,363.40	274.00	9.45	17.84	2,664.69	3.08
Physics	5,045.64	—	137.43	216.93	5,400.00	48.46
	$45,946.24	$2,885.73	$1,596.75	$1,998.50	$52,427.22	$945.77
Expense items brought down			45,946.24	2,885.73		
Total stocks and supplies			$47,542.99			
Total salaries and wages				$4,884.23		
Grand total					$52,427.22	
Less Salaries of Teachers (included elsewhere)				1,502.17	1,502.17	
Total, Schedule C–1				$3,382.06	$50,925.05	
Department overdrafts (Schedule D — Current Assets)						$945.77

Schedule C–3.

DETAIL OF PLANT REPAIRS.

	Labor.	*Stock.*
Rogers Building	$1,008.46	$450.53
Walker Building	484.59	265.10
Lowell Building	332.10	165.16
Engineering A and B	280.42	166.62
Engineering C	162.16	112.98
Pierce Building	408.46	283.12
Mechanical Laboratory	222.06	105.70
Gymnasium	135.90	72.07
Boiler Room	329.95	280.89
Power Plant	242.12	318.11
Shop Maintenance	238.78	32.67
Modelling Room	81.24	90.92
Furniture	239.43	71.57
Laundry	63.90	26.49
Clocks	76.56	4.47
Garage	20.49	2.99
Trucks	113.42	261.38
Undistributed	—	1,257.12
	$4,440.04	$3,967.89

Schedule D.

TREASURER'S BALANCE SHEET.

1.

INVESTMENT ASSETS.

Securities and Real Estate, Schedule H	$3,332,698.34
Cash: In banks for Investment and New Buildings, Schedule E	1,195,835.81
Total	$4,528,534.15

2.

CURRENT ASSETS.

Cash available for general purposes, Schedule E		$139,475.54
Accounts Receivable, Schedule F–2		5,374.27
Advanced acct. Draper Fund, Interest Paid		757.86
Unexpired Insurance		11,651.28
Advances — account 1915–1916	Department Appropriations $945.77; Summer Camp 2,686.41	3,632.18
Purchases — account 1915–1916 — Dining Room, Tech Union		147.35
Total		$161,038.48
Excess of Investment Assets (per contra)		153,938.83
Total		$314,977.31

3.

EDUCATIONAL PLANT ASSETS.

Lands, Buildings and Equipment. Nominal Values.	
Total book value at beginning of year	$3,155,358.52
Additions during year (net), Schedule K	1,697,997.40
Total book value at end of year	$4,853,355.92
Unexpended balance in investments as above	1,121,737.50
Total	$5,975,093.42

M. I. T. ALUMNI FUND. ASSETS.

Securities (Schedule H)	$100,000.00
Cash in bank for investment (Schedule E)	195,730.82
	$295,730.82

WALKER MEMORIAL FUND. ASSETS.

Securities (Schedule H)	$140,652.85
Cash in bank for investment (Schedule E)	10,010.75
	$150,663.60

IMPROVEMENT FUND. ASSETS.

Securities (Schedule H)	$21,433.00
Cash in bank for investment (Schedule E)	896.97
	$22,329.97

CILLEY FUND. ASSETS.

Securities (Schedule H)	$60,460.66
Cash in bank for investment (Schedule E)	2,104.47
	$62,565.13

Schedule D.

JUNE 30, 1915.

1.

ENDOWMENT AND OTHER FUNDS.

Funds, Schedule Q recapitulation		$3,236,523.81
Minor Funds, Schedule R		16,334.01
Total Funds		$3,252,857.82
Excess of investment assets (carried down per contra)	$153,938.83	
New Site cash and investments	1,121,737.50	1,275,676.33
		$4,528,534.15

2.

CURRENT LIABILITIES.

Accounts Payable	$3,831.33
Tuition in advance, 1915–16	10,870.00
Summer Camp, 1915, Fees and Deposits	990.77
Summer Camp, 1913–14 Outside Students' Fees	100.00
Entrance Examination fees	4,595.00
Students' deposits in advance	2,707.50
Students' deposits outstanding	2,245.32
Locker deposits outstanding	172.50
Alumni Site Fund	2,606.70
Gifts, anticipated	790.00
Suspense account	949.65
Total	$29,858.77
Surplus available for current expense, Schedule S	285,118.54
	$314,977.31

3.

EDUCATIONAL PLANT ENDOWMENT AND CAPITAL ACCOUNTS.

New Site and Buildings Funds	$4,348,939.60
Other endowment funds and capital (not analyzed)	1,626,153.82
	$5,975,093.42

M. I. T. ALUMNI FUND.

Balance at beginning of year	$212,446.88
Subscriptions and net income for year added to fund	83,283.94
	$295,730.82

WALKER MEMORIAL FUND.

Balance at beginning of year	$144,614.45
Net income for year added to fund	6,049.15
	$150,663.60

IMPROVEMENT FUND.

Balance at beginning of year	$21,373.49
Net income for year added to fund	956.48
	$22,329.97

CILLEY FUND.

Balance at beginning of year	$60,591.83
Net income for year added to fund	1,973.30
	$62,565.13

Schedule E.

CASH RECEIPTS AND DISBURSEMENTS.

FOR THE YEAR.

Total Cash Disbursements	$2,958,665.30
Total Cash Receipts	2,411,428.85
Excess of Disbursements	$547,236.45
Cash balance at beginning of year	2,091,290.81
Cash balance at end of year	$1,544,054.36

CASH BALANCE.

Cash on deposit at banks:		
For Walker Memorial		$10,010.75
For Improvement Fund		896.97
For Cilley Fund		2,104.47
For Alumni Fund		195,730.82
For Investment and New Buildings		1,195,835.81
For General Purposes	$138,844.29	
Cash at office:		139,475.54
For General Purposes	631.25	
Cash balance as above		$1,544,054.36

Schedule F–2.

ACCOUNTS RECEIVABLE.

For Tuition:	
9 Students (U. S. Government)	$4,500.00
7 Students	463.36
Miscellaneous:	
Chemical Breakage	332.76
Debit balances of Accounts Payable	78.15
Accounts Receivable, Schedule D	$5,374.27

Schedule F–3.

RENTS RECEIVABLE.

Arrears of Rents at beginning of year	$1,500.00
Paid on account during year	1,500.00
Rents Receivable	—

Schedule H.

SECURITIES: BONDS, STOCKS,

Bonds.	*Description of securities.*	*Due.*	*Balance at beginning of year.*
$26,000.00	Am. Dock and Improvement Co. 5%	1921	$26,500.00
115,000.00	Am. Tel. & Tel. Co. 4%	1929	114,025.00
25,000.00	Atchison, Topeka & Santa Fe R.R. 4%.	1995	25,000.00
34,000.00	Baltimore & Ohio R.R. Co. 3½%	1925	30,090.00
10,000.00	Boston & Northern St. Ry. Co. 4%	1954	9,250.00
50,000.00	Brooklyn Rapid Transit Co. 5%	1918	—
1,000.00	Burlington & Mo. River R.R. (Neb.) 6%	1918	1,000.00
43,000.00	Chesapeake & Ohio Ry. Co. 5%	1939	47,667.00
38,000.00	Chicago, Burlington & Quincy R.R. 4%	1958	38,086.00
1,000.00	Chi., Burlington & Quincy (Neb. ext.) 4%	1927	1,000.00
—	Chi. Junc. Rys. and Union Stock Yds. 5%	1915	70,000.00
50,000.00	Chi. Junc. Rys. and Union Stock Yds. 4%	1940	49,250.00
10,000.00	Chi. Junc. Rys. and Union Stock Yds. Co. 5%	1940	—
25,000.00	Chi., Mil. & St. Paul R.R. 5%	2014	—
100,000.00	Chi. & West Michigan Railway Co. 5%	1921	100,625.00
25,000.00	Cleveland & Pittsburgh R.R. Co. 4½%	1942	25,803.00
—	Columbus (Ga.) Elec. Co. 5%	1914	49,625.00
—	Connecticut River R.R. Co. 5%	1915	9,900.00
50,000.00	Cumberland Tel. & Tel. Co. 5%	1937	25,122.00
17,000.00	Delaware & Hudson Co. 4%	1943	17,280.00
50,000.00	Detroit Edison Co. 5%	1933	25,399.00
25,000.00	Eastern Texas Elec. Co. Notes 6%	1916	24,500.00
25,000.00	Electrical Securities Corp. 5%	1943	25,000.00
—	Fitchburg R.R. 4%	1915	6,000.00
25,000.00	General Electric Co. 5%	1952	25,927.00
3,000.00	Illinois Central R.R. Co. 4%	1951	3,000.00
—	Illinois Central R.R. Co. 4½%	1914	24,906.25
25,000.00	Indianapolis Union Ry. Co. 5%	1965	—
—	Jacksonville Traction Co. 6%	1915	49,500.00
7,000.00	Kan. City, Clinton & Spfd. Ry. Co. 5%	1925	6,289.21
50,000.00	Kan. City, Fort Scott & Mem. R.R. 6%	1928	54,715.00
8,500.00	Kan. City, Mem. & Birmingham R.R. 4%	1934	8,287.50
37,000.00	Kan. City, Mem. & Birmingham R.R. 5%	1934	34,225.00
18,000.00	Kentucky Central Ry. Co. 4%	1987	17,910.00
3,000.00	Lake Shore & Mich. So. Ry. Co. 4%	1928	3,000.00
85,000.00	Lake Shore & Mich. So. Ry. Co. 4%	1931	84,087.50
100,000.00	Long Island R.R. 4%	1949	96,137.50
50,000.00	Massachusetts Gas Co's. 4½%	1931	49,312.50
50,000.00	Minneapolis General Electric Co. 5%	1934	50,565.00
17,000.00	Missouri Pacific Ry. Co. 5%	1914	16,952.40
50,000.00	N. E. Tel. & Tel. Co. 4%	1930	50,320.00
10,000.00	N. E. Tel. & Tel. Co. 5%	1932	10,134.00
36,000.00	N. Y. C. Lines Equipment 5%	1919	34,740.00
52,000.00	N. Y. C. & H. R.R. (L. S.) 3½%	1998	46,046.65
31,000.00	N. Y. N. H. & H. R.R. 6%	1948	34,923.00
25,000.00	New York Telephone Co. 4½%	1939	24,187.50
52,000.00	Northern Pacific-Gt. No. R.R. 4%	1921	50,500.00
—	Northern Pacific Ry. Co. 6%	1914	50,000.00
25,000.00	Old Colony St. Ry. Co. 4%	1954	22,750.00

Schedule H.

REAL ESTATE AND MORTGAGES.

Purchases and charges during year.	*Sales and credits during year.*	*Balance at end of year.*	*Accrued int. paid.*	*Interest received.*
—	$80.00	$26,420.00	—	$1,300.00
—	—	114,025.00	—	4,600.00
—	—	25,000.00	—	1,000.00
—	—	30,090.00	—	1,487.50
—	—	9,250.00	—	400.00
$50,000.00	—	50,000.00	$708.33	—
—	—	1,000.00	—	60.00
—	194.00	47,473.00	—	2,150.00
—	2.00	38,084.00	—	1,520.00
—	—	1,000.00	—	40.00
—	70,000.00	—	—	4,470.82
—	—	49,250.00	—	2,000.00
9,850.00	—	9,850.00	19.45	—
25,500.00	5.00	25,495.00	246.53	—
—	100.00	100,525.00	—	—
—	29.50	25,773.50	—	1,125.00
—	49,625.00	—	—	1,250.00
—	9,900.00	—	—	500.00
24,218.75	—	49,340.75	354.17	1,250.00
—	10.00	17,270.00	—	680.00
25,668.75	59.75	51,008.00	354.87	1,250.00
—	—	24,500.00	—	1,500.00
—	—	25,000.00	—	1,250.00
—	6,000.00	—	—	240.00
—	25.00	25,902.00	—	1,250.00
—	—	3,000.00	—	120.00
—	24,906.25	—	—	562.50
24,906.25	—	24,906.25	427.08	—
—	49,500.00	—	—	3,000.00
—	—	6,289.21	—	175.00
—	362.00	54,353.00	—	3,000.00
—	—	8,287.50	—	340.00
—	—	34,225.00	—	925.00
—	—	17,910.00	—	720.00
—	—	3,000.00	—	120.00
—	—	84,087.50	—	3,400.00
—	—	96,137.50	—	4,000.00
—	—	49,312.50	—	2,250.00
—	30.00	50,535.00	—	2,500.00
—	—	16,952.40	—	1,020.00
—	20.00	50,300.00	—	2,000.00
—	8.00	10,126.00	—	500.00
—	—	34,740.00	—	1,800.00
—	—	46,046.65	—	1,820.00
—	118.00	34,805.00	—	1,860.00
—	—	24,187.50	—	1,125.00
—	—	50,500.00	—	2,120.74
—	50,000.00	—	—	1,500.00
—	—	22,750.00	—	1,000.00

Schedule H. (*Continued.*)

Bonds.	*Description of securities.*	*Due.*	*Balance at beginning of year.*
$50,000.00	Oregon R.R. & Navigation Co. 4%. . .	1946	$50,937.00
50,000.00	Oregon Short Line R.R. 4%	1929	48,500.00
25,000.00	Pacific & Tel. Co. 5%	1937	25,018.40
50,000.00	Penn. R.R. Co. (Conv.) 3½%	1915	48,187.50
18,000.00	Penn. R.R. Co. 4½%	1960	—
25,000.00	Portland Gen. Elec. Co. 5%	1935	25,544.00
50,000.00	Quebec, City of, 5%	1920	—
50,000.00	Rio Grande & Western Ry. Co. 4% . .	1939	49,180.00
15,000.00	Saginaw, Mich., City of, 4%	1924	15,000.00
19,000.00	Seattle Elec. Co. 5%	1929	18,430.00
6,000.00	Seattle Elec. Co. 5%	1930	6,276.00
50,000.00	Southern Pac. Co. (S. F. Terminal) 4% .	1950	—
25,000.00	Southern Railway Co. 4%	1951	24,875.00
—	St. Croix Paper Co. 5%	1914	24,687.50
25,000.00	St. Croix Paper Co. 5%.	1915	24,517.50
—	Tennessee, State of, 5%	1914	49,875.00
5,000.00	Terminal R.R. Assn. of St. Louis 4% . .	1953	5,000.00
50,000.00	Union Pacific R.R. Co. 4%	1947	51,354.00
8,000.00	United Fruit Co. 4½%	1923	7,642.50
17,000.00	United Fruit Co. 4½%	1925	16,156.25
30,000.00	United Fruit Co. 5%.	1918	—
—	U. S. Smelting, Refin'g & Min'g Co. 5%.	1914	53,428.75
26,000.00	U. S. Steel Corporation 5%	1963	29,231.00
—	Wabash R.R. Equipment 4½%.	1916	18,259.00
25,000.00	Western Electric Co. 5%	1922	24,875.00
100,000.00	West End St. Ry. Co. 4%	1917	100,540.00
30,000.00	West End St. Ry. Co. 4%	1915	30,000.00
			$2,317,052.41

		Par.	
50 shares	Amoskeag Mfg. Co. Pfd.	$100	4,950.00
295 "	Boston & Albany R.R.	100	60,911.50
10 "	Boston Ground Rent Trust	100	900.00
64 "	Boston Real Estate Trust	1000	68,461.64
70 "	Central Wharf & Wet Dock Cpn. . . .	100	14,700.00
80 "	Chicago, Milwaukee & St. Paul Ry. Co. Pfd.	100	5,713.00
2 "	Coöperative Publishing Co.	1	2.00
2 "	Dwight Manufacturing Co.	500	1,600.00
27 "	Essex Company	100	3,780.00
25 "	Fitchburg R.R. Pfd.	100	2,025.00
31 "	Great Falls Mfg. Co.	100	3,472.00
56 "	Hamilton Woolen Co.	100	5,390.00
50 "	Lancaster Mills	100	5,519.00
50 "	Nashua Manufacturing Co.	500	32,500.00
30 "	New England Tel. & Tel. Co.	100	4,110.00
25 "	N. Y., N. H. & Hartford R.R. Co. . . .	100	1,725.00
51 "	Pepperell Mfg. Co.	100	2,789.50
50 "	Pray Building Trust	50	2,500.00
25 "	South Terminal Trust	100	2,000.00
			$223,048.64

NOTES RECEIVABLE:

Burke Loan	75.00

Schedule H. (*Continued.*)

Purchases and charges during year.	*Sales and credits during year.*	*Balance at end of year.*	*Accrued int. paid.*	*Interest received.*
—	$30.00	$50,907.00	—	$2,000.00
—	—	48,500.00	—	2,000.00
—	0.80	25,017.60	—	1,250.00
—	—	48,187.50	—	1,750.00
$18,675.00	15.00	18,660.00	$36.00	—
—	27.00	25,517.00	—	1,250.00
49,375.00	—	49,375.00	76.39	—
—	—	49,180.00	—	2,000.00
—	—	15,000.00	—	600.00
—	—	18,430.00	—	950.00
—	18.00	6,258.00	—	300.00
40,568.33	—	40,568.33	51.34	—
—	—	24,875.00	—	1,000.00
—	24,687.50	—	—	625.00
—	—	24,517.50	—	1,250.00
—	49,875.00	—	—	1,250.00
—	—	5,000.00	—	200.00
—	42.00	51,312.00	—	2,000.00
—	—	7,642.50	—	360.00
—	—	16,156.25	—	765.00
29,550.00	—	29,550.00	670.83	750.00
—	53,428.75	—	—	1,350.00
—	2,221.00	27,010.00	—	1,400.00
—	18,259.00	—	—	1,016.50
—	—	24,875.00	—	1,250.00
—	270.00	100,270.00	—	4,000.00
—	—	30,000.00	—	1,200.00
$298,312.08	$409,848.55	$2,205,515.94	$2,944.99	$95,698.06
—	—	4,950.00	—	225.00
—	—	60,911.50	—	2,581.25
—	—	900.00	—	45.00
—	—	68,461.64	—	2,880.00
—	—	14,700.00	—	560.00
—	10.00	5,703.00	—	560.00
—	—	2.00	—	—
—	—	1,600.00	—	80.00
—	—	3,780.00	—	297.00
—	—	2,025.00	—	125.00
—	—	3,472.00	—	372.00
—	—	5,390.00	—	336.00
—	—	5,519.00	—	—
—	—	32,500.00	—	2,500.00
—	—	4,110.00	—	262.50
—	—	1,725.00	—	—
—	—	2,789.50	—	204.00
—	—	2,500.00	—	50.00
—	—	2,000.00	—	87.50
—	$10.00	$223,038.64	—	$11,165.25
—	$75.00	—	—	$35.24

Schedule H. (*Continued.*)

Bonds, shares, etc.	*Description of securities.*		*Balance at beginning of year.*
MORTGAGE NOTES:			
	E. V. & C. T. Bigelow		$4,500.00
	W. H. Partridge		7,000.00
			$11,500.00
REAL ESTATE:			
	Back Bay, Boston, Land & Building, Equity		—
	Clarendon Street Land and Buildings		$142,762.94
	Massachusetts Avenue, Cambridge, Land and Buildings		16,154.38
	Edgehill Road, Brookline		18,000.00
	Pearl Street, Boston, Equity		44,764.32
	Norfolk Street, Dorchester		2,000.00
			$223,681.64
INVESTMENTS, W. B. ROGERS MEMORIAL FUND:		*Due.*	
$25,000	Atchison, Top. & St. Fe Ry. Co. 4%	1995	$24,470.00
6,000	Baltimore & Ohio R.R. 3½%	1925	5,310.00
7,000	Chesapeake & Ohio Ry. Co. 5%	1939	7,761.00
1,000	Chi., Burl. & Quincy R.R. 4%	1958	1,000.00
—	Chi. Junc. Rys. & U. Stock Yds. Co. 5%	1915	40,000.00
40,000	Chi. Junc. Rys. & U. Stock Yds. Co. 5%	1940	—
4,000	Cin., Ind., St. Louis & Chi. Ry. 6%	1920	4,000.00
37,500	Detroit, Grand Rapids & West'n R.R. 4%	1946	37,500.00
35,000	Fort St. Union Depot Co. 4½%	1941	34,825.00
27,000	Kansas City Belt Ry. 6%	1916	27,134.00
31,000	N. Y. C. & H. R.R. 4%	1934	30,225.00
1,000	N. Y. Central Lines Equipment 5%	1919	965.00
24,000	Rome, Watertown & Ogdensburg R.R. 5%	1922	24,934.00
4,000	United Electric Securities 5%	1940	4,037.00
—	Wabash R.R. Equipment 4½%.	1916	961.00
			$243,122.00
INVESTMENTS, EBEN S. DRAPER FUND:			
$20,000	C. M. & St. Paul Ry. Co. 5%	2014	—
16,000	Georgia Ry. & Elec. Co. 5%	1932	—
24,000	Indianapolis Union Ry. Co. 5%	1965	—
20,000	New York Tel. Co. 4½%	1939	—
20,000	Wilmington City Elec. Co. 5%	1951	—
			—
INVESTMENTS, THOS. WENDELL BAILEY FUND:		*Par.*	
5 shares	Swift & Co.	100	—
10 shares	Trinity Copper Co.		—
	Miscellaneous Oklahoma Properties		—
			—
INVESTMENTS JOY SCHOLARSHIP FUND:			
	Mass. Hospital Life Ins. Co.		$5,000.00
INVESTMENTS SUSAN H. SWETT SCHOLARSHIP FUND:			
	Mass. Hospital Life Ins. Co.		10,000.00
INVESTMENTS RICHARD LEE RUSSEL FELLOWSHIP FUND:		*Due.*	
$2,000	Fiske Wharf Warehouse Trust 4%	1921	1,980.00

Schedule H. (*Continued.*)

Purchases and charges during the year.	*Sales and credits during the year.*	*Balance at end of year.*	*Accrued int. paid.*	*Interest received.*
—	—	$4,500.00	—	$225.00
—	—	7,000.00	—	350.00
—	—	$11,500.00	—	$575.00
$25,000.00	—	25,000.00	—	—
—	—	142,762.94	—	6,500.00*
—	$16,154.38	—	—	60.00*
—	18,000.00	—	—	80.96*
—	—	44,764.32	—	1,005.36*
—	2,000.00	—	—	—
$25,000.00	$36,154.38	$212,527.26	—	$7,646.32
—	—	24,470.00	—	1,000.00
—	—	5,310.00	—	262.50
—	31.00	7,730.00	—	350.00
—	—	1,000.00	—	40.00
—	40,000.00	—	—	2,500.01
39,400.00	—	39,400.00	—	—
—	—	4,000.00	—	240.00
—	—	37,500.00	—	—
—	—	34,825.00	—	1,575.00
—	134.00	27,000.00	—	1,620.00
—	—	30,225.00	—	1,240.00
—	—	965.00	—	50.00
—	134.00	24,800.00	—	1,200.00
—	1.50	4,035.50	—	200.00
—	961.00	—	—	53.50
$39,400.00	$41,261.50	$241,260.50	—	$10,331.01
20,400.00	4.00	20,396.00	$200.00	—
16,320.00	20.00	16,300.00	224.44	—
23,880.00	—	23,880.00	410.00	—
19,395.00	—	19,395.00	419.25	450.00
19,600.00	—	19,600.00	454.17	500.00
$99,595.00	$24.00	$99,571.00	$1,707.86	$950.00
525.00	—	525.00	—	52.50
30.00	—	30.00	—	—
1,152.00	—	1,152.00	—	48.00
$1,707.00	—	$1,707.00	—	$100.50
—	—	$5,000.00	—	$212.50
—	—	10,000.00	—	425.00
—	—	1,980.00	—	80.00

* Net rent.

Schedule H. (*Continued.*)

	Due.	Balance at beginning of year.
*INVESTMENTS JONATHAN WHITNEY FUND:		
$21,000 United Elec. Securities Co. 5%	1940	$21,102.00
INVESTMENTS GEO. H. MAY FUNDS:		
100 shares E. I. du Pont de Nemours Powder Co. Pfd.		—
*INVESTMENTS EMMA ROGERS FUND:		
Real Estate, Temple Place, Boston		291,000.00
Total		$3,347,561.69
INVESTMENTS NEW SITE AND BUILDING FUNDS:		
Notes of T. C. du Pont 4%		200,000.00
Grand Total, Schedule D.		$3,547,561.69
INVESTMENTS WALKER MEMORIAL FUND:		
$30,000 Am. Tel. & Tel. Co. 4%	1929	$30,300.00
10,000 Chi., Burl. & Quincy R.R. Co. 4%	1958	10,000.00
6,000 Cleveland Elec. Illum. Co. 5%	1939	—
8,000 Detroit Edison Co. 6%	1925	—
17,000 Electrical Securities Corporation 5%	1940	16,915.00
54,000 N. Y. C. & H. R.R. (L. S.) 3½%	1998	47,986.35
14,000 Oregon Short Line R.R. 5%	1946	16,310.00
5,000 St. Louis Iron Mt. & So. R.R. 4%	1933	4,812.50
— Wabash R.R. Equipment 4½%	1916	6,764.45
Total		$133,088.30
INVESTMENTS IMPROVEMENT FUND:		
$4,000 Cleveland Elec. Illum. Co. 5%	1939	—
8,000 Electrical Securities Corporation 5%	1940	$7,960.00
9,000 U. S. Steel Corporation 5%	1963	9,524.68
Total		$17,484.68
INVESTMENTS M. I. T. ALUMNI FUND:		
$75,000 Loan through First National Bank		$75,000.00
25,000 Chi., St. L. & New Orleans 5%	1915	—
50,000 N. Y. C. & H. R.R. Co. 5%	1915	—
Total		$75,000.00
INVESTMENTS FRANK HARVEY CILLEY FUND:		
$15,000 Nashville, City of, 5%	1917	—
	Par.	
40 shares Boston & Albany R.R. Co.	$100	$8,000.00
10 " Boston & Providence R.R. Cpn.	100	2,500.00
30 " Edison Elec. Illum. Co.	100	8,010.00
50 " Fitchburg R.R. Pfd.	100	5,000.00
75 " Massachusetts Gas Co.'s Pfd.	100	6,825.00
50 " N. Y., N. H. & H. R.R.	100	4,700.00
25 " Springfield Ry. Co.'s Pfd.	100	2,125.00
50 " West End St. Ry.	50	3,600.00
South American Properties		1.00
D. C. Aznive, Mortgage Note.		1,600.00
Jacob Levenson, Mortgage Note		2,400.00
A. J. Diamond, Mortgage Note		1,333.33
Total		$46,094.33

* Balance of funds invested in securities included in General Investments (Schedule 4).

Schedule H. (*Continued.*)

Purchases and charges during year.	*Sales and credits during year.*	*Balance at end of year.*	*Accrued int. paid.*	*Interest received.*
—	$4.00	$21,098.00	—	$1,050.00
$8,500.00	—	8,500.00	—	375.00
—	—	291,000.00	—	11,110.87
$472,514.08	$487,377.43	$3,332,698.34	$4,562.85	$13,253.37
—	200,000.00	—	—	—
$472,514.08	$687,377.43	$3,332,698.34	$4,652.85	$139,754.75
—	$22.00	$30,278.00	—	$1,200.00
—	—	10,000.00	—	400.00
$5,940.00	—	5,940.00	$61.67	150.00
8,540.00	54.00	5,486.00	—	—
—	—	16,915.00	—	850.00
—	—	47,986.35	—	1,890.00
—	75.00	16,235.00	—	700.00
—	—	4,812.50	—	200.00
—	6,764.45	—	—	374.50
$14,480.00	$6,915.45	$140,652.85	$61.67	$5,764.50
3,960.00	—	3,960.00	—	100.00
—	—	7,960.00	—	400.00
—	11.68	9,513.00	—	450.00
$3,960.00	$11.68	$21,433.00	—	$950.00
—	—	75,000.00	—	2,250.00
50,000.00	25,000.00	25,000.00	—	1,250.00
49,900.00	49,900.00	—	—	1,250.00
$99,900.00	$74,900.00	$100,000.00	—	$4,750.00
15,168.75	84.75	$15,084.00	—	—
—	—	8,000.00	—	350.00
—	—	2,500.00	—	100.00
—	51.00	7,959.00	—	360.00
—	—	5,000.00	—	250.00
—	—	6,825.00	—	300.00
—	—	4,700.00	—	—
—	—	2,125.00	—	100.00
—	—	3,600.00	—	175.00
—	—	1.00	—	—
—	—	1,600.00	—	96.00
—	—	2,400.00	—	120.00
—	666.67	666.66	—	58.34
$15,168.75	$802.42	$60,460.66	—	$1,909.34

Schedule J.

LANDS, BUILDINGS AND EQUIPMENT.

EDUCATIONAL PLANT:

Land, Buildings, Book Values.

	Balance June 30, 1914.	*Balance June 30, 1915.*
Rogers Building	$200,000.00	$200,000.00
Walker Building	150,000.00	150,000.00
Engineering Building A, Trinity Place	90,000.00	90,000.00
Engineering Building B, " "	57,857.10	57,857.10
Engineering Building C, " "	47,561.08	47,561.08
Henry L. Pierce Building, " "	154,297.05	154,297.05
Boiler and Power House, " "	26,916.74	26,916.74
Tech Union, " "	19,460.36	19,460.36
Lot Number 1, " "	76,315.69	76,315.69
Lot Number 2, " "	137,241.60	137,241.60
Lot Number 3, " "	282,286.35	282,286.35
Electrical Engineering Building, Clarendon St.	121,790.93	121,790.93
Mechanic Arts Building, Garrison St.	30,000.00	30,000.00
Land on Garrison St.	50,840.00	50,840.00
Gymnasium Building	12,624.07	12,624.07
	$1,457,190.97	$1,457,190.97
Summer Camp, East Machias, Me.	36,081.81	36,081.81
New Site and Preliminary Expense	840,201.43	840,251.43
New Site Construction	689,003.27	2,386,950.67
	$3,022,477.48	$4,720,474.88

Equipment, Book Values.

In Engineering Building A	20,645.24	20,645.24
In Electrical Engineering Building.	91,607.24	91,607.24
In Mechanic Arts Building	20,628.56	20,628.56
	$132,881.04	$132,881.04
Total Educational Plant	$3,155,358.52	$4,853,355.92

Schedule K.

ADDITIONS TO LANDS, BUILDINGS AND EQUIPMENT.

New Site Expense	$50.00
Construction at new site	1,697,947.40
	$1,697,997.40

Schedule P.

ENDOWMENT FUNDS FOR GENERAL PURPOSES.

Increases and Decreases of Funds for General Purposes.

Invested funds. Restricted.	*Funds June 30, 1914.*	*Investment income.*	*Other increases or decreases of funds.*	*Expenditures.*	*Funds June 30, 1915.*
George Robert Armstrong .	$5,000.00	$224.57	—	$224.57	$5,000.00
Charles Choate	32,149.54	1,443.91	$1,783.09	1,443.91	33,932.63
Eben S. Draper	—	950.00	100,000.00	*950.00	100,000.00
Martha Ann Edwards . . .	30,000.00	1,347.40	—	1,347.40	30,000.01
James Fund	163,654.21	7,350.19	—	7,350.19	163,654.20
Katharine B. Lowell. . . .	5,000.00	224.57	—	224.57	5,000.00
Richard Perkins	50,200.00	2,245.70	—	2,245.70	50,000.00
John W. and Belinda L. Randall	83,452.36	3,748.08	—	3,748.08	83,452.36
William B. Rogers	250,225.00	10,331.01	—	10,331.01	250,225.00
Saltonstall Fund	46,219.60	2,075.83	—	†1,556.87	46,738.56
Samuel E. Sawyer.	4,764.40	213.97	—	213.97	4,764.40
Albion K. P. Welch	5,000.00	224.57	—	224.57	5,000.00
Unrestricted.					
Sidney Bartlett	$10,000.00	$449.13	—	$449.13	$10,000.00
Stanton Blake	5,000.00	224.57	—	224.57	5,000.00
George B. Dorr	49,573.47	2,226.47	—	2,226.47	49,573.47
Arthur T. Lyman	5,000.00	224.57	—	224.57	5,000.00
James McGregor	2,500.00	112.29	—	112.29	2,500.00
Nathanial C. Nash	10,000.00	449.13	—	449.13	10,000.00
Frances M. Perkins	16,500.00	741.08	25.00	741.08	16,525.00
Emma Rogers	472,983.68	19,284.27	—	19,284.27	472,983.68
Robert E. Rogers	7,680.77	344.93	—	344.93	7,680.77
Seth K. Sweetser	—	375.16	25,061.62	375.16	25,061.62
Nathaniel Thayer	25,000.00	1,122.85	—	1,122.85	25,000.00
Charles G. Weld	15,000.00	673.70	—	673.70	15,000.00
Alexander S. Wheeler . . .	5,000.00	224.57	—	224.57	5,000.00
	$1,299,703.03	$56,832.52	$126,869.71	$56,313.56	$1,427,091.70

* Applied to payment of accrued interest on securities purchased.
† One fourth of the income applied to fund.

Schedule Q.

ENDOWMENT FUNDS FOR DESIGNATED PURPOSES.

Increases and Decreases of Funds for Designated Purposes.

Invested funds.	*Funds June 30, 1914.*	*Investment income.*	*Other increases or decreases of funds.*	*Expenditures.*	*Funds June 30, 1915.*
FUNDS FOR SALARIES:					
Sarah H. Forbes For General Salaries	$500.00	$22.46	—	$22.46	$500.00
George A. Gardner For General Salaries	20,000.00	898.26	—	898.26	20,000.00
James Hayward Professorship of Engineering	18,800.00	844.36	—	844.36	18,800.00
Wm. P. Mason Professorship of Geology	18,800.00	844.36	—	844.36	18,800.00
Henry B. Rogers For General Salaries	25,000.00	1,122.85	—	1,122.85	25,000.00
Nathaniel Thayer Professorship of Physics	25,000.00	1,122.85	—	1,122.85	25,000.00
Totals	$108,100.00	$4,855.14	—	$4,855.14	$108,100.00
FUNDS FOR LIBRARY AND READING ROOM:					
Charles Lewis Flint Library	$5,000.00	$224.57	—	$224.57	$5,000.00
William Hall Kerr Library	2,000.00	88.93	—	88.93	2,000.00
Arthur Rotch Architectural Library	5,000.00	224.57	—	224.57	5,000.00
John Hume Tod Fund	2,500.00	112.29	—	112.29	2,500.00
Edna Dow Cheney for Margaret Cheney Reading Room	15,049.48	628.79	—	691.72	14,986.55
Totals	$29,549.48	$1,279.15	—	$1,342.08	$29,486.55
FUNDS FOR DEPARTMENTS:					
Samuel Cabot (Industrial Chemistry)	$55,190.49	$2,245.70	—	$285.00	$57,151.19
Susan E. Dorr Fund	95,955.67	4,309.63	—	4,309.63	95,955.67
George H. May Chem. Dept.	—	187.50	$4,250.00	187.50	4,250.00
Arthur Rotch Architectural Fund	25,000.00	1,122.85	—	1,122.85	25,000.00
Totals	$176,146.16	$7,865.68	$4,250.00	$5,904.98	$182,356.86
FUNDS FOR RESEARCH:					
Ellen H. Richards Research Fund	$16,256.82	$673.70	$30.00	$762.50	$16,198.02
Charlotte B. Richardson (Industrial Chemistry)	37,378.78	1,347.40	—	1,347.40	37,378.78
Whitney Fund	26,890.25	1,122.85	—	1,000.00	27,013.10
Totals	$80,525.85	$3,143.95	$30.00	$3,109.90	$80,589.90

Schedule Q. (*Continued.*)

Invested funds.	*Funds June 30, 1914.*	*Investment income.*	*Other increases or decreases of funds.*	*Expenditures.*	*Funds June 30, 1915.*
FUNDS FOR FELLOWSHIPS:					
Dalton Graduate Chemica . .	$5,626.42	$224.57	—	$250.00	$5,600.99
Moore Fund	5,067.70	224.57	—	—	5,292.27
Willard B. Perkins	7,339.09	269.48	—	—	7,608.57
Richard Lee Russel	2,206.57	80.00	—	—	2,286.57
Henry Saltonstall	10,814.10	449.13	—	400.00	10,863.23
James Savage	14,281.71	449.13	—	500.00	14,230.84
Susan H. Swett	10,595.45	425.00	—	400.00	10,620.45
Totals	$55,931.04	$2,121.88	—	$1,550.00	$56,502.92
FUNDS FOR SCHOLARSHIPS:					
Elisha Atkins	$5,407.05	$224.57	—	$250.00	$5,381.62
Billings Student Fund	52,120.50	2,245.70	—	2,000.00	52,366.20
Jonathan Bourne	—	149.71	$10,000.00	—	10,149.71
Lucius Clapp	5,218.88	224.57	—	200.00	5,243.45
Isaac W. Danforth	5,473.31	224.57	—	250.00	5,447.88
Ann White Dickinson	42,665.29	1,823.20	—	1,700.00	42,788.49
Farnsworth Fund	5,407.05	224.57	—	200.00	5,431.62
Charles Lewis Flint	5,454.56	224.57	—	200.00	5,479.13
Sarah S. Forbes	3,422.57	134.74	—	100.00	3,457.31
T. Sterry Hunt	3,276.23	134.74	—	150.00	3,260.97
Wm. F. Huntington	5,442.15	224.57	—	200.00	5,466.72
Joy Scholarship	10,000.00	437.07	—	437.07	10,000.00
Income Joy Scholarship . . .	3,253.54	—	437.07	63.62	3,626.99
Wm. Litchfield	5,448.05	224.57	—	200.00	5,472.62
Elisha T. Loring	5,457.84	224.57	—	200.00	5,482.41
George H. May	—	187.50	4,250.00	250.00	4,187.50
James H. Mirrlees	3,018.93	112.29	—	100.00	3,031.22
Nichols Fund	5,407.05	224.57	—	200.00	5,431.62
Charles C. Nichols	5,448.34	224.57	—	200.00	5,472.91
John Felt Osgood	5,398.05	224.57	—	200.00	5,422.62
Richard Perkins	56,113.54	2,324.93	—	2,000.00	56,438.47
Thomas Sherwin	5,457.05	224.57	—	200.00	5,481.62
Susan Upham	1,069.09	44.91	—	50.00	1,064.00
Ann White Vose	65,557.36	2,708.89	—	2,400.00	65,866.25
Louis Weissbein	—	59.88	4,000.00	—	4,059.88
Frances Erving Weston . . .	600.00	—	200.00	—	800.00
Samuel Martin Weston	200.00	—	200.00	200.00	200.00
Totals	$306,316.43	$13,058.40	$19,087.07	$11,950.69	$326,511.21
FUNDS FOR PRIZES:					
Arthur Rotch Prize Fund in Architecture	$5,307.05	$224.57	—	$200.00	$5,331.62
Arthur Rotch "Special" Prize Fund in Architecture . . .	5,707.05	224.57	—	200.00	5,731.62
Totals	$11,014.10	$449.14	—	$400.00	$11,063.24

Schedule Q. (*Continued.*)

Invested funds.	*Funds June 30, 1914.*	*Investment income.*	*Other increases or decreases of funds.*	*Expenditures.*	*Funds June 30, 1915.*
FUNDS FOR RELIEF:					
Architectural Society . .	$1,197.14	$44.91	—	$50.00	$1,192.50
Bursar's Fund	6,315.84	264.71	$385.93	469.00	6,497.48
Edward Austin	371,974.31	16,168.68	—	16,574.37	371,568.62
Edward Austin (income reserve)	23,010.76	—	1,616.87	—	24,627.63
Thomas Wendell Bailey .	—	100.50	2,172.24	250.76	2,021.98
Jonathan Whitney . . .	456,119.54	18,341.51	—	2,200.00	472,261.05
Teachers' Fund	124,071.91	4,491.30	—	4,556.56	124,006.65
Morrill Wyman	—	145.97	12,500.00	—	12,645.97
Totals	$982,689.50	$39,557.58	$16,675.04	$24,100.69	$1,014,821.43

Recapitulation of Funds.

Funds for General Purposes	$1,299,703.03	$56,832.52	$126,869.71	$56,313.56	$1,427,091.70
Funds for Salaries . . .	108,100.00	4,855.14	—	4,855.14	108,100.00
Funds for Libraries and Reading Room	29,549.48	1,279.15	—	1,342.08	29,486.55
Funds for Departments .	176,146.16	7,865.68	4,250.00	5,904.98	182,356.86
Funds for Research . . .	80,525.85	3,143.95	30.00	3,109.90	80,589.90
Funds for Fellowships . .	55,931.04	2,121.88	—	1,550.00	56,502.92
Funds for Scholarships. .	306,316.43	13,058.40	18,650.00	11,513.62	326,511.21
Funds for Prizes	11,014.10	449.14	—	400.00	11,063.24
Funds for Relief	982,689.50	39,557.58	16,675.04	24,100.69	1,014,821.43
Grand Total	$3,049,975.59	$129,163.44	$166,474.75	$109,089.97	$3,236,523.81

Schedule R.

INCREASES AND DECREASES OF MINOR FUNDS.

	Funds June 30, 1914.	*Income and other increases of funds.*	*Expenditures and other decreases of funds.*	*Funds June 30, 1915.*
MINOR FUNDS:				
Aerodynamical Laboratory	$983.91	$470.55	$1,454.46	—
American Tel. & Tel. Library Fund	510.48	3,797.23	3,863.25	$444.46
American Tel. & Tel. Research Fund	*1,203.25	9,647.17	8,485.71	*41.79
Cabot Medal Fund	*38.12	39.43	1.31	—
Commercial Research Fund	24.97	60.00	77.45	7.52
Dormitory Fund	2,587.78	51.76	—	2,639.54
Edison Electric Vehicle Fund	*245.20	510.00	368.32	*103.52
Egg Investigation Fund	*400.00	500.00	100.00	—
Electric Railway Traffic Research Fund	610.50	3,084.40	2,192.89	1,502.01
Jacques Fund	727.80	14.56	—	742.36
Letter Box Fund	81.24	30.12	3.50	107.86
Macy Research Fund	153.35	900.64	669.93	384.06
Naval Architectural Fund	51.84	35.00	15.00	71.84
Ozone Fund	50.00	735.82	771.64	14.18
Physico-Chemical Research Fund	763.80	3,085.93	2,108.26	1,741.47
President's Fund	583.92	—	519.09	64.83
Research Laboratory of Applied Chemistry	2,247.80	3,110.03	2,642.37	2,715.46
Research Laboratory of Organic Chemistry	1,581.00	31.62	—	1,612.62
Rochester Experiment Fund	—	150.00	150.00	—
Roentgen Ray Experiment Fund	670.17	13.41	—	683.58
Sanitary Research Fund	3,430.70	3,551.65	5,156.96	1,825.39
Seismological Research Fund	500.00	750.00	1,250.00	—
Terminal Research Fund	188.72	—	198.35	*9.63
Traveling Scholarship in Architecture	—	1,000.00	250.00	750.00
Vehicle Research Fund	1,250.00	75.00	143.23	1,181.77
	$15,111.41	$31,644.32	$30,421.72	$16,334.01

*. Overdrafts.

Schedule S.

CURRENT SURPLUS.

Balance July 1, 1914	$268,912.79
Net increase, Schedule A	16,205.75
Balance June 30, 1915, Schedule D	$285,118.54

Details of Losses and Gains, Etc.

LOSSES AND CHARGES:		
Refund of old deposits previously credited to Profit and Loss	$17.30	
Refund of Students' Fees, 1913–14	250.00	
Gift for Summer Camp credited to income in 1913 and not carried forward	18.75	
Tuitions, unpaid 1913–14 charged off	100.00	
Adjustments, account of Sales of Real Estate	11,154.38	
Total, Schedule A		$11,540.43

GAINS AND CREDITS:		
Summer Camp Fees forfeited	$200.00	
Gains on Sales of Bonds	3,280.60	
Adjustment, account of charge against Cheney Fund omitted in 1912–13	132.00	
Adjustment, account of Richards Fund	250.00	
Loan to School for Health Officers 1913, Paid	517.17	
Total, Schedule A		$4,379.77

September 14, 1915.

To the Auditing Committee
of the Massachusetts Institute of Technology, Boston.

GENTLEMEN:

WE HEREBY CERTIFY that we have examined the books and have audited the accounts of the Treasurer and Bursar of the Massachusetts Institute of Technology for the year ended June 30, 1915.

We have established the assets and liabilities of the Institute as set forth on the balance sheet of the printed report of the Treasurer, except that we have not made a physical inventory of the securities, which we understand has been done by your committee.

The various schedules A to S inclusive, appearing in the printed report of the Treasurer for the year ended June 30, 1915, have been verified by us as being accurately drawn from the books and truly showing the intent of each schedule.

We have verified the details of the bookkeeping during the year, have examined the vouchers for disbursements and have satisfied ourselves that all receipts of money have been acknowledged on the books and deposited in the bank and that the cash balances shown by the books on June 30, 1915, were actually available and that these balances are correct.

Very respectfully,
HARVEY S. CHASE & COMPANY,
Certified Public Accountants.

November 17, 1915.

To the Corporation of the
Massachusetts Institute of Technology:

Your Auditing Committee reports that Messrs. Harvey S. Chase and Company, certified public accountants, employed by this Committee, have examined the accounts of the Treasurer and Bursar of the Massachusetts Institute of Technology for the year ended June 30, 1915, and have verified the cash at office and in banks and that their certificate is hereto annexed.

Your Committee has verified the list of securities as set forth in the Treasurer's Report by certificate of the Old Colony Trust Company, the holder of said securities.

WILLIAM L. PUTNAM,
EDWIN S. WEBSTER,
EBEN S. STEVENS,
Auditing Committee.