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Massachusetts Institute of Technology

REPORTS

OF THE

PRESIDENT AND TREASURER

1916 - 1917

PRESENTED AT THE DECEMBER MEETING OF THE CORPORATION

JANUARY, 1918

TABLE OF CONTENTS

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FRANCIS RUSSELL HART.

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[1] Address correspondence to Professor Allyne L. Merrill, Secretary of the Faculty

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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. It will be convenient to present the topics to be dealt with under three heads: The War, Coöperation, and The Financial Outlook.

THE WAR

Everything that has happened during the year is, of course, greatly overtopped in importance by the entrance of this country into the war. It is a war that differs from all previous wars in history in many respects, but perhaps in none more strikingly than in the extent to which it is a contest, not between sections of nations but between nations and groups of nations as a whole. The methods with which the war is conducted and must be conducted affect the whole adult population of our nation and put to a new and severe test practically every institution in the country, including, of course, the colleges, universities, and technical schools. As an appreciation of the scientific method and a knowledge of scientific principles is perhaps even more essential in war than in peace, it is not surprising that this Institute has already been called upon to play a very active part in the nation's preparations. When the call to the colors came, our students were eager to serve. The advice given to them in general was that seniors should immediately enlist in some branch of the national service, but that all others should continue their studies as patiently as possible and thus prepare themselves for more effective service later. Those who enlisted in the national service were recommended for graduation on their records up to the time of their enlistment. This was in May last, and since then there has been an almost continuous stream of enlistments, the movement having been greatly accelerated recently by the publication of the

selective draft regulations and more especially by the order closing enlistments on the 15th of December. The rules of the selective draft were of such a character as to place practically all the students in Class I, and this, combined with the recommendations made by high officials in Washington that the draft age should be lowered, caused great unrest amongst the students and threatened to lead to a dangerous depletion of the number of students of engineering throughout the country. The seriousness of the situation was brought to the attention of the authorities in Washington by various individuals and societies and as a result the order regarding the closing of enlistments on December 15 has been given an official interpretation so as somewhat to allay the unrest, and what is of more importance, the draft regulations have been altered within the last few days so as to take at least a portion of the student body out of Class I and put them into Class V. This may not go far enough, but it is at least a step in the right direction. Without such a step the country would almost certainly have repeated the experience of some of the allied countries in the early part of the war and found herself with a serious shortage of men trained to apply science to the problems that the war presents. In order to enable the country to prepare men in as short a time as possible for the service of their country the Faculty of the Institute has agreed that during the war work shall go on practically continuously throughout the year. A great many courses were given last summer to enable men to anticipate the work of this year, and as a consequence a large number will be recommended for graduation at the end of this month instead of in June next. The Faculty has decided to make more systematic provision for summer work during the next few years; and by this expedient and by the temporary omission of some courses that are not of the first importance for purposes of war, a material shortening of the courses will be effected.

It would be impracticable within the limits properly set for this report to give any adequate account of the war services that have been rendered by individual members of the Institute's Faculty or the Alumni Association. Alumni are to be found in most responsible positions in practically all branches of the service, both in the Army and in the Navy and in the various lines of activity that are almost as essential to success as the Army and Navy themselves. As regards the Faculty, a considerable number of the members have been granted

leave of absence in order to enable them to enter the national service, and a larger number who are still with us are devoting much of their time and energies to problems arising out of the war. Many of our professors have gone into branches of the service that have long existed, but not a few into new branches that have been developed since the war began. One of the most important of these is the Chemical Section of the Army, which has been placed in charge of a regular officer with Professor Walker as Assistant Director. Professor Walker has been commissioned as Lieutenant Colonel and, with the aid of an organization that is being built up, is attacking the numerous chemical problems that the novel conditions of this war present. As examples of these problems may be mentioned the gas investigations that are being conducted by a large staff of chemists, including five professors of chemistry at the Institute, who have given up their whole time to the work. These investigations include researches on the artificial production of clouds as a means of screening instruments of destruction from observation by the enemy, the use of incendiary mixtures which the methods of the enemy have forced upon us, and the use of gases in offense and defense. Great advances have been made with all these problems. I have stated that five of the professors of chemistry have been granted leave of absence to give their whole time to work of the kind just referred to. This drain on our Department of Chemistry is felt more acutely because many of the members still remaining are engaged in various ways on war problems. For example, Professor Talbot is a member of a national committee appointed to coöperate with the Bureau of Mines in dealing with the special chemical problems that the war is presenting to that Bureau, and Professor Noyes has taken, and is taking, an active part in dealing with the very important problem of maintaining the nitrate supply, which is absolutely essential in the manufacture of explosives. Eighteen months ago, at the request of the Secretary of War, the National Academy of Sciences, in coöperation with the American Chemical Society, appointed a committee to report on the best methods of securing a sufficient supply of nitrogen products (nitric acid and ammonia). Three of the professors at the Institute were members of this committee, Dr. Noyes being chairman. The recommendations of this committee were made in due time, but there was a most unfortunate delay in putting them into practical effect, with the result that an acute crisis was threatened in the

supply of ammonia. The Government is, however, now pushing forward the erection of plants in different parts of the country and meanwhile is carrying on investigations relative to the chemical processes involved in the operation of these plants. Some of these investigations are being made in the Research Laboratory of Physical Chemistry, under the direction of Dr. Noyes. I have mentioned the Chemical Department merely as a type. Time does not permit me to enter similarly into the work being done in other departments (such as that by our professors of mechanical engineering in the development of the Liberty motor and other work of great importance in various fields of applied science), nor to do more than remind you of the important war services of the Alumni Association and its members.

Your Corporation will doubtless be specially interested in the war service of the Institute considered as an organization rather than as a group of individuals. In estimating these services it is necessary to look backwards and remember that the Institute has done a great deal for many years not only to train men in such a way as to be of service in any emergency but to fit them for particular fields of service in times of war. Amongst other things it has for many years trained all the Naval Constructors that are in the service of the Government. Selected groups of men, after graduation from Annapolis, have been detailed to the Institute for a post graduate course of three years' duration leading to a Master's degree in Naval Architecture. In this way the whole corps of Naval Constructors of the United States has been trained at this Institute to deal with the problems presented by the design of ships of the Navy of all types, — battleships, cruisers, submarines, torpedo boats, etc. Moreover, five years ago the Institute established a course in aëronautical engineering, a course laid out on somewhat similar lines to the course in Naval Architecture just referred to. Until shortly before the war the instruction given in aircraft design was in charge of Lieutenant Hunsaker, U.S.N., who was detailed here for this service by the Secretary of the Navy. After graduating from this Institute Lieutenant Hunsaker was sent abroad to study the methods of aircraft design employed in the apincipal centers in Europe, and on his return an aërodynamical lrboratory was built and equipped and the work of instruction begun. This work has gone on steadily ever since, although it was unfortunately affected by Lieutenant Hunsaker's withdrawal to assume very

responsible duties in connection with the design of aircraft for the Navy. Not only has the Institute trained men to design aircraft; it has also, since the outbreak of war, been active in training men for other branches of the aviation service. Early in the summer a Navy Aviation school was established here at the request of the Secretary of the Navy, this being the only school of its kind in the country. Almost the whole of the Walker Memorial was placed at the disposal of the Navy Department for this purpose and there are now over 400 men in the School. This School consists of two parts, the larger designed for the instruction of pilots and the other for inspectors of aircraft and their motors, the whole School being under the command of Lieutenant McKitterick, U.S.N., with Professor Peabody as President of the Academic Board and Mr. Harrison W. Smith, formerly of our Faculty, as Dean of the School. In the school for pilots men arrive in groups every week or two and stay here for ten weeks. They are not taught to fly, instruction in this art being given later in a different School. The function of the ground school is to train men in fundamental matters such as military discipline and a knowledge of the machines that they are to use, with special reference to the motors and the guns. In addition to drill, guns, and motors, the curriculum includes such things as rigging, signaling (including radio work), navigation, meteorology, and photography, all the courses being of a most practical kind and designed to train men as rapidly as possible in matters of fundamental importance in the art that they are to practice.

As I have been speaking of the services of this Institute to the Navy, it may not be out of place here to direct your attention to some of the things that it has been doing for the benefit of the Merchant Marine. It is generally recognized that one of the greatest contributions that this country can make to the success of the war is to build ships and put them on the high seas as rapidly as possible. There has been consequently an enormous stimulus to the shipbuilding industry and a quite phenomenal demand for men trained to deal with various phases of the shipping problem. As the Institute has for a great many years maintained a School of Naval Architecture it has done much to prepare men for usefulness in the present emergency. The demand for men, however, greatly exceeded the supply, and to aid in making good the deficiency the Institute, immediately after the country's entry into the war, instituted an intensive course

in Naval Architecture designed to train men who had had considerable experience in allied fields for service in this one. All the men who took this intensive course almost immediately entered into service, and there is so much evidence that these courses are helping to meet a real need that they are to be continued as long as there seems a demand for them. As so many ships are being built, it is necessary to provide for a proper supply of officers, and here, too, the Institute, through members of its Faculty and Alumni body, has been actively helping. Mr. Henry Howard, an alumnus of the Institute and until recently a member of its Corporation, has been appointed Director of Recruiting Service of the United States Shipping Board, and following his suggestions the Board has provided for the training in large numbers of two groups of officers, engineers and deck officers. It was recognized, of course, that no training of a few weeks' or months' duration could suffice to make men competent for the responsible positions that they would occupy as captains, mates, or engineers and that a considerable amount of practical experience was absolutely essential. In the case of deck officers certain minimum qualifications, depending on practical experience, such, for example, as two years' experience in the deck department of an ocean steamer, or one year's experience as mate of such a steamer, are required before entering the navigation schools that have been set up to meet the present emergency. About thirty of these schools have been established at various points around our coasts and on the Great Lakes, one of these schools being at the Institute and the general oversight of them all being entrusted to Professor Burton, of our Department of Civil Engineering. In the schools for training engineer officers, that is, the first, second, third, or fourth engineer of an ocean-going steamer, similar rules have been laid down. Men before entering the schools must have had certain practical experience; for example, six months' service as chief or assistant engineer on a vessel, or one year's service as stationary engineer in full charge of a plant of not less than 1000 horse power; and in all cases, before a license is granted, six months' service at sea is required either before entering or after finishing the course. Eight of these schools for engineer officers have been established at different parts of the country, one of them being at the Institute, and all of them being supervised by Professor Miller of our Department of Mechanical Engineering.

I have spoken of service to the Navy and to the Merchant Marine,

but I need hardly say that similar services are being performed for the Army. Here, too, the work of the Institute goes back many years, indeed to the very beginning, a certain amount of military training having always been incorporated in the curriculum. For many years this training, in so far as it is compulsory, has been confined to the freshman class, but war conditions have brought about a change and the Faculty has made military service compulsory for both freshmen and sophomores. As normally there are about five hundred students in each of these classes, this involves the training of a large number of men. This training is brief, being confined to three hours per week and being concerned only with matters that are of fundamental importance in the training of any soldier, whatever his rank. The military exercises at the Institute are not, however, confined within these limits. Under the stimulating guidance of Major Cole, U.S.A., several hundreds of men of the junior and senior years have enrolled themselves voluntarily in what is known as "the advanced battalion." These men are undergoing training in matters that are regarded by the military authorities as of special importance for those who are to be officers. In addition to this two separate units of the Reserve Officers' Training Corps, namely Coast Artillery and Signal Service, have been established, and arrangements are in progress for the establishment of two other units, Ordnance and Engineer Corps. This is a matter not only of present but of very considerable prospective importance, as it will doubtless persist after the war and form an excellent means of preparing men for any emergency that may hereafter arise. Another direct service to the Army has been performed, in coöperation with the Signal Corps, in maintaining a school of Military Aëronautics here. Very shortly after the war broke out the Government decided to establish ground schools of military aëronautics — eight schools in different parts of the country, this Institute being the center for the Northeastern Department. The School of Military Aëronautics is at present under the command of Major Sneed, U.S.A., and Professor Breed, of our Department of Civil Engineering, is chairman of its Academic Board. The course is of eight weeks' duration, instead of ten, as in the case of the Navy School, but except for the difference in time the curricula of the two schools are very similar. There are at present between three and four hundred men in the School for Military Aëronautics, all of them being housed in the portion of our buildings normally

devoted to the use of the Department of Civil Engineering. The establishment of the various military schools has made a serious drain upon our resources, particularly in the matter of instructors, and has taxed our space to the utmost. Indeed, it has been necessary to erect a number of buildings of a temporary character to provide space for the extra equipment needed in these schools. This bare outline of the military activities of the Institute can convey no adequate impression of the effect of the war on the work that is being carried on here. Much has been accomplished, and happily accomplished without noise or fluster, but there is doubtless much more to be done, and this is certainly no time for self-satisfaction and far less for self-glorification. It is already apparent that the war is to bring changes in our regular curriculum that are likely to be permanent, and its most important influence up to the present has been its effect on the spirit of students and Faculty alike, an intensifying of the desire for service and a quickening of the impulse to disregard small things and concentrate on matters of larger moment. Particularly is this noticeable in the readiness to consider old problems anew, to rely less on tradition, and thus to maintain an openmindedness that should bring about far-reaching reforms.

COÖPERATION

One of the encouraging signs of the times that has had a marked influence upon the Institute in recent years is the movement towards coöperation. Three matters of large importance that will doubtless affect the development of the spirit of coöperation have happened within the year. One of these has been the successful putting into effect of the scheme of coöperation between the Institute and certain industries that was involved in the establishment of the School of Chemical Engineering Practice. This plan called for the maintenance by the Institute of a professor to direct its educational work at five different stations, namely, (1) the Eastern Manufacturing Company in Bangor, Maine; (2) the New England Gas and Coke Company at Everett, Massachusetts; (3) the Carborundum Company at Niagara Falls, New York; (4) the American Synthetic Color Company, at Stamford, Connecticut; (5) the Atlas Portland Cement Company, at Allentown, Pennsylvania. This coöperative effort went forward most happily until war conditions made it necessary to postpone its operation. The experiment, while it lasted, was

singularly successful, and scarcely any of the minor difficulties that had been expected were actually encountered. For example, some anxiety had been felt that the presence of our students in the factories would cause jealousy amongst the superintendents, foremen, or other employees, but as a matter of fact, the men in the factories at all times quickly assumed a most friendly attitude towards the students and proved most helpful. From an educational point of view, the plan was most successful. All the officers of the various companies concerned coöperated at every point in the most gratifying way, and each of the companies expressed its readiness to take up the work again when the change in war conditions makes this practicable. The reasons for the temporary discontinuance of this important enterprise are easily explained. The Director of the School, Professor Walker, on whose capacity and tact the success of the whole undertaking was largely dependent, has felt constrained to accept the important position in the national service to which I have referred earlier in this report. Most of his assistants have also gone into the national service, and there has been such an unusual demand for well-trained chemists both in the service of the Government and in the industries that practically all the students in the School received offers that they could not properly refuse.

While this coöperative effort has been temporarily abandoned, another plan, similar in some of its aspects, has been adopted during the year and is now being followed. This is in the field of electrical engineering and involves an intimate coöperation between the Institute and the General Electric Company. The fundamental idea here is not new, involving indeed the really very old expedient of an alternation of experiences in a school and an industrial plant. The novelty is merely in the details of the working and in the type of instruction to which the method is applied. After men have been for two years at the Institute a selected number in the Department of Electrical Engineering are given an opportunity, instead of following the regular curriculum at the Institute, of entering upon a course which will require their attendance here for three more years instead of two, the three years being equally divided between instruction at the Institute and practical training at the West Lynn or other works of the General Electric Company. The training at the works is laid out and conducted so as to be correlative with the educational instruction at the Institute. The coöperative training occupying

three years is divided into ten periods, of which the first eight periods, each of approximately four months, are spent alternately in residence at the Institute and in training at the works. During this time each class is divided into two sections which change places at the end of each period. The ninth period occupies nine weeks and is spent by the two sections jointly at the works, and the final period of ten weeks is spent by both sections at the Institute. The work in the shops and in the testing departments and engineering divisions of the Company is supplemented by conferences with the heads of departments, and in these conferences technical and administrative problems arising in the works are intimately discussed. Students in training at the works are subject to the usual regulations of the Company; they receive regular compensation for their work, and the total of this compensation exceeds considerably the charges made for tuition for the three years of the coöperative training. At the conclusion of the course graduates are free to accept employment wherever offered and have no further obligation to the General Electric Company. This plan was adopted in June last and has therefore not been working long enough to have been thoroughly tested. So far, however, everything has gone as well as was expected, and there seems good ground for the hope that it will prove a permanent addition to the educational institutions of the country. At present the most serious doubt arises from the financial difficulties that are involved. The experiment is a somewhat costly one, and although the financial load on the Institute arising from this experiment has been removed for a while, there are numerous financial difficulties ahead in other directions, and the Institute cannot carry on the experiment unaided.

Much larger difficulties in the way of continued coöperation are presented by the recent decree of the Supreme Court with reference to the agreement made some years ago between this Institute and Harvard. That agreement marked an epoch in the history of educational progress in this country. The end sought was to build up an educational machine more useful to the community and to the nation than anything that could be maintained by either the Institute or the University acting independently. It is easy to draw up schemes of coöperation on paper, but less easy to make plans that will actually work. The plan adopted by the two Corporations nearly three years ago has in the meanwhile been put to the actual test of experience and has met that test well. Most, if not all, of the difficulties that were

anticipated by some have either not presented themselves at all or have been easily overcome. The educational power both of the Institute and the University has been greatly strengthened and the cause of science that is applicable to the service of man greatly promoted by this combination of forces. Men taking Institute courses have had the benefit of contact with eminent professors of the University whose influence they would not otherwise have enjoyed, and men taking Harvard courses have similarly benefited by their association with professors of the Institute. All have had the advantage of working in a school pervaded by an admirable professional spirit and of using laboratories the extent and variety of whose equipment is unique. Unfortunately, however, the funds that the University has at its disposal for the promotion of the great science of engineering is almost wholly dependent upon the income from the Gordon McKay Endowment, and the Supreme Court has decreed that this income cannot be applied in the manner indicated by the agreement. It remains to be seen whether another plan can be drawn up that is equally, or nearly equally, workable and effective as an educational instrument and that accords with the view of the Court regarding Mr. McKay's intentions. We should be false to our educational trust if we did not give this matter due consideration and earnestly seek a satisfactory way out. If intimate coöperation between these two institutions was demanded by the exigencies of the situation before the war, it is still more urgently demanded now. With the serious problems that this nation must face during the war and the equally serious problems that must be dealt with in the period of reconstruction thereafter, needless duplication of effort and needless dissipation of energy would be in a high degree reprehensible.

THE FINANCIAL OUTLOOK

From the Treasurer's report that has just been presented, you will have noted that the year therein dealt with registers the high-water mark of the Institute's rising tide of prosperity. The gifts in that year come not far short of five million dollars. The larger part of this, as you know, is due to the stimulus of Mr. "Smith's" remarkable generosity. In June of last year he offered to give five dollars for every three that others gave to the Endowment Fund of the Institute, providing merely that his contribution should not exceed two and

one-half millions. The million and a half needed to secure the full benefit of his generosity were obtained before the end of the year, and thus four millions were added to the treasury of the Institute. This may seem a large sum, and yet it is not so when we consider all that the Institute must do if it is to meet, even in a moderate measure, the needs of the country now and in the not distant future. Only a little more than a year ago we built a great plant here and equipped it with elaborate and costly machinery. Now, as I have said, that building is crowded and the machinery at least in some departments is overtaxed. What we have done is merely a beginning, and if the Institute is to take a part commensurate with the immense importance of applied science amongst the nations of to-morrow it will need vastly greater resources yet. Had it not been for war conditions, the acquisitions to its treasury made during last year would have placed it in an unusually strong position financially and enabled it to effect some large improvements. However, like many other schools in the country, the Institute has been hard hit by the war, partly through the large loss of revenue due to the diminution in the number of students, and still more through the greatly increased cost of operation due to higher wages and enhanced prices of materials. If these conditions do not improve we must look for a contraction rather than an expansion of our educational activities, or serious deficits may result. It is, of course, unfortunate for the Institute that just at the time when these peculiar difficulties have arisen the constitution of this State should be changed so as to make it impossible to secure any appropriations from the Commonwealth after the expiration of the ten-year period fixed by Act of the Legislature in 1911, and indeed to make it somewhat uncertain whether the Institute will get the benefit of what seemed then to be assured. I have said that this is unfortunate for the Institute, but, of course, an educational institution such as this is a mere servant of the community, and it is the community that suffers if the Institute suffers.

While you are considering these matters, the financial consequences of an abandonment of our coöperative agreement with Harvard University ought not to be overlooked. As far as the Institute is concerned in the near future the abandonment of this agreement would be much less serious in its financial aspects than seems generally to be supposed. This arises from the fact that the actual amount of income available from the Gordon McKay Endowment has been

greatly exaggerated in certain quarters. According to the testimony before the Court all that the University has available at present is the income from less than two and one-quarter millions. Under the agreement Harvard does not turn any of this income over to the Institute, but appropriates a portion of it for the maintenance of courses leading to Harvard degrees, these courses being conducted at the Institute. The amount thus appropriated since the agreement went into operation has been $100,000 annually, the major part of this having been employed in paying the salaries of the University's professors and instructors. The whole amount is, as you will have seen from the Treasurer's report, less than one-tenth of the annual expenditure of the Institute. It must not be supposed, therefore, that the Institute will be crippled financially if the agreement with the University is abandoned. None the less, the cause of education may suffer immediately, and the suffering may increase as the years roll on.

RICHARD C. MACLAURIN

Reports of Administrative Officers

REPORT OF THE SECRETARY OF THE FACULTY

In view of the conditions resulting from the declaration of war, the Faculty passed the following resolution, — "That the Faculty of the Massachusetts Institute of Technology hereby records its desire to assist and coöperate with the President and Congress of the United States by affording every opportunity for students to enter for sufficient reasons the service of the United States before the end of the term," and it was voted that candidates for graduation whose records were clear at the time of the declaration of war would upon entering the service of the country be excused from the further exercises of the term, and be at once recommended for their degrees. As a result of this action one hundred and forty-nine candidates for graduation were recommended for their degrees before the close of the term. Many of these men entered an intensive course in Naval Architecture given at the Institute, others took special work to prepare them for the Engineer Corps examinations, while the remainder were either called to active military duty or other government service.

In the summer of 1917 special summer courses were offered in all departments enabling the Junior class to anticipate some of the fourth year work.

Action has been taken in regard to two important course schedules:

First, — a Coöperative Course in Electrical Engineering between the Institute and the General Electric Company has been approved, this course of five years' duration leading to the degrees of Bachelor of Science and Master of Science in the Department of Electrical Engineering. After the second year students who are qualified are admitted to the course and divided into two groups, taking work alternately at the Institute and with the General Electric Company, each period occupying about fifteen weeks, and including

the summer as well as the winter terms. At present only ten men are registered in each group, the course having gone into effect for the present junior class only.

Second, — a revision of the course in General Science has been made, by which there is offered approximately three terms of work in each of the fundamental subjects, — Mathematics, Chemistry, Physics, Biology and Geology. About one-third of the work of the third year and all of that of the fourth year is elective. The student chooses his electives, under the supervision of a special committee in charge of the course, in such a way as to obtain in some branch of science the proficiency which will enable him to write a creditable thesis.

ALLYNE L. MERRILL,
Secretary.

REPORT OF THE DEAN

During the past year there has been inaugurated a new method of dealing with the records of first year students.

The Dean was authorized by Faculty action to appoint a small sub-committee of first year instructors to hold meetings once a week throughout the year. The members of this committee were selected from the different departments of work, and all the instructing staff in the first year were asked to report cases that needed special attention to the sub-committee's representative in their department. Men were referred to the Dean, or to other professors, for advice or warning, without making the reference a matter of Faculty record.

This rather informal method of dealing with first year students at the beginning of their course has been found to be very desirable, and it has materially simplified and shortened the work of the general First Year Committee.

The plan inaugurated last year for the government of the student dormitories proved to be a success, and will be continued.

The Technology Christian Association has been of great assistance in the selection of student advisers for new students, and has continued publishing the very valuable registry of rooms.

The Association is proposing at the present time to start an employment bureau for undergraduates. The Dean will have a general oversight of this work for the present.

Last year was a trying one for the undergraduates, and it was gratifying to note that the student Institute Committee was able to grapple with the difficulties effectively, with little advice or interference from the Faculty.

At the beginning of the year the undergraduate committee advised the students regarding the course to be pursued following the declaration of war, and later indicated to each student, as far as practicable, where he could find opportunities for the most effective service. Volunteer training corps were organized in all the classes, and officered by undergraduates. There were no noisy demonstrations, but a general atmosphere of determined preparation was noticeable.

The classes in Physical Training were held under the direction of Mr. Frank M. Kanaly, assisted by Mr. John W. Kilduff, of the Class of 1919.

The required twenty weeks of compulsory exercise began November 6, 1916, and ended April 11, 1917. During the first term 437 men took the required work, and in the second term 445. The number excused on account of physical disability was 20. The number of students who substituted athletic sports for gymnasium work was 164, divided as follows: track athletics, 83; wrestling, 31; rowing, 24; swimming, 14; heavy gymnastics, 6; hockey, 3; boxing, 3. Seventy-five students failed to pass 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 made in October, 1916, and again in April, 1917. 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 efficiency in class work. The order of these awards is as follows: Harry Montgomery Noelke, '20; George Theodore Corr, '20; Harold Francis Smiddy, '20; Henry William Erickson, '20; and Leland David Wilson, '20. Six men were given Honorable Mention: Henry Rivero Monasterio, '20; Herbert Melancthon Federhen, '20; Malcolm Bruce Lees, '20; William Kennedy MacMahon, '20; Joshua Musnitsky, '20, and Paul Matthew Berko, '20.

One hundred and fifty-seven in the first year class were temporarily excused from work during the year on account of illness; 115 in the second year; 89 in the third year; and 31 in the fourth year. There were three deaths during the year: Mr. P. B. Boyd of the class of 1917, who died April 9, 1917, of pneumonia; Mr. Joseph A. Shepard, of the class of 1918, who died October 16, 1916, of typhoid fever; and Mr. A. J. Gomez, of the class of 1920, who died December 11, 1916, of congestion of the brain.

ALFRED E. BURTON,
Dean.

REPORT OF THE MEDICAL ADVISER

With the beginning of the college year, 1916–1917, Technology was in her new quarters in Cambridge, and the medical adviser occupied the room in building 3–329 as temporary quarters. The permanent offices assigned to the department were yet to be completed, but in February, 1917, the present offices were taken over by this department in building 8–101. Though not yet wholly adequate, they offer facilities superior to anything which the medical advisers have had in the past.

It has been the aim of this department to impress upon the student the need of prompt attention to physical ills, thus avoiding possible complications which might because of lost time embarrass his class standing. As a result, students appear for advice and examination with greater freedom than ever before, with a corresponding better record as to "lost time." The "health education" idea is impressed upon the student as a most necessary complement to his mental development. An effort is made in the consultation hours to impress upon the individual the great advantage that good health adds to natural ability and the great value to the individual who can understand and apply these principles not only to himself but to those who come under his direct supervision.

As a result of precautionary measures in the direction of the students in physical training of various kinds, it is to be noted that fewer accidents have resulted during the past year than in previous years and the general appearance of the students seems to warrant the kind of athletic training that the Institute has adopted. Mr. Frank Kanaly continues to show interest and skill in the furtherance of his duties.

Four lectures "required" were given to the freshmen on Sex and Personal Hygiene, as follows, with excellent attendance:

(1) Physiology and Hygiene of Digestion and Respiration.

(2) Personal Hygiene (hair, teeth, skin, baths, clothing, exercise, etc.).

(3) Physical Training and First Aids.

(4) Sex Hygiene.

The Charlesgate Hospital has offered excellent facilities for our students requiring hospital care, and for the time being, at least, will answer all purposes of a Dispensary.

The First Aid room in the office of the Superintendent of Buildings is most commendable in its plan and application.

The year just started (1917–1918) gives a new plan of protection to the student body. More will be said of this in the next annual report, but it is pertinent at this time (November, 1917) to state that the five days a week plan has brought in more students than during any previous service of the medical department and it is safe to predict that the individual student will lose less time because of injuries or illness by virtue of this added protection. The increased numbers are not to be misinterpreted as indication of poorer health condition; but should suggest the appreciation by the student of the fact that it is to his advantage to attend to indisposition or illness immediately, that he may return to full effectiveness at an earlier date than could be possible should he postpone protecting his physical being.

J. Arnold Rockwell, M.D.

REPORT OF THE LIBRARIAN

The total receipts of the Library during the year ending June 30, 1917, amount to 4,469 items, exclusive of the periodicals received in parts.

The collections of the Institute show a net increase of 4,456 volumes and 74 maps, but there was a decrease in the number of pamphlets, although 505 of these were actually added to the collection. This decrease is partly due to the binding of 830 pamphlets belonging to the Vail Library, which are therefore now listed with the volumes. The total number of pamphlets in the Library have been decreased also by the rejection from the Physical Library of 1727 pamphlets. These were removed from the Library during the year 1915–1916, but at the time of the previous report exact information in regard to them was not available, so that number is now deducted from the total in Table II.

In the statistics for the present year appears also, for the first time, the Crafts Collection, which was received during a previous year. Of this collection 363 volumes have been placed in the Chemical Reading Room, in addition to the 130 volumes which had been previously accessioned, so that now there are 493 volumes of this collection available for use. The rest of the collection consists of duplicates of books already in the Library, and is safely stored with other duplicates in the Rotunda.

Table II shows the total contents of the Libraries of the Institute on June 30, 1917, there being at that time nearly 130,000 volumes and over 48,000 pamphlets and maps. Of these the Central Library contains 84,122 volumes in the main collection, and also 2,000 of the Baldwin collection. In spite of the very great centralization which has taken place in the establishment of the Central Library, we still have over 27,000 volumes distributed among ten or more departmental libraries and reading rooms. The Vail Library, which is at present in temporary quarters, will eventually be incorporated in the Central Library.

TABLE I. NET INCREASE, WITH THE COST OF THE SAME, DURING THE YEAR 1916–1917

	Volumes.	Pamphlets.	Maps.	Cost.
CENTRAL LIBRARY:				
General	271	103		$205.67
Biology	108	15		267.34
Chemistry	284	5		737.32
Civil Engineering	23			
Economics	326	114	..	708.85
Electrical Engineering	187	...	..	379.60
English Literature	16	...	..	28.70
Geology	28	39	74	
History	84	2	..	284.39
Mechanical Engineering	118	...	..	194.44
Military Science				
Modern Languages	4	...	..	7.50
Physics	29	5		
Todd Fund	72	...	..	105.38
Walker Memorial	10	...	..	26.89
Other Departments	21	...	..	27.25
Total Central Library	1,581	281	74	$2,973.33
DEPARTMENTAL LIBRARIES:				
Architecture	88	1	..	451.62
Civil Engineering	350	126	..	640.01
Geology	144	...	..	178.09
Margaret Cheney Room	4	...	..	33.27
Mathematics	71	3	..	98.55
Mining	104	27	..	224.88
Naval Architecture	117	25	..	242.04
Physics	133	...	..	314.40
Total Libraries	2,592	463	74	$5,156.19
SPECIAL COLLECTIONS:				
Vail Library	830	−830	..	4,303.39
Crafts Collection	363	...	..	
Harvard Engineering Library	671	42	..	
Grand Totals	4,456	−325	74	$9,459.58

TABLE II. TOTAL CONTENTS OF THE LIBRARIES OF THE INSTITUTE, JUNE 30, 1917

	Volumes	Pamphlets and Maps
CENTRAL LIBRARY:		
General	9,470	6,155
Biology	4,750	1,516
Chemistry	14,049	3,952
Civil and Mechanical Engineering	16,691	6,859
Economics	13,400	5,258
Electrical Engineering	3,015	215
English Literature	3,591	40
Geology	3,582	4,397
History [1]	3,302	
Military Science	367	9
Modern Languages	2,085	61
Physics	9,005	42
Todd Fund	72	
Walker Memorial	536	
Other Departments	207	1
Total Central Library	84,122	28,505
DEPARTMENTAL LIBRARIES:		
Architecture	5,262	312
Chemistry and Physico-chemistry	289	
Civil Engineering [1]	3,423	126
Economics [1]	1,764	
Geology [1]	2,479	
Margaret Cheney Room	903	15
Mathematics	2,764	400
Mining	6,609	1,297
Naval Architecture and Aëronautical Engineering	2,281	594
Physics	1,323	
Total Libraries	111,219	31,249
SPECIAL COLLECTIONS:		
Harvard Engineering Library [1]	671	42
Vail	14,623	16,866
Baldwin	2,000	93
Wyeth	805	20
Crafts (Room 4–258)	493	
Grand Totals	129,811	48,270

The expenditures of the Library, exclusive of salaries and moving expenses, amounts for the year to $11,801.24, as shown by Table III. The item for "accession by purchase and binding" includes items paid out of the A. T. & T. fund for the Vail Library.

TABLE III. BILLS APPROVED 1916–1917

For accession by purchase and binding	$9,459.58
For subscriptions to periodicals	1,006.87
For office supplies	527.79
For equipment	807.00
	$11,801.24

[1] Number ascertained by actual count.

The war has caused a complete cessation of the receipt of periodicals from Germany, and the suspension of a number of French and English periodicals, so that the total number received during the year 1916–1917 is reduced to 686, of which 255 were paid for out of the appropriation for the periodical account, 147 from the departmental appropriations, and 284 were gifts. The distribution of these periodicals among the different departments is shown by Table IV, from which will be seen also that the estimated cost of these periodicals amounts to $1,572.59, of which $1,068.36 is chargeable to the Periodical Account.

TABLE IV. PERIODICALS RECEIVED DURING THE YEAR 1916–1917, CLASSIFIED BY DEPARTMENTS AND METHOD OF PAYMENT

Libraries	Number Received				Estimated Cost		
	Per acct.	Dept. acct.	Gifts	Tot'ls	Per. acct.	Dept. acct.	Total
CENTRAL LIBRARY:							
General Bibliographical	6	5	4	16	$35.65	$16.10	$51.75
Educational	3	2	6	11	7.10	4.00	11.10
Scientific	2	1	17	19	10.00	1.50	11.50
Miscellaneous	1	2	37	40	4.00	7.80	11.80
Dept. of Biology	21	6	16	43	118.11	28.49	146.60
" " Chemistry	..	..	9	9			
" " Civil Engineering	6	8	17	31	18.25	25.80	44.05
" " Economics	2	..	5	7	4.50	...	4.50
" " Elec. Engineering	2	1	3	6	6.00	1.00	7.00
" " English	16	1	..	17	62.06	2.00	64.06
" " History	9	2	1	12	22.93	5.00	27.93
" " Mech. Engineering	19	6	23	48	53.82	12.92	66.74
" " Modern Languages	7	..	..	7	61.22	...	61.22
DEPARTMENTAL LIBRARIES:							
Architecture	25	1	5	31	107.47	4.00	111.47
Chemistry	12	11	24	47	89.96	78.90	168.86
Civil Engineering	18	15	30	63	52.80	40.50	93.30
Economics	27	25	34	86	91.24	78.25	169.49
Electrical Engineering	14	28	14	56	72.60	93.17	165.77
Geology	8	1	3	12	38.61	1.50	40.11
Margaret Cheney Room	..	10	1	11	...	28.25	28.25
Mathematics	10	1	3	14	33.38	3.00	36.38
Mining	19	2	16	37	68.85	18.67	87.52
Modern Languages	6	..	1	7	18.08	...	18.08
Naval Architecture	8	11	7	26	22.14	39.13	61.27
Physics	14	..	8	22	69.59	...	69.59
Others	..	8	..	8	...	14.25	14.25
Total	255	147	284	686	$1068.36	$504.23	$1572.59

When the Reading Room in the Rotunda was opened, there was still present much of the conditions of moving, and the room seemed to many rather remote from the rest of the Institute, but with time this has been changed, and the use of the Library for reading and reference has happily shown a steady increase.

In the evenings and Saturday afternoons a student attendant is in charge of the Reading Room. During this time the attendance has amounted to 2,243, a daily average attendance of 17 for these hours.

During this year the number of books lent from the Central Library amounts to 6,137, and of periodicals, 495. The lendings from the departmental libraries brings up the circulation of books within the Institute to a total of 20,620, as shown by Table V.

TABLE V. CIRCULATION OF BOOKS, 1916–1917

Architecture, books	3,921
Photographs	5,754
Central Library, books	6,137
Periodicals	495
Civil Engineering	1,025
General Studies	1,250
Geology	777
Mining	763
Naval Architecture	299
Physics	199
Total	20,620

In addition to these, the Institute lent to other libraries 27 volumes, and in return borrowed one volume.

The work on the Vail Library has progressed rapidly during the year under review. Mr. Chapin reports that during this period 847 volumes and 378 pamphlets were catalogued. This involved the writing of some 20,000 cards. A large part of the work consisted of the collection and arrangement of unbound books to go to the binder. There were issued during the year 6,017 orders for binding, which included the binding of 830 pamphlets.

Some rearrangement in the duties of the Library Staff became necessary by the resignation of Miss Florence G. Finley, who had been with us a number of years, first as assistant in charge of the Chemical Library, and afterwards in charge of the Engineering Library. In filling the vacancy made by her resignation, Miss Rose Greenberg was appointed cataloguer. Miss Greenberg graduated

with high honors from Tufts College, and was Assistant for several years in the Somerville Public Library before joining our staff.

The Institute received during the year many valuable gifts of books, among which may be mentioned the receipt of a handsome volume on "Thomas Jefferson, Architect," presented by Mrs. Thomas Jefferson Coolidge, Jr. A valuable collection of publications of the Yale University Press consisting of ten volumes was received. From the Jewish Publication Society of America there was received a very interesting collection of forty-two volumes, illustrating Jewish literature and history.

The largest accession other than by purchase was from Harvard University, consisting of 671 volumes and 42 pamphlets from the Harvard Engineering Library. One of the most useful gifts received by the Institute was 73 volumes which were purchased at the order of Mrs. Edward Cunningham for the use of students at the summer camp in connection with their summer reading.

The Institute is indebted to Mr. C. W. Barron of Boston for a copy of the original edition of Swedenborg's "Opera Philosophica," which was published in three handsome folio volumes, beautifully illustrated. These volumes contain not only Swedenborg's views in regard to Cosmology, Geology, and Mineralogy, but are also valuable for their information concerning the early development of the arts of extracting iron and copper from their ores, and the methods of working these materials.

We are also much indebted to the Reverend John Whitehead, Librarian of the New Church Theological School, for his connection with this gift, he having made the purchase and attended to the re-binding of these volumes in a style suitable to their great rarity and interest.

From the New Church Publishing Society we have also received a complete set of the 28 volumes of the latest edition of the theological writings of Swedenborg.

The following gifts should also be recorded:

Donor	Gift
Frank Aydelotte	English and Engineering.
Cambridge Christian Science Church	Nine volumes on Christian Science.
Chemical Rubber Co.	Handbook of Chemistry and Physics.
Class of 1906	M.I.T. Class of 1906.
Commercial Press Ltd., Shanghai	15 volumes of Chinese publications.

Donor	Gift
K. B. Conger	Military Historian and Economist.
C. R. Cross	Holmes, E. T. A Wonderful Fifty Years.
W. Macneile Dixon	Brittain, H. E. To Verdun from the Somme; also, many other valuable documents on the War.
Doubleday, Page & Co.	The War of Democracy.
E. C. Farnsworth	Farnsworth, E. C. Euphrates and Other Poems.
Fay L. Faurote	Curtiss & Post, The Curtiss Aviation Book.
H. Fay	Microscopic Examination of Steel.
C. B. Fillebrown	Fillebrown, C. B. Principles of Natural Taxation.
John Fritz Medal Board	John Fritz Medal Book.
W. T. Hall	German-English Dictionary for Chemists.
George L. Heath	Heath, G. L. Analysis of Copper and its Ores and Alloys.
E. T. Holmes	Holmes, E. T. A Wonderful Fifty Years.
Walter Humphreys	Vincenz Pollock, Kurze Praktische Geometrie.
A. S. Jenney	Vitruve, Les dix livres d'Architecture.
" " "	Gauthier, M. P. Les plus beaux edifices de la Ville de Gênes. Vols. 1 and 2.
Kenison & E. H. C. Bradley	Kenison & Bradley. Descriptive Geometry.
A. E. Kennelly	Kennelly, A. E. Reprints, Vol. 8, 1915, containing twenty of his Scientific Papers bound in one volume.
F. H. Lahee	Lahee, F. H. Field Geology.
E. F. Langley	Le Mariage de Figaro.
Francisco Lobos	Two books on Chile.
Mrs. J. M. Longyear	Gailhabaud, Monuments Anciens et Modernes, Vols. 1, 2, 3, and 4.
E. I. Lovett, President Rice Institute	Opening of the Rice Institute.
M.I.T.; Alumni Association	Technology Review, Vol. 18.
F. S. & C. H. Pratt	Phineas Pratt and Some of his Descendants.
Chas. F. Prentice	Prentice, C. F. Ophthalmic Lenses and Prisms.
Pullman Co.	The Story of the Pullman Car.
Mrs. Isaac Rich	Engineering books.
W. E. D. Stokes	Stokes, W. E. D. The Right to be Well Born.
Augustus H. Strong	American Poets and their Theology.
H. P. Talbot	American Electrochemical Sociey Transactions. Vol. 29, 1916.
H. W. Tyler	Durrell & Fletcher. Plane Geometry.
Hon. John W. Weeks	Navy Year Book 1916.
F. S. Woods & F. H. Bailey	Woods & Bailey. Analytic Geometry and Calculus.

ROBERT P. BIGELOW,
Librarian.

REGISTRAR'S REPORT

Since 1905–06 the registration of the Institute has steadily increased. Judging by the size of the present first year class (where the average age is distinctly below the draft age) the number of students this year would have been even greater than last year had we not been at war.

The registration of 1918 is 87 per cent of the enrollment of last year. The greatest loss in the classes is the 30 per cent drop in the junior class. The senior class is 25 per cent lower than last year, while the sophomore class is almost the same and the first year class is 7 per cent larger. There are four more candidates for the advanced degree than last year.

Among the professional courses the greatest loss in students is noted in the Department of Architecture, where the drop is over 40 per cent. The courses in Mechanical Engineering and Electrical Engineering have each lost slightly more than 20 per cent; Engineering Administration about 15 per cent; Civil Engineering 7 per cent; while Chemical Engineering has gained 10 per cent and the smaller course in Naval Architecture has risen from 38 to 40 students.

These figures are, as usual, for the first day of November, since which date a considerable number has left the Institute, practically all of them to enter the military service of the country.

While the number of the students in the various professional courses of the Institute has fallen off, the number of students under the roof of the Institute is larger than last year mainly because of the two large schools of aviation, the one for the Army and the other for the Navy. At this moment there are over seven hundred students in these schools. The demand, therefore, on the appointments of the Institute is even greater than last year.

The number of students from other colleges is 57 per cent of last year, and while formerly the larger proportion were graduates, this year there are more undergraduates than graduates. The percentage of the whole student body made up of those from other colleges has fallen from 29 per cent to 23 per cent. For some time the students who have come to us from other colleges have rather generally entered in almost equal numbers either the second or the third year classes, but this year, while the largest number has entered the second year class, the drop in number of these students among the several classes

has been least in the first year. Only one-half as many this year have entered in the senior class and less than one-half in the junior class. The number of colleges represented by their students is still large, namely 175. The 9 per cent drop in the number of colleges is distinctly less than the 33 per cent drop in the number of college men.

The shrinkage in the number of students from the North Atlantic States, which is the geographical group of States from which we receive the largest number of students, is practically the same as it is for the school as a whole. The loss in per cent of the students from other districts is most noticeable from the South Atlantic, where the registration has dropped to a figure which is lower than it has been during the past seven years. The number of students from the Western States is smaller now than it has been for the past ten years. On the other hand, the number of students who have come to us from foreign countries is larger than last year, and with the exception of 1915, the largest in the history of the school. As the number of students in the whole school has dropped, the percentage of foreign students is somewhat larger than ever before, being now over 7 per cent.

China continues to be the country which sends us the largest delegation of foreign students, and this year the countries that sent us more than five students are Canada, Chile, China, Cuba, Japan, and Norway. Twenty-four countries are represented by our foreign students as compared with twenty-five countries last year.

The number of women students has risen from sixteen of last year to nineteen of this year. While the greater number of these studied in the Department of Biology and Public Health last year, and while the same number study there this year, the greatest group of women students is now in the Department of Architecture.

The proportion of new students this year is larger than usual. This is due to the fact that the first year class is larger and that a greater proportion than usual of the upper classes has not returned.

Last June, for the second time in the history of the school, the number of degrees of Bachelor of Science exceeded 300. In addition there were granted four degrees of Doctor of Philosophy, two of Doctor of Engineering, and thirty-two of Master of Science. The degree of Doctor of Philosophy was first conferred in 1907, and of the twenty-seven candidates upon whom it has been bestowed eight have received their Bachelor's Degree from the Institute and four

have received their Master's Degree. The Degree of Doctor of Engineering was first granted in 1910, and of the eight candidates upon whom it has been bestowed five have previously received the Bachelor's Degree from the Institute and two have also received the Master's Degree. The Degree of Master of Science was first granted in 1886, and since then this degree has been conferred 333 times. Of the total number of recipients of the Master's Degree one hundred seventy-one received their Bachelor's Degree also from the Institute.

The average age of students at entrance is 18 years and 11 months and at graduation 23 years and 8 months, both slightly higher than in recent years.

The number in the Faculty is nearly the same as last year, although nine members are absent on account of war service. The combined number of instructors and assistants has fallen from 144 last year to 108 this. Omitting lecturers and research associates and research assistants, the staff numbers 246, as compared with 284 of last year. In percentage this is a diminution identical with that in the number of students.

The amount of undergraduate scholarship assistance given during the school year of 1916–17 was $24,962, which was used to aid 213 students. There were 114 students who received State scholarships, 73 of whom received a whole State scholarship; the balance received a half State scholarship. One hundred and eleven were aided by the State only, hence, with the 213 who were aided from Institute Funds, the total number of students receiving aid either from the Institute or the State or from both was 324. The ratio of students receiving aid to the total number of students was 1 to 6. As previously, the greatest number of students aided in any particular class was the 107 of the third year class.

During the past summer an unusually large number of students attended the summer school. In addition to those who came as usual either to make up deficiencies or to anticipate work, a large number took the special opportunities offered to anticipate some of the fourth year work. At Cambridge military work was carried on by members of the summer school. A delegation of sophomores went to the summer camp at East Machias, where military training was also conducted prior to the regular summer school in Civil Engineering. In the statistics of the summer school, the increased number of students anticipating work will be noted.

Since the last report was submitted this office has been called upon to arrange the program of exercises for the Army School of Aviation and the Naval Aviation Detachment until these schools were organized with special officers who could take up these duties. When the fall term began the hours of exercise were made to conform to the hours of exercise of the regular school. The demand by these schools for recitation rooms has grown, and while a certain group of rooms is assigned to each of these schools, they share other recitation rooms with the students of the Institute itself. Up to the first of November 370 students had passed through the Army School of Aëronautics, and in addition 206 were in attendance. In the Naval Aviation Detachment 198 had passed through the school and there were 241 in attendance on the date mentioned. Since then each of these schools has grown considerably.

The usual tables of statistics are submitted herewith.

THE CORPS OF INSTRUCTORS

	1909–10.	1910–11.	1911–12.	1912–13.	1913–14.	1914–15.	1915–16.	1916–17.	1917–18.
Professors	44	45	41	56	56	69	73	72	71
Associate Professors	14	20	17	16	23	23	24	31	31
Assistant Professors	32	31	33	35	34	36	32	37	36
	— 90	— 96	— 91	—112	—113	—128	—129	—140	—138
Research Professors	—	—	4	16	18	10	7	6	10
			— 95	—128	—131	—138	—136	—146	—148
Number counted twice	—	—	—	11	17	10	7	6	10
Faculty	90	96	95	112	114	128	129	140	138
Instructors	69	66	64	67	74	70	79	90	70
Assistants	51	55	50	49	54	52	58	54	38
					—128	—122	—137	—144	—108
Faculty, Instructors and Assistants	210	217	200	228	242	250	266	284	246
Research Associates	12	8	5	4	3	5	5	5	4
Research Assistants	1	5	6	7	10	16	12	14	7
					— 13	— 21	— 17	— 19	—11
Lecturers	18	21	25	16	19	23	30	31	29
Total Members of Staff*	241	251	245	254	272	291	308	331	284

* Omitting those counted twice.

YEARLY REGISTRATION SINCE THE FOUNDATION OF THE INSTITUTE

Year.	Number of Students.	Year.	Number of Students.	Year.	Number of Students.
1865–66	72	1883–84	443	1901–02	1,415
1866–67	137	1884–85	579	1902–03	1,608
1867–68	167	1885–86	609	1903–04	1,528
1868–69	172	1886–87	637	1904–05	1,561
1869–70	206	1887–88	720	1905–06	1,466
1870–71	224	1888–89	827	1906–07	1,397
1871–72	261	1889–90	909	1907–08	1,415
1872–73	348	1890–91	937	1908–09	1,462
1873–74	276	1891–92	1,011	1909–10	1,481
1874–75	248	1892–93	1,060	1910–11	1,509
1875–76	255	1893–94	1,157	1911–12	1,566
1876–77	215	1894–95	1,183	1912–13	1,611
1877–78	194	1895–96	1,187	1913–14	1,685
1878–79	188	1896–97	1,198	1914–15	1,816
1879–80	203	1897–98	1,198	1915–16	1,900
1880–81	253	1898–99	1,171	1916–17	1,957
1881–82	302	1899–00	1,178	1917–18	1,698
1882–83	368	1900–01	1,277		

THE STUDENTS

Registration by Classes.	Classified.	Unclassified.	Total.
Candidates for advanced degrees, including 2 fellows	42	—	42
Fourth Year	251	31	282
Third Year	204	130	334
Second Year	279	181	460
First Year	397	127	524
Special	—	—	56
Total	1,173	469	1,698

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.	Electrical Engineering VIa	Biology and Public Health.	Physics.	General Science.	Chemical Engineering.	Sanitary Engineering.	Geology.	Naval Architecture.	Electrochemical Engineering.	Engineering Administration.	Aëronautical Engineering.	Mathematics.	Total.
Graduates		—	4	2	3	2	11	6	—	3	3	—	—	—	1	—	—	—	6	1	42
4th	C†	—	45	57	6	20	9	45	—	3	3	1	31	5	—	3	7	16	—	—	251
	U	—	4	4	3	2	1	5	—	—	1	—	3	—	1	3	5	—	—	—	31§
Total		—	49	61	9	22	10	50	—	3	4	1	34	5	1	3	10	21	—	—	282§
3rd	C	—	30	41	5	11	5	25	17	7	1	—	33	7	—	5	3	15	—	—	204§
	U	2	14	22	6	13	6	15	3	5	1	—	13	1	1	4	5	19	—	—	130
Total		2	44	63	11	24	11	40	20	12	2	—	46	8	1	9	8	34	—	—	334§
2nd	C	—	43	47	10	7	5	47	—	2	1	—	59	5	—	10	9	34	—	—	279
	U	9	17	36	4	15	2	19	—	3	—	—	25	2	—	11	9	29	—	—	181
Total		9	60	83	14	22	7	66	—	5	1	—	84	7	—	21	18	63	—	—	460
Specials		5	3	1	3	10	6	4	—	14	—	—	—	1	—	7	1	1	—	—	56
Total	C	—	122	147	24	40	30	123	17	15	8	1	123	17	1	18	19	65	6	1	776
	U	11	35	62	13	30	9	39	3	8	2	—	41	3	2	15	17	53	—	—	342
	Sp.	5	3	1	3	10	6	4	—	14	—	—	—	1	—	7	1	1	—	—	56
Total		16	160	210	40	80	45	166	20	37	10	1	164	21	3	40	37	119	6	1	1,174§
First Year*																					524
																					1,698

* 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 * SINCE 1905

Year.	Engineering Courses.													Science Courses.						
	Civil Engineering.	Mechanical Engineering.	Mining Engineering.	Electrical Engineering.	Chemical Engineering.	Sanitary Engineering.	Naval Architecture.	Naval Construction.	Electrochemical Engineering	Engineering † Administration	Aeronautical Engineering.	Total of Engineering Courses.	Architecture.	Chemistry.	Biology.	Physics.	Geology.	Total of Science Courses.	General Science.	Mathematics.
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	—	—	1,003	130	78	36	12	3	129	3	—
1914–15	197	271	34	205	146	61	25	16	46	57	—	1,057	157	66	44	10	3	123	5	—
1915–16	188	279	46	235	157	60	28	23	50	99	—	1,165	163	59	48	14	4	125	4	—
1916–17	172	270	55	233	173	31	38	26	42	139	—	1,179	142	60	61	11	9	144	4	—
1917–18	160	210	40	186	164	21	40	—	37	119	6	983	80	45	37	10	3	95	1	1

* 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 SEVEN YEARS

This table includes first year students

	1911.	1912.	1913.	1914.	1915.	1916.	1917.
Engineering Courses							
Civil	267	276	264	263	251	234	225
Mechanical	264	273	331	365	329	337	340
Mining	108	91	61	58	49	56	67
Electrical	264	255	244	250	271	282	290
Chemical	161	183	181	205	192	200	267
Sanitary	70	72	80	90	78	69	40
Naval Architecture	41	38	42	52	49	62	74
Electrochemical	41	44	57	53	65	63	55
Engineering Administration	—	—	—	—	102	146	199
Total Eng.	1,216	1,232	1,260	1,336	1,386	1,449	1,557
Architecture	132	145	148	160	183	173	163
Science Courses							
Chemistry	57	71	73	82	82	72	66
Biology	20	25	31	41	51	51	63
Physics	9	9	9	8	16	15	11
Geology	7	4	2	3	6	5	7
Total Science Courses	93	109	110	134	155	143	147
General Science	4	5	3	5	5	4	5
Special and No Course Classification	9	11	18	10	18	17	20
Grand Total	1,454	1,502	1,544	1,645	1,747	1,786	1,892

RESIDENCE OF STUDENTS

NUMBER OF STUDENTS IN EACH YEAR, FROM 1907, COMING FROM EACH STATE OR TERRITORY

States and Territories.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
North Atlantic:	1,049	1,116	1,126	1,118	1,152	1,212	1,279	1,394	1,434	1,502	1,316
Connecticut	29	31	32	33	45	44	45	55	61	69	49
Maine	23	22	20	24	25	24	25	32	23	32	26
Massachusetts	781	839	852	840	860	890	954	1,032	1,060	1,110	1,005
New Hampshire	27	24	27	27	29	28	34	34	27	30	26
New Jersey	17	14	14	18	33	34	38	48	54	53	47
New York	82	99	99	106	90	108	102	113	121	122	101
Pennsylvania	57	53	46	37	39	43	42	42	46	57	31
Rhode Island	28	28	30	27	25	33	34	31	35	17	19
Vermont	5	6	6	6	6	8	5	7	7	12	12
South Atlantic:	48	51	44	41	49	45	66	66	72	81	43
Delaware	1	—	1	1	1	2	2	3	5	4	7
Dist. of Columbia	10	10	8	5	13	12	21	18	19	27	10
Florida	3	6	5	1	2	3	5	2	5	7	1
Georgia	2	3	4	5	3	3	4	3	5	5	3
Maryland	18	17	12	14	8	8	16	18	13	9	4
North Carolina	—	1	—	—	1	2	4	2	4	5	4
South Carolina	2	—	2	1	3	—	5	6	9	9	4
Virginia	9	11	10	12	15	13	8	11	8	8	6
West Virginia	3	3	2	3	3	2	1	3	4	7	4
South Central:	36	38	37	37	48	46	43	50	54	49	42
Alabama	4	3	5	4	6	3	5	5	5	5	6
Arkansas	2	1	2	2	2	2	1	2	1	1	—
Kentucky	5	4	4	2	8	7	10	10	8	9	6
Louisiana	—	3	2	5	4	4	5	5	7	7	5
Mississippi	3	3	3	6	8	7	5	6	5	2	4
Tennessee	6	8	8	5	3	2	2	5	5	8	3
Texas	16	16	13	13	17	21	15	17	23	17	18
North Central:	142	121	123	140	141	137	115	115	152	146	124
Illinois	31	23	24	33	30	25	15	27	37	31	27
Indiana	12	9	11	10	9	10	9	7	12	5	9
Iowa	16	14	5	4	9	8	11	10	12	6	1
Kansas	5	4	6	9	7	8	3	4	2	3	1
Michigan	8	7	10	9	9	7	12	14	15	16	14
Minnesota	8	8	10	8	7	14	15	6	5	6	4
Missouri	14	6	7	13	12	13	3	5	10	18	15
Nebraska	3	2	4	6	8	8	8	5	5	5	3
North Dakota	4	3	3	3	3	3	2	3	3	1	—
Ohio	26	30	27	33	37	32	25	28	44	43	42
South Dakota	3	3	5	3	2	2	2	1	3	1	1
Wisconsin	12	12	11	9	8	7	10	5	4	11	7
Western:	49	54	59	53	57	65	63	72	59	52	46
Alaska	—	—	—	—	—	1	1	—	—	—	1
Arizona	—	—	—	1	1	1	—	—	—	1	—
California	14	20	25	21	23	22	23	30	25	22	16
Colorado	10	5	6	9	11	14	13	14	11	8	7
Idaho	—	1	—	—	—	—	1	2	1	2	1
Montana	3	2	3	2	2	4	4	3	2	1	3
Nevada	1	1	—	—	—	—	—	—	—	—	—
New Mexico	1	1	1	—	—	1	1	1	1	—	—
Oklahoma	1	1	—	—	—	1	2	—	—	1	—
Oregon	3	4	7	8	11	14	11	10	5	6	6
Utah	3	5	5	3	3	2	2		5	5	5
Washington	12	13	11	9	6	6	5	10	7	4	4
Wyoming	1	1	1	—	—	—	—	—	2	2	3

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
Districts.	6	9	11	15	11	6	6	5	4	5	4
Canal Zone	1	1	1	1	—	—	—	—	—	—	—
Hawaii	2	1	2	2	3	2	1	2	1	—	1
Philippine Islands	1	1	1	4	3	1	2	1	1	2	—
Porto Rico	3	6	7	8	5	3	3	2	2	3	3
Total for the United States	1,331	1,389	1,400	1,404	1,458	1,511	1,572	1,702	1,775	1,835	1,575

Number of Students in Each Year, from 1907, Coming from Each Foreign Country

	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.
Foreign Countries.	79	72	79	102	101	100	113	114	125	122	123
Albania	—	—	—	—	—	—	—	—	—	—	1
Argentine Republic	2	2	4	5	2	1	—	—	1	1	1
Armenia	2	2	—	—	—	—	—	—	—	—	—
Australia	—	—	—	—	1	—	—	—	—	—	—
Austria-Hungary	3	—	—	2	1	2	1	2	1	1	1
Belgium	1	—	—	—	—	—	—	—	—	—	—
Brazil	2	3	1	2	3	5	7	4	1	1	4
Bulgaria	—	—	1	—	—	—	—	—	1	—	—
Canada	9	15	20	18	19	13	14	15	14	16	10
Cape Colony	1	1	—	—	1	—	—	1	—	—	—
Central America	—	1	—	—	—	2	—	2	—	—	—
Chile	1	1	1	3	1	—	1	—	—	8	10
China	9	10	11	27	36	37	42	46	49	40	42
Colombia	—	—	—	—	—	—	1	3	4	3	2
Costa Rica	2	3	2	1	1	—	1	—	—	1	1
Cuba	4	2	7	5	3	6	7	3	2	8	6
Cyprus, Island of	—	—	—	—	—	—	—	—	1	—	—
Denmark	1	1	—	1	1	—	2	1	1	1	3
Ecuador	2	2	1	1	1	1	1	—	—	1	1
Egypt	2	2	1	1	2	1	1	1	1	1	1
England	4	3	—	1	1	—	—	1	1	1	—
Finland	—	—	—	1	—	—	—	—	—	—	—
France	—	—	—	2	2	3	4	2	—	—	—
Germany	—	—	1	1	2	3	2	2	3	1	—
Greece	—	—	—	—	1	1	1	1	—	—	2
Guatemala	—	—	—	1	—	—	1	1	1	—	1
Honduras	—	1	3	3	2	—	1	1	2	3	3
India	1	2	1	—	—	2	1	2	2	1	—
Ireland	3	1	—	—	—	—	—	—	—	—	—
Italy	2	1	1	1	—	—	—	—	1	2	—
Jamaica	—	1	1	1	1	—	—	—	—	—	—
Japan	3	4	4	4	3	—	1	1	6	8	11
Korea	—	—	—	—	—	2	—	—	—	—	—
Mexico	12	6	10	9	5	4	7	7	10	9	5
Newfoundland	—	—	—	—	1	1	1	—	—	—	—
New Zealand	—	—	1	1	2	1	—	—	—	—	—
Nicaragua	—	—	—	—	—	—	—	—	2	—	—
Norway	—	—	—	1	—	—	—	—	2	3	6
Paraguay	1	1	1	1	1	1	1	1	—	—	—
Peru	2	2	1	2	1	—	2	3	3	—	2
Poland	1	—	—	—	—	—	—	—	—	—	—
Portugal	—	—	—	1	—	—	1	—	1	—	—
Russia	2	2	2	2	3	4	4	5	2	2	1
Salvador	—	—	—	1	—	—	1	—	3	1	—
Scotland	1	—	—	—	—	—	1	1	—	—	—
Siam	—	—	—	—	—	—	—	—	1	1	—
South African Republic	—	—	—	—	—	1	1	—	1	—	—
Spain	—	—	—	—	—	—	—	—	—	—	2
Sweden	—	—	—	—	—	—	—	—	—	—	2
Switzerland	—	—	1	1	1	—	—	—	—	—	—
Syria	—	—	—	1	2	3	2	2	—	1	—
Transvaal	3	2	1	2	—	—	—	—	—	—	—
Turkey	2	1	2	2	1	5	3	6	8	6	5
Uruguay	1	1	—	—	—	—	—	—	—	—	5
Total in school	1,410	1,461	1,471	1,506	1,559	1,611	1,685	1,816	1,900	1,957	1,698

Women Students

Year and Classification.		Course.						
		Architecture.	Chemistry.	Biology & P. H.	Geology.	Electro-chemistry.	No Course Classification.	Total.
First Year { Classified. . . .	1	—	—	—	—	—	—	1
First Year { Unclassified. . .		—	—	—	—	—	—	
Second Year { Classified . . .	2	1	—	—	—	1	—	4
Second Year { Unclassified. .	1	1	—	—	—	—	—	
Second Year { Special	1	1	—	—	—	—	—	
Third Year { Classified . . .	2	1	—	1	—	—	—	9
Third Year { Unclassified . .	3	1	1	1	—	—	—	
Third Year { Special	4	1	1	—	—	—	2	
Fourth Year { Classified . . .	1	—	—	1	—	—	—	5
Fourth Year { Unclassified . .	2	—	1	—	1	—	—	
Fourth Year { Special	2	—	—	2	—	—	—	
Total	19	6	3	5	1	1	2	19

Statistics of Admission

	Classified.	Unclassified.	Total.
Admitted clear	206	3	209
" with one condition	80	28	108
" with more than one condition	34	56	90
" on examination	320	87	407
" on certificate *	23	8	31
Total First Year Class	397	127	524

Admitted but did not enter	53
Candidates at June Entrance Examinations	744
Candidates in September for Entrance and Advanced Standing Examinations	362
Certificates of the College Entrance Examination Board submitted . .	215

* Because of agricultural or military service a few students have been admitted on certificates from preparatory schools.

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	1,528	1,042	486	249	237
1904–1905	1,561	986	575	295	280
1905–1906	1,466	984	482	213	269
1906–1907	1,397	862	535	272	263
1907–1908	1,415	888	527	273	254
1908–1909	1,462	868	594	323	271
1909–1910	1,479	890	579	317	262
1910–1911	1,506	944	562	283	279
1911–1912	1,559	932	627	312	315
1912–1913	1,611	984	627	310	317
1913–1914	1,685	1,049	636	295	341
1914–1915	1,816	1,084	727	348	379
1915–1916	1,900	1,146	754	321	433
1916–1917	1,957	1,165	792	369	423
1917–1918	1,698	1,005	693	385	308

Graduate Students

American Colleges and Universities Represented

	1912–13.	1913–14.	1914–15.	1915–16.	1916–17.	1917–18.
Akron	..	..	..	..	..	3
Alabama	2	2	2	1	2	2
Alabama Polytechnic Institute	..	1	..	1	2	1
Albany Medical	..	..	..	1	..	..
Alfred	..	..	..	..	..	1
Allegheny	1	1	1	..	..	1
Amherst	3	7	8	6	10	3
Arizona	..	..	..	..	..	1
Armour Institute of Technology	..	..	..	..	2	1
Baldwin	..	1	..	..	..	..
Baltimore Medical	..	..	1	..	..	..
Bates	3	3	3	..	4	3
Baylor	1	1	2	1	1	..
Bellevue	..	..	1	..	1	..
Bellevue Hospital, Medical	..	..	..	1	..	..
Beloit	2	3	2	1	2	2
Bethany	..	..	..	..	..	1
Boston College	4	2	2	..	3	1
Boston University	3	2	..	1	4	2
Bowdoin	2	4	2	..	4	..
Brooklyn Polytechnic Institute	..	..	..	..	2	1
Brown	3	4	2	1	2	2
Bryn Mawr	1	..	..	..	..	..
Bucknell	..	1	..	..	..	..
Buffalo	..	..	..	..	..	1
California	..	1	2	3	7	4
Canisius	2	..	..	..	1	..
Carnegie Institute of Technology	..	..	1	..	1	1
Case School of Applied Science	1	..	1	..	6	1
Catholic University of America	..	..	1	..	5	3
Charleston	..	1	1	2	1	..
Chicago	1	1	1	..	1	1
Cincinnati	..	..	1	1	1	1
City of New York	4	1	2	2	3	7
Clark	1	4	3	2	1	1
Clemson Agricultural	..	1	1	..	..	..
Colby	1	2	1	1	3	2
Colgate	..	1	1	2	2	3
Colorado Agricultural	..	..	..	1	1	..
Colorado College	1	..	1	1	1	..
Colorado School of Mines	1	..	2	..	1	1
Colorado University	..	..	1	..	1	1
Columbia	1	2	3	4	6	3
Cooper Union	..	..	..	..	1	..
Cornell University	1	..	1	2	9	8
Cornell (Iowa)	..	..	..	1	..	1
Cotner	..	..	..	..	1	..
Creighton	..	1	1	1	..	..
Dakota Wesleyan	..	..	..	1	..	..
Dartmouth	9	7	7	4	22	15
Davidson	..	..	..	..	..	1
Davis & Elkins	..	..	..	..	1	1
Delaware	..	..	..	..	..	1
Denison	2	2	2	4	2	2
Denver	..	..	..	..	2	1
Doane	..	..	1	..	..	..
Drake	2	1	..	..	1	..
Drury	..	..	..	..	2	..
Earlham	..	..	1	..	..	..
Fargo	..	..	..	..	1	..
Franklin and Marshall	1	1	..	..	1	..
Furman	..	1	1	1	..	1
Geneva	..	..	..	..	1	..
Georgetown	1	2	1	1	2	1
George Washington	..	..	..	..	..	1
Georgia	..	..	1	..	1	1
Georgia School of Technology	..	2	1	1	4	2
Gonzaga	1	1	2	2	1	..
Grinnell	..	..	..	2	2	..
Grove City	1	..	..	..	..	..
Hamilton	3	3	3	3	4	2
Hamline	1	1	..	..	..	..
Harvard	8	11	23	44	46	27
Haverford	..	..	..	..	3	..
Highland Park	..	1	..	..	..	..
Hobart	..	1	..	1	1	..
Holy Cross	1	3	1	1	1	3
Hospital College of Medicine	..	..	1	..	..	..
Indiana Medical College	..	..	..	..	..	1
Illinois	2	2	2	3	5	4
Iowa State	..	1	..	1	2	..
Jefferson Medical	..	..	1	..	..	..
John B. Stetson	..	..	..	..	2	..
Johns Hopkins	2	3	1	2	1	..
Juniata	..	..	1	..	..	..
Kalamazoo	..	..	..	..	2	2
Kansas	2	..	..	1	2	4
Kentucky	..	..	1	1	1	1
Kenyon	..	..	1	..	..	..
Lafayette	2	1	2	..	1	..
Lake Forest	..	..	..	1	1	2
Lawrence	..	..	..	..	1	1
Lehigh	..	..	..	..	4	5
Leland Stanford Junior	1	..	1	1	2	1
Lincoln	..	..	..	..	1	..
Lombard	..	..	..	1	1	1
Louisiana State	..	..	..	..	1	1
Louisville	..	..	..	..	1	..
Loyola	..	..	1	1	1	1
McMaster University	..	..	..	..	..	1
Maine	..	1	..	3	7	2
Manhattan	..	..	..	..	..	1
Marietta	..	..	1	1	..	..
Maryville	..	..	..	1	1	1
Massachusetts Agricultural	..	..	1	1	6	3
Mass. Institute of Technology	17	22	32	3	16	14
Mercer	..	..	..	..	..	1
Miami	..	..	1	2	2	3
Michigan	3	6	3	4	4	2
Michigan Agricultural	1	..	1	1	..	..
Michigan College of Mines	..	..	..	1	1	..
Middlebury	1	3	2	1	2	..
Millsaps	..	..	..	..	..	1
Minnesota	2	1	1	2	3	2
Mississippi	1	..	..	..	..	1
Mississippi Agricultural and Mech.	..	2	3	3	2	..
Missouri	..	..	..	1	3	2
Monmouth	..	..	..	1	1	..
Montana	1	1	..	..	..	1
Montana School of Mines	..	..	..	..	..	1
Moore's Hill	..	..	..	1	1	1
Mount Holyoke	..	..	2	..	1	..
National Univ. Law School	..	..	..	1	..	..
Nebraska	2	1	..	..	1	1
Newberry	..	..	..	..	1	..
New Hampshire Agr. & Mech.	..	..	..	..	1	1
New Mexico	1	1	1	..	..	..
New York University	3	3	1	..	2	1

GRADUATE STUDENTS — *Continued*

American Colleges and Universities Represented

	1912–13.	1913–14.	1914–15.	1915–16.	1916–17.	1917–18.
North Carolina	1	2	..	2	6	4
North Dakota Agricultural	2	1	..	..	..	..
Northwestern	..	1	1	..	3	1
Norwich	..	..	..	..	4	1
Notre Dame	..	..	..	..	2	4
Oberlin	3	3	1	2	5	..
Occidental	2	2	..	1	1	2
Ogden	..	1	1	2	1	..
Ohio Northern	..	..	1	..	..	..
Ohio State	1	..	..	2	2	..
Ohio University	..	..	..	2	1	..
Ohio Wesleyan	..	..	1	1	1	1
Oklahoma Agr. & Mech.	..	1	..	..	1	..
Oregon	1	1	1	1	..	1
Oregon Agricultural	1	..	1	1	1	3
Otterbein	1	..	..	..	..	..
Park	1	1	1	..	..	..
Pennsylvania (Gettysburg)	..	..	..	1	2	..
Pennsylvania Military	..	..	..	..	..	..
Pennsylvania State	2	1	1	..	..	..
Pennsylvania University	1	1	1	1	3	..
Pittsburgh	..	..	3	2	10	5
Pomona	1	..	1	1	..	1
Princeton	..	..	..	..	..	1
Purdue	3	6	6	6	9	4
Radcliffe	..	3	3	3	3	2
Randolph-Macon	..	1	..	2	4	4
Reed	..	..	1	..	..	..
Rensselaer Polytechnic Institute	..	..	..	1	1	..
Rhode Island State	..	..	..	..	3	1
Rice Institute	..	..	..	1	1	1
Rochester	..	..	..	..	1	1
Rose Polytechnic Institute	..	..	1	3	7	4
Rutgers	..	..	..	..	..	4
Rush Medical College	..	..	..	..	1	..
Saint Anne	..	..	..	..	..	1
St. Anselm	..	..	..	..	1	..
Saint Francis Xavier	..	..	..	..	1	1
Saint Francis Xavier (Antigonish, N. S.)	1	..	..	..	1	1
Saint Louis	..	..	..	..	..	2
Saint Mary's	3	..	..	..	..	..
Saint Olaf	1	1	1	..	..	..
Simpson	1	1	1	..	1	..
Smith	2	2	2	..	..	..
South Carolina	1	2	1	2	..	1
South Carolina Military	..	..	..	2	..	..
South Dakota State	1	..	2	1	3	3
Southern California	..	1	1	..	..	..
Southwestern	..	1	1	..	..	..
Spring Hill	4	4	2	3	1	..
Stevens Institute of Technology	..	..	1	..	..	3
Syracuse	1	1	3	1	2	1
Tarkio	1	..	..	..	..	..
Tennessee	1	1	2	2	1	1
Texas	4	3	4	2	3	4
Texas. Agr. & Mech. Coll. of	1	1	..	4	4	2
Throop	..	..	..	..	2	..
Trinity (Hartford, Conn.)	..	..	3	2	..	1
Trinity (Washington, D. C.)	..	..	..	2	2	1
Trinity (N. C.)	..	..	..	1	..	..
Tufts	..	..	3	1	14	7
Tulane	..	..	..	1	1	1
Union	..	1	1	1	2	3
U. S. Military Academy	1	1	..	..	3	1
U. S. Naval Academy	6	8	10	15	22	1
Univ. of the South	..	..	..	..	1	..
Ursinus	..	1	1	1	1	..
Utah	..	..	..	..	2	3
Utah Agricultural	..	..	..	..	1	..
Valparaiso	..	..	1	..	1	1
Vanderbilt	..	..	..	..	1	1
Vermont	..	1	..	..	2	3
Virginia	2	1	5	4	3	3
Virginia Military	1	..	3	7	5	4
Virginia Polytechnic Institute	..	1	..	1	..	..
Wabash	1	..	..	..	..	..
Washburn	2	..	1	1	3	..
Washington	1	..	1	..	6	2
Washington (St. Louis)	..	..	..	..	..	1
Washington & Jefferson	2	1	1	..	2	1
Washington & Lee	2	1	1	2	4	3
Washington State	..	..	..	..	1	..
Wellesley	2	..	..	1	..	2
Wesleyan	..	..	1	1	7	5
Western Reserve	..	..	1	..	1	1
West Virginia	..	..	..	1	..	..
Whitman	1	1	1	1	..	1
William Jewell	..	..	1	1	..	1
William and Mary	1	1	2	1	1	..
Williams	11	11	10	12	10	5
Wisconsin	..	2	1	2	4	4
Wittenberg	..	..	..	1	..	..
Wofford	..	..	..	..	1	..
Wooster	1	2	2	3	3	1
Worcester Polytechnic	..	1	..	..	9	11
Wyoming	..	..	..	1	2	4
Yale	7	8	19	25	21	10
Yankton	1	..	..	..	..	..

GRADUATE STUDENTS — *Continued*

Foreign Colleges and Universities Represented

	1912–13.	1913–14.	1914–15.	1915–16.	1916–17.	1917–18.
Acadia University	..	..	..	..	2	..
Aix la Chapelle	..	..	..	..	..	1
Anhui Provincial (China)	2	2	..	..	..	..
Belgian Institute (Liege)	..	..	..	..	2	..
Cambridge (England)	..	..	..	..	1	..
Central Technical	..	..	..	1	..	..
Central Turkey	..	1	1	1	3	..
Central University of Quito	..	..	..	..	1	1
Chalmers Institute of Technology (Sweden)	..	..	..	..	..	1
Chile	..	1	..	..	2	4
Chi-li Provincial (China)	1	1	1	1	..	..
Chinese Naval	4	4	4	4	4	2
Christiana	..	..	..	..	..	1
Colegio Mayor de Unestra del Rosario	..	..	..	1	1	1
Dalhousie	..	1	1	..	1	..
Dulwich College	..	..	..	..	..	1
Durham	..	..	..	3	..	..
Ecole Polytechnique (Montreal)	..	..	..	1	..	..
Escuela Industrial (Buenos Ayres)	1	..	..	..	..	..
Euphrates (Turkey)	1	..	..	..	1	2
France	1	1	..	..	..	..
Gymnasium of Salonica	..	..	1	..	..	..
Havana	3	2	..	..	2	2
Hong Kong	..	..	..	..	..	2
Imperial German Naval College	..	..	..	..	1	..
Imperial Polytechnic (Shanghai)	8	8	7	2	..	..
Imperial Technical School (Moscow)	..	..	..	..	..	1
Inst. National of Honduras	..	..	..	..	2	1
Institute National Central (Salvador)	..	..	..	2	1	..
Japanese Naval Engineering (Tokio)	1	1	..	..	1	1
Knarof Imperial University	..	..	..	..	..	1
Kiang Nan Provincial	..	1	1	1	..	..
Köng. Techn. Hochschule	..	..	..	1	..	..
Kyoto Imperial	..	..	..	1	2	1
London University	..	..	..	1	1	..
McGill (Montreal)	2	1	..	..	4	1
McGill (Vancouver)	..	..	..	..	1	1
Mackenzie College	..	..	..	..	..	1
Madrid	..	..	..	..	..	1
Manitoba	..	..	2	1	2	..
Meizi College of Technology	..	..	..	..	1	1
Melbourne	1	..	..	..	..	..
Montevidio	..	..	..	..	..	1
Manking (China)	3	..	..	..	..	..
Nanyang	..	..	..	..	4	6
National (Paraguay)	..	1	1	..	..	..
Naval Academy (Chile)	..	..	..	..	6	6
Naval College (Canton)	..	..	..	3	1	..
Naval College (Cheetoo)	..	..	..	1	..	..
Osaka Technical	..	..	..	..	..	2
Oxford	1	..	..	..	..	..
Paris	..	..	..	..	2	..
Pei-Yang	..	..	..	..	..	2
Pekin	..	..	..	1	1	..
Philippines	..	..	1	..	1	..
Porto Algere School of Engineering	..	..	..	..	..	1
Presidency (Calcutta)	..	1	1	1	..	..
Robert College (Turkey)	..	..	..	..	1	..
Royal Inst. of Technology (Stockholm)	..	..	..	..	..	1
Royal Military (Canada)	1	..	..	..	..	..
Royal Tech. (Copenhagen)	..	1	..	..	..	1
Saint John's University (Shanghai)	2	2	2	3	2	2
Santa Clara (Cuba)	..	..	1	1	2	2
Scientific & Lit. Inst.	1	..	..	..	..	..
Syrian Protestant	4	3	3	4	3	2
Technical Hochschule (zu Darmstadt)	..	..	..	..	2	1
Technical Hochschule (Karlsruhe)	..	..	..	..	1	1
Technical Hochschule (zu Sachen)	..	..	..	..	1	1
Technical School of Athens	..	..	..	..	..	1
Tokio Imperial	..	..	..	4	2	2
Tomsk Institute of Technology	..	..	1	..	..	..
Tong-Shan Eng. College	..	..	..	..	1	3
Toronto	..	1	2	..	1	1
Tsing Hua	..	..	2	2	11	6
Turin	..	..	..	..	1	1
Union Medical (Pekin)	..	..	..	1	..	..
Universidad National	..	..	..	..	1	..
Waseda University	..	..	..	..	..	1
Wuchang (China)	1	1	1	..	..	..

Graduates who are candidates for Advanced Degrees	42
Graduates who are pursuing undergraduate work	127
Colleges and Universities represented	175

NEW STUDENTS FROM OTHER COLLEGES BY YEARS

Class Joined at Institute.	Years Spent at College.				Total
	One.	Two.	Three.	Four, or more.	
First Year	25	8	—	3	36
Second Year	25	20	3	10	58
Third Year	—	6	13	19	38
Fourth Year	—	—	3	23	26
Graduate Year	—	—	2	16	18
Total	50	34	21	71	176

COLLEGE STUDENTS AMONG THE COURSES

Graduates and Students from Colleges. 23% 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.	Electrochemical Eng.	Engineering Administration.	No Course Classification.	Aëronautical Engineering.	Mathematics.	Total.
Graduates	6	29	18	15	12	15	29	14	2	—	4	3	1	8	1	5	—	6	1	169
Non-graduates	31	27	35	5	19	8	19	2	1	—	31	1	1	9	5	27	3	0	0	224
Total	37	56	53	20	31	23	48	16	3	—	3	4	2	17	6	32	3	6	1	393

AGES OF STUDENTS

CLASSIFIED FIRST YEAR STUDENTS, OCTOBER, 1917

Period of Life.	1916–1917.		1917–1918.	
	Half-year Groups.	Yearly Groups.	Half-year Groups.	Yearly Groups.
Under 17	8	8	13	13
17 to 17½	28	—	33	—
17½ to 18	44	72	47	80
18 to 18½	85	—	69	—
18½ to 19	46	131	48	117
19 to 19½	57	—	65	—
19½ to 20	24	81	33	98
20 to 20½	35	—	39	—
20½ to 21	15	50	13	52
21 to 22	14	14	16	16
22 to 23	6	6	4	4
	362	362	380	380

Repeating the first year 12
Students of unusual age 5
Average age, omitting these 21 . . . . . 18 years, 11 months

THE GRADUATING CLASS, JUNE, 1917

Those receiving the S.B. degree in one course

Below 20 years	3
Between 20 and 21	7
" 21 " 22	45
" 22 " 23	72
" 23 " 24	82
" 24 " 25	49
" 25 " 26	39
" 26 " 27	12
" 27 " 28	9
" 28 " 29	2
" 29 " 30	3
Total	323

The average age, omitting those below 20 and over 29, was 23 years and eight months.

STATISTICS OF GRADUATION, CLASS OF 1917

Number receiving degree after one year at the Institute	12
" " " " two years at the Institute	48
" " " " three years at the Institute	48
" " " " four years at the Institute	181
" " " " more than four years at the Institute	41
Total number of degrees of S.B. awarded	330
Number entering from other colleges	116
" of graduates among these	68
" of non-graduates among these	48

FURTHER STATISTICS OF THE STUDENTS FROM OTHER COLLEGES OF THE GRADUATING CLASS, JUNE, 1917

Years at the Institute.	Graduate.	Non-graduate.	Total.
1	8	4	12
2	41	7	48
3	17	25	42
4	2	6	8
More than 4	—	6	6
	68	48	116

SUMMER SCHOOL

	1916.	1917.
Number from other colleges and schools attending	113	68
Number not referring to any other school or college	1	—
Number from Massachusetts Institute of Technology	436	562
	550	630
Registrations for failures or deficiencies	275	146
Registrations to anticipate work	684	973
Number who attended Summer School but did not return for Registration	164	99

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.	Electro-chemistry.	Engineering Administration.	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	507
1890	25	28	3	5	13	18	3	2	6	—	—	—	—	—	—	103	
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	1,573
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	2,256
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	26	12	43	2	1	—	30	15	—	4	8	—	269	
1914	60	65	17	19	9	51	6	1	4	37	19	—	8	8	—	301*	
1915	49	69	5	30	23	42	3	3	2	33	12	—	7	10	—	286*	
1916	45	84	5	37	11	56	5	3	2	32	18	—	9‡	14	—	318*	
1917	48	61	14	25	12	43	10	1	5	28	17	—	9†	10	37	318*	
Totals	1,201	1,453	537	547	500	1,087	97	66	114	424	193	14	222	86	37	6,573*	

Names counted twice, students graduating in two different years	24
Bachelors of Science	6,549*
Masters of Science, not including 153 counted above	180
Doctors of Philosophy and of Engineering, not including 13 counted above	22
Total	6,751*

* Deducting names counted twice (students graduating in two courses).
† Prior to 1909 this Course was designated as Option 3 (Electrochemistry) of Course VIII.
‡ Two received the degree in XIIIB in 1916 and three in 1917.

Doctor of Philosophy

	Biology.	Chemistry.	Geology.	Physics.	Physical Chemistry.	
1907	—	—	—	—	3	3
1908	—	1	—	—	2	3
1909	—	—	—	—	—	—
1910	—	—	1	—	1	2
1911	1	—	—	—	—	1
1912	—	3	3	—	—	6
1913	—	1	—	—	—	1
1914	—	2	—	—	—	2
1915	—	2	—	—	—	2
1916	—	1	1	1	—	3
1917	—	3	1	—	—	4
Total	1	13	6	1	6	27

Doctor of Engineering

	Aëronautical Engineering.	Electrical Engineering.	Electrochemical Engineering.	
1910	—	1	—	1
1911	—	1	—	1
1912	—	—	—	—
1913	—	—	—	—
1914	—	1	—	1
1915	—	1	—	1
1916	1	1	—	2
1917	—	1	1	2
	1	6	1	8

Master of Science.	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, U.S.N.	Naval Construction, Foreign Students	Aëronautical Engineering.	Electrochemical Engineering	Total
1886	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
1887	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
1888	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1889	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1890	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
1891	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1892	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1893	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
1894	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
1895	—	—	—	1	1	—	—	1	—	—	—	—	—	—	—	—	—	3
1896	—	—	—	2	1	—	—	—	—	—	—	—	—	—	—	—	—	3
1897	—	—	—	2	—	—	—	1	—	1	—	—	—	—	—	—	—	4
1898	—	1	—	1	—	—	—	1	—	2	—	—	—	—	—	—	—	5
1899	—	—	—	1	1	—	1	—	—	—	—	—	—	—	—	—	—	3
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1901	—	2	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	4
1902	—	2	—	3	3	—	—	—	—	—	—	—	—	—	—	—	—	8
1903	—	1	—	5	—	—	—	—	—	—	1	—	—	—	—	—	—	7
1904	—	1	—	4	1	2	—	1	—	—	—	—	—	3	—	—	—	12
1905	—	—	—	9	—	—	—	—	—	—	1	—	—	8	—	—	—	18
1906	—	—	—	3	1	—	—	—	—	—	—	—	2	3	—	—	—	9
1907	—	—	—	6	—	—	—	—	—	1	—	—	—	8	—	—	—	15
1908	—	—	—	1	1	3	—	—	—	—	—	—	—	7	—	—	—	12
1909	2	1	2	6	1	1	—	1	—	1	—	1	—	3	—	—	—	19
1910	2	1	—	6	1	1	1	—	—	—	—	—	—	7	—	—	—	19
1911	2	2	—	5	2	4	2	—	—	—	—	—	—	3	—	—	—	20
1912	3	—	2	4	3	2	2	—	—	—	—	—	—	4	—	—	—	22
1913	1	2	1	4	—	1	1	—	—	7	—	1	—	2	—	—	—	20
1914	3	1	—	3	5	2	2	—	—	3	3	1	—	2	—	—	—	25
1915	1	4	1	4	2	10	—	—	—	2	—	—	1	2	—	1	1	29
1916	5	4	—	7	3	6	1	—	—	1	1	—	—	2	5	5	1	41
1917	3	1	1	3	1	4	—	1	—	1	2	—	—	9	—	4	—	30
Total	23	23	7	83	29	36	10	6	1	19	10	3	3	63	5	10	2	333

Massachusetts Cities which send Five or More Students

Boston	234	Haverhill	9
Cambridge	73	Holyoke	9
Brookline	53	Lexington	9
Newton	47	Sharon	9
Lawrence	33	Watertown	9
Somerville	29	Belmont	8
Brockton	28	Winthrop	8
Lynn	27	Dedham	7
Melrose	25	Framingham	7
Lowell	24	New Bedford	7
Malden	22	Springfield	7
Quincy	19	Woburn	7
Newburyport	17	Andover	6
Taunton	17	Milton	6
Arlington	15	Needham	6
Chelsea	13	Danvers	5
Fall River	12	Gloucester	5
Medford	10	Salem	5
Waltham	10	Worcester	5
Everett	9		

Number of Students Registered in Each of the Courses of the Summer School for This Year and the Year Before

	1916.	1917.		1916.	1917.
Algebra B	13	6	Mechanism	17	4
Alternating Current Machinery	7	0	Metal Turning	0	1
Applied Mechanics	32	72	Microscopy and Gen. Biology	2	0
Bacteriology Gen.	7	3	Organic Chemistry	0	29
Chemistry, Inorganic and Analytical	137	150	Organic Chemical Laboratory	0	26
Constructive Design	0	3	Perspective	0	2
Cost Accounting	0	23	Physical Laboratory	15	2
Descriptive Geometry	34	26	Physics	42	20
Design (Architectural)	20	6	Precision of Measurements	12	14
Electrical Engineering, Elements of	0	39	Shades and Shadows	5	2
Electrical Engineering Laboratory	22	33	Solid Geometry	17	11
Electrical Engineering, Prin. of	6	29	Structural Design	0	11
English	14	6	Structures	16	11
Forging	3	6	Surveying	6	51
Foundry	0	1	Testing Materials Laboratory	0	29
French	16	19	Theory of Warship Design	2	0
German	46	49	Vise and Bench Work	16	3
Heat Engineering	0	31	Warship Design	4	0
Hydraulics, Theoretical	9	44	Woodwork and Pattern Making	12	4
Hygiene and Sanitation	1	0			
Industrial Chemical Laboratory	14	0	*Surveying Camp.*		
Machine Design	0	73			
Machine Tool Work	17	44	Railroad Field Work 120	64	64
Mathematics (1)	44	18	Surveying 103	11	10
Mathematics (2)	67	23	Surveying, Geodetic and Topographic 108	64	63
Mathematics (3)	10	11	Surveying, Hydrographic 160	64	63
Mechanic Arts 297	16	12	Surveying, Plane 107	64	65
Mechanical Applications of Electric Power	4	0	Surveying, Underground 104	11	7
Mechanical Drawing	10	15			
Mechanical Engineering Drawing	23	17			

Walter Humphreys,
Registrar and Recorder.

Reports of Departments

DEPARTMENT OF CIVIL AND SANITARY ENGINEERING

The effect upon the Department of the entry of the United States into the world war has been to cause it to lose for the present two of its most valued instructors, and to make it impossible to secure its usual force of assistants. This reduction in the staff has necessarily put an unusual burden upon the other members of the instructing staff, which has been still further increased by the congestion due to the establishment of an Army Aviation Ground School in the Department quarters. Despite those conditions, the Department has not only carried on all its usual work, but has given numerous additional courses for the benefit of students intending to enter upon military service, and has participated in various other war activities. A brief recital of these extra activities follows.

Professor Swain is acting as a member of the Engineering Committee of the National Research Council.

At the request of Henry Howard, Esq., '89, Director of the Recruiting Service of the United States Shipping Board, made through the President of the Institute, Professor Burton was suggested by the Department to take charge in the New England district of the instruction in navigation of prospective officers of the new Merchant Marine. The course begun by him was the first of this character in the country and was so successful that he was entrusted with the establishment of schools for the purpose elsewhere, until he now has oversight of schools on the Atlantic, Pacific, and Gulf coasts, as well as on the Great Lakes. In the early part of this work, he was assisted by Professors Robbins, Hosmer and Howard of this Department, and by certain of our civil engineering graduates and undergraduates as well as by teachers from other colleges.

Professor Whipple, during the early summer, was appointed as a member of the American Red Cross Mission to visit Russia and to

study sanitary conditions in that country, and particularly in the Russian army. During the trip he took occasion to visit water works, sewerage works, and other engineering works in China and Japan as well as in Russia. He also holds the appointment of Consulting Sanitary Engineer in the United States Public Health Service.

Professors Breed, Hosmer, Howard and Mr. Babcock have, from time to time, given instruction in one or the other of the Ground Schools for Aviators established at Technology by the United States Army and Navy. In November, Professor Breed was appointed as President of the Academic Board in charge of instruction in the army school, and is giving a large portion of his time to this work. He is, however, retaining oversight over the third year courses in Railroad Engineering and giving personally the fourth year courses in this subject. The remaining instruction in Railroad Engineering has been taken over by Mr. Babcock, Instructor in Railroad Engineering.

Numerous extra courses have been voluntarily offered by members of the Department instructing staff not only during the academic year but also in the summer, for the purpose of assisting Technology graduates and undergraduates to prepare for examinations for commissions in the Regular Army. Special mention may be made of the intensive course offered by members of the Department staff, in conjunction with representatives of other Departments, to men wishing to take the examination for Engineer Officer in the United States Regular Army. The Corps of Engineers has, in the past, made few appointments from civil life, it being its custom to receive annually a few students of the highest standing from each graduating class at West Point, although occasionally graduates of approved technical schools have been appointed after passing a rigid and comprehensive examination. The results of such an examination held in June of this year were gratifying in that out of thirty-eight men in the entire country passing the mental examination, sixteen were graduates and one was a special student at the Institute. All of these, with one exception, came from courses in Civil Engineering, Sanitary Engineering, or the Civil Engineering Option of the new course in Engineering Administration, the other being a graduate of the course in General Science who had specialized in Civil Engineering. Fifteen of the seventeen were members of the class of 1917. It is particularly pleasing to note that amongst the Technol-

ogy representatives were the men standing first and second on the list, and that four others appear amongst the nine of highest standing.

Owing to the probability of continual demands for Engineer Officers, the Department has presented to the Faculty a proposed Military Option in the Civil Engineering Course covering the topics required by the War Department as preparation for admission to the Engineer Corps, this requiring but very slight modifications in the present curriculum.

The following instructors have during the year been granted leaves of absence for the purpose of entering upon military duties:

Howard B. Luther, Bureau of Construction and Repair, Navy Department, Washington, D. C., engaged upon the design and inspection of airplanes.

C. H. Sutherland, First Lieutenant, United States Reserve Corps, now serving with the 8th Engineer Train (Mounted), Camp Stewart, Fort Bliss, Texas.

All of the assistants who were connected with the Department last year have resigned, Mr. McCarthy to enter the Navy Department at Washington, where he is engaged in work connected with airplane design and construction. The following assistants have been appointed for the year: James B. Newman, B.A.E., and Alfred S. Niles, Jr., A.B., S.B. Other assistants have been engaged temporarily, amongst whom have been several members of the fourth year class.

Of the 69 graduates in 1917 from Courses I and XI, 20 are known to hold commissions in the army or navy, 12 are non-commissioned officers or privates, or are serving the government in technical positions connected with war activities, and 17, after taking a special intensive course in Naval Architecture at the Institute, and several months of special training at the Charlestown Navy Yard, will receive appointments according to their qualifications either as ensigns, inspectors, or draftsmen in the Bureau of Yards and Docks of the United States Navy. Of the 20 remaining graduates of the class of 1917, 5 are known to have been disqualified for military service for physical reasons, while several others were rejected as not being American citizens. Of all the living graduates from Courses I and XI, 144 are known to be serving either in the army or navy, and of these, 107 hold commissions.

Owing to the desire of many undergraduates to obtain military training during the summer, Camp Technology was opened to sophomores of all courses on June 19, thus permitting a twelve weeks' session instead of the usual seven weeks. The first five weeks of the session were devoted entirely to military training; during the last seven weeks the regular instruction in field-work was given to students in Courses I, III, XI and XV, in addition to a certain amount of military training. Students from other courses not required to take field-work were, during this latter period, given additional military training together with courses in Applied Mechanics ordinarily given to juniors at Cambridge, although students properly qualified were allowed to substitute courses in Military Surveying for the Applied Mechanics.

Professor George E. Russell of this Department, who has seen considerable service with the Massachusetts Militia, acted as Commandant, and was responsible for the conduct of military affairs, while the general oversight of the camp was under the direction of the writer.

As it seemed important that the military instruction at the camp should be based to as large an extent as possible upon the experience gained in Europe, Professor Russell was asked to visit the Canadian training camp at Toronto before the opening of our camp, both to enable him to study the methods in use there, and to secure a Canadian officer to join the instructing staff. As a result of his trip, Captain A. G. Bland of the Canadian Field Artillery was authorized by the Canadian Minister of Militia to attend the camp and was in residence there from July 10 to September 8. Captain Bland gave a course of instruction in artillery, planned and supervised the construction of trenches, built a model village for gunnery practice, and added greatly to the interest and value of the military instruction. During the present academic year he is serving as Artillery Instructor at Yale.

During the first five weeks of the course, the following undergraduates or recent graduates who were especially qualified to serve, volunteered their services as officers: J. M. DeBell, '17, F. A. Washburn, '18, A. E. Tuttle, '18, H. L. Wirt, '18, R. O. Lowengard, '17, and K. S. M. Davidson, '19. All of these men except DeBell, who after a few weeks was transferred to the Technology Bureau at Washington, served without compensation throughout the entire twelve

weeks' session and for their unselfish service the thanks of the Department are due.

Professor L. S. Smith of the Mechanical Engineering Department was appointed to give the courses in Applied Mechanics previously mentioned.

The total number of students in attendance during the first five weeks of the period was 94. At the end of this period, 56 men in the courses in Civil, Sanitary, and Mining Engineering arrived and 12 men departed. In the period between July 24 and the end of the camp, 18 other men left. The average attendance of the camp was 135, and the maximum attendance was 164. Of these, 70 consisted of students required to take the camp fieldwork, 69 were students who attended voluntarily, 14 were members of the instructing staff, and 11 were employees.

The instructing staff in charge of the regular instruction in Surveying consisted of Professors Robbins, Russell, Hosmer, Howard, and Mr. Babcock of the Department staff; Professors A. R. Cullimore and C. A. Short of Delaware College, and the following assistants: W. T. Biggar, E. H. Clarkson, Jr., S.B., P. B. Craighead, H. V. V. Fay, A.B., S.B., A. Haertlein, A.B., J. M. Hanley, F. B. Hastie, S.B., H. G. Killam, A.B., H. J. McDonald, S.B., and Y. C. Tu.

The resident physician from June 20 to August 1 was Dr. F. D. Adams; from August 1 to the end of the camp, Dr. J. J. Donovan. J. W. Kilduff served during the second period of the camp as instructor in calisthenics.

Owing to the illness of Professor Howard, Mr. John G. Barry, Instructor in Geology, was engaged to take charge of the two weeks' course in Mining Surveying at Corinth, Vermont, which is taken by students in Course III after five weeks' instruction in Surveying at Camp Technology. This work he conducted with great success.

The introduction of the military features to the camp, with the increased attendance caused thereby, made necessary a considerable increase in accommodations and equipment. This was made possible through the generous gift of Mrs. Edward Cunningham. A new building providing sleeping accommodations for 80 men, with a large lecture room at one end, was constructed, this building being named the Cunningham Barracks by the students. It was, both for appearance and convenience, located at some distance from the

main group of buildings and amongst the group of tents. An outside lavatory was constructed nearby and connected with the water supply system.

Owing to various inconveniences connected with the gas lighting plant at the camp, it was decided that electric lights should be used for this new building and that the entire plant should be wired for electricity. An oil engine and dynamo borrowed from other departments of the Institute were installed, and a storage battery already delivered will be installed next spring. These are contained in a small combined power house and garage constructed this year.

In addition to the money required for the barracks and for additional equipment, Mrs. Cunningham's gift was largely drawn upon for financial aid to students who would otherwise have been unable to attend the military camp.

Mr. Charles W. Eaton, whose interest in the camp since its establishment has been noteworthy, furnished the very considerable sum of money required for the construction of a drill field; this field will also be of great value as an athletic field.

The Department wishes at this time to express its thanks to Mrs. Cunningham and to Mr. Eaton for their generous gifts and for the personal interest they have shown in the camp.

Other gifts made to the camp during the year are as follows:

A cement-stone sundial pedestal from the Cambridge Cement Stone Company of Brighton, Massachusetts.

Two thousand cotton bags for use as sand bags in connection with trench construction from A. Farwell Bemis, Esq.

A moose head and a framed photograph of Dean Burton from the Class of 1918.

In spite of the rise in the price of supplies and transportation, the total charge per student for meals and for the miscellaneous expenses necessary for the operation of the camp, including a small charge for depreciation but not including personal laundry, was from $1.07 to $1.09 per day, depending upon the length of stay. This, on a basis of the number of days which the camp would normally have been in operation, would give a charge of $56.71 per man as compared with a corresponding figure of $56.72 in 1916. This good result was due in no small degree to the efficient and economic conduct of the commissary by Steward W. K. Merrill.

The writer is of the opinion that the military training, coupled

with the healthful life at the camp, was of much value, and that the results obtained warrant the introduction of this feature into the camp life, at least during the duration of the war. The following statement by Professor Russell is of interest in this connection:

"Regarding the general conduct of the men, I have only words of commendation and praise for the officers and men who composed the military camp. Never in my years of association with undergraduates have I met and worked with a finer set of young men than those who contributed each his full share toward making Camp Cunningham a memorable success."

Since the Institute moved to Cambridge, the Civil Engineering Department has found it necessary to assign others a part of its quarters. At the opening of the 1916–1917 session, the new dormitory was not ready for use and the Civil Engineering museum was utilized for dormitory space. After the opening of the dormitory and pending the completion of the Walker Memorial, the same room was used for a student lounge. Upon the establishment of the Army Aviation Ground School at Technology, soon after the United States entered the war, the museum and the adjoining large lecture room were turned into dormitories for the Aviation Corps. The gradual increase in the number of students in this Corps has since required the Civil Engineering Department to give up the following additional space: Six offices, the entire drafting room originally assigned to fourth year students; the graduate drafting room; and about one-half of the third year drafting room. The Civil Engineering Library has also been used in the evening for a reading and study room. To offset these demands, two offices and one drafting room have been secured from the quarters previously occupied by the Department of Naval Architecture, which has found additional accommodations in the quarters of the Mechanical Engineering Department.

The thanks of the Department are due to the Office of Public Roads, United States Department of Agriculture, for the loan of valuable models illustrating the construction of roads. These models were on exhibition from February to October. It was hoped that they might be kept permanently at the Institute, but it was found necessary to return them to the government owing to the demands for exhibition at various road congresses.

The United States National Museum has loaned a set of instruments formerly used for base line measurements by the United States

Coast and Geodetic Survey, consisting of several metal rods, the length of which have been determined with great accuracy, together with attachments for supporting them while measurements are being made. It is probable that these instruments may be permanently retained.

The Holyoke Water Power Company has permitted the graduate class in Water Power Engineering to visit the Holyoke testing flume and to test a wheel there. The Department has also received from the Proprietors of Locks and Canals at Lowell, Massachusetts, the privilege of having its students receive instruction in stream measurements at the Merrimac Canal.

Through the courtesy of J. H. Allen, '81, permission was given to use the mine at Corinth, Vermont, for the course in Underground Surveying; many courtesies were extended to the students in this course by Mr. H. G. Hunter, Manager of the mine, and by Mr. P. G. Whitman, '12, Assistant Manager.

Captain Elmer D. Hodgkins of Annisquam, Massachusetts, has presented an interesting sample of a toredo infested ship timber, and the Raymond Concrete Pile Company has sent an exhibit of the steel forms used in constructing its patented reinforced concrete pile.

CHARLES M. SPOFFORD

DEPARTMENT OF MECHANICAL ENGINEERING

The first year spent in our new quarters has been a busy one; the laboratories and the drawing rooms having been in almost constant use.

Throughout the school year from October, 1916, to June, 1917, both day classes and evening classes were conducted, while during the summer, day exercises held for Institute students taking summer courses, together with the instructions given to Engineer Officers in the training school established at the Institute by the United States Shipping Board, Recruiting Service, kept a large percentage of the staff at work and nearly all of the equipment in use for purposes of instruction.

In addition, there has been an unusually large amount of testing either directly for the Government or for people engaged on Government work.

The Gas Laboratory, together with its entire equipment, was in use evenings from April till June in training men, enlisted in the Coast Patrol Service, to operate marine gasoline engines. Later, this laboratory was taken over by the Training School for Aviators.

During the summer the foundry was used by the students in the Aviation Schools as a room for stripping and erecting gas engines.

One end of the Refrigerating Laboratory has been used as a study room by the students in the Training School for Deck Officers.

Two bays in the crane well of the Hydraulic Laboratory and two bays under the hatches in the Materials Testing Laboratory have each been screened off from the rest of the laboratory, and the space used by students of both the Army and the Navy Aviation schools in connection with the estimation of ranges.

The Naval Architecture Department, which was crowded out of its quarters, has been re-located temporarily in the fourth year Mechanical Engineering Drawing Room, where space for thirty desks was obtained by moving certain classes into the third year drawing room.

At the opening of the fall term, the registration of students in Mechanical Engineering showed a reduction of 21 per cent, due to the draft and to enlistments. The greatest loss in numbers was in the junior class; the loss in the senior class being comparatively small.

There was a general feeling among the juniors that as they would be called into service before the completion of their work at the Institute, it was best for them to enlist at once.

Fully 90 per cent of the present senior class in Mechanical Engineering anticipated, through attendance at the numerous free summer courses given by the staff, much of the senior work of the first term. This was done in the hope that they might be allowed to put in, in one year, such additional time as was expected the Government might require for new subjects, in addition to those now given in Course II, in fitting a man for the position of First Lieutenant in the Ordnance Officers' Reserve Corps.

When late in September it was learned that such an arrangement could not be made with the War Department, the Mechanical Engineering Department, with the consent of the Faculty, offered to those men who had anticipated at least two hundred hours of senior work, the option of taking second term subjects in the first term and of taking in the second term advanced work along engineering lines, or a course in Naval Architecture which is to be opened to them through the courtesy of the Naval Architecture Department. About 50 per cent of the class have availed themselves of this opportunity and courses of instruction in second term subjects are now given by the Department in addition to the first term work.

Eighteen of the seniors in Course II, class of '17, were given a training in Naval Architecture by that Department in a ten weeks' course, extending through June of last year.

The Department has been at work during the past year on a revision of the course and has now a schedule prepared which it is about to present to the Faculty.

Through the personal efforts of Mr. Chas. T. Main, Chairman of our Visiting Committee, $1200 was obtained for the equipment of a Textile Testing Laboratory.

At the annual meeting of the American Society of Testing Materials at Atlantic City, June, 1917, Professor Haven was appointed Chairman of the Committee on Testing of Textile Materials.

The Goodyear Tire and Rubber Co. have placed $6000 at the dis-

posal of the Department to defray the expense of certain tests which are to be carried on as thesis work under the direction of Professor Park.

Professor Miller was given charge of the training of Engineer Officers for the Merchant Marine and has, under the direction of the United States Shipping Board Recruiting Office, established eight schools which have been running since July.

Professor Riley, who is on leave of absence, has been commissioned a Major in the Regular Army and assigned to special duty in France.

Professor Marks, who has been relieved of much of his work at the Institute, spends half of his time at Washington in charge of investigations on airplane engines.

Professor Taft and Messrs. Jones and Robinson have been giving instruction in the Engineer Officers' Training School established at M.I.T.

Professor Hayward has kept the Materials Testing Laboratory running throughout the summer on work sent in either by the Navy or by the Ordnance Department of the Army, and on work connected with Government contracts executed by private concerns.

Professors Fuller, Haven, Hayward, Taft and Messrs. R. H. Smith, Cowdrey, Adams and Robinson are, in addition to their regular duties, giving instruction to the Inspectors in the Naval Aviation School.

Mr. W. H. Wengert, who had been an instructor in Machine Design for a number of years, resigned in January, 1917. The vacancy was filled by Mr. T. E. Raymond.

Since June the Department has lost from the staff, Messrs. M. C. Mackenzie, A. A. Packard, S. R. Bartlett, Jas. T. Shorrock, and H. M. Mosher, who have gone into industrial work; and Messrs. A. L. Brown, H. W. Brown, W. J. Barrett, A. S. Morrison, C. A. Coleman and T. E. Raymond, who have been commissioned First Lieutenants and assigned to duty; also Dean A. Fales, who was transferred to the Aviation Schools in charge of the Instruction in Gasoline Engines.

To replace the men lost from the staff, Messrs. D. M. Taylor, S.B., M.I.T., '06; C. A. Rogers; J. A. Lunn, B.S., Colorado Agricultural College, '15, S.B., M.I.T., '17; A. J. Ferretti, S.B., M.I.T., '17; H. C. Parker, A.B., Leland Stanford University, '17; F. Olson;

and P. Hatch, S.B., M.I.T., '16, have been secured. Recently Mr. Hatch received a commission as Second Lieutenant and will probably be called to duty before the end of the year.

Mr. C. B. Sawyer, B.A., Yale, '15, has been appointed instructor and assigned to the Heat Treatment Laboratory.

The instructing staff of the Department, even though reduced in numbers, is carrying with a true war spirit not only more than the usual amount of undergraduate class work, but also such an additional load of lectures and laboratory exercises as has come to it through the various training schools established here, under the direction of the Government.

EDWARD F. MILLER

DEPARTMENT OF MINING ENGINEERING AND METALLURGY

In the academic year of 1916–1917, all lectures and recitations were given in the new Mining building; laboratory exercises were started on the old site and finished on the new. The removal of the laboratories from the basement of Rogers building was begun last December and managed in such a manner as to have the furnaces and machines in place when they were needed for laboratory work. Now that the new classrooms and laboratories have been used for nearly a year, it can be said that the general arrangements have been found to be on the whole very satisfactory. Former students visiting the new quarters are enthusiastic over the changed conditions under which the work of the department is carried on. The only actual need so far felt is the lack of storage room for ores and intermediary products. Space for this was provided in the plans, but the work has not yet been completed.

While in a general way all divisions are in working order, much has still to be done to perfect details. Ores and apparatus have to be catalogued; each laboratory needs finishing touches; the same is the case with the museum and the collection of charts and drawings. We hope to see installed the equipment for rolling, wire-drawing, and punching of metal so that the course in Mechanical Treatment of Metals can be given.

Since the occupation of the new laboratories there have been installed several new apparatus. The division of crushing and sampling has a pair of Sturtevant laboratory rolls, a two-by-six-inch Sturtevant roll-jaw crusher, a small-size Abbé pebble mill, and new sets of sizing screens. The ore dressing department has acquired two movable feeders and two dryers.

The Laboratory for Fire Metallurgy has erected a Wedge six-hearth roasting kiln and a Dwight-Lloyd sintering machine, both specially constructed for laboratory experimentation. The purchase of the former was made possible through contributions made by Messrs. F. A. Eustis and U. Wedge; the latter was a gift by the Dwight-

Lloyd Sintering Co. of New York City. The laboratory is now completed with the exception of the Cottrell electric precipitator for dust and fume, which will be installed, it is hoped, at an early date.

In the Laboratory for Wet Metallurgy the wooden tanks used for the electrolytic refining of copper have been replaced by slate vats having glass sides. The visiting changes taking place in the process can now be observed.

The carpenter and machine shops have been furnished with the necessary tools and with closets to keep these under lock and key. They are in charge of one man, who is responsible for them. The new system of caring for the tools of the department as a whole is expected to do away with deterioration and loss. The tools of the several laboratories are in care of the instructors in charge.

In planning the laboratories, the policy of the Department was to provide for space for future acquisitions of apparatus. Thus in the ore-dressing laboratory there are apparently many unoccupied spaces which, however, will be ultimately filled by a number of machines. Little attention has been given so far to the equipment of the Mining Laboratory. It contains at present various forms of percussion and rotary drills.

In conformity with the general policy of the Institute of aiding industrial development, the Department entered last April into an arrangement with the United States Smelting, Refining and Mining Co., a Boston corporation, whereby the laboratory facilities of the Institute are placed at its disposal under proper restrictions. The company has established in the Department its central research laboratory, which forms the headquarters of all investigations carried on in its several concentrating and smelting plants. The division is in special charge of Mr. H. M. Schleicher, of the class of 1910, as research associate, who has two research assistants and one analytical chemist on his staff. General supervision of the work carried on is placed in the hands of the department. This collaboration of school and plant is of advantage to both participants. The school is kept in touch with industrial work, and the plant has at its disposal facilities which are not to be obtained in any other way.

The Department acknowledges gratefully a gift from Mrs. John A. Heard, Jr., who presented valuable apparatus and mineralogical specimens.

No professional summer school was held, as the number of applicants was unusually small. The second year students in Options 1 and 3 attended the summer course in surveying at East Machias, Maine, us usual, and later spent two weeks in underground surveying at the Pike Hill Mines near East Corinth, Vt. The Department is under obligation to Mr. John H. Allen, General Manager, for permission to use the mines, and to Mr. Hunter, Superintendent, and Mr. P. G. Whitman, Assistant Superintendent, for other favors received. Mr. John G. Barry of the Geological Department conducted the work of underground surveying at Corinth on account of the illness of Professor J. W. Howard. We were fortunate in securing Mr. Barry's services, as he has had special experience in underground surveying.

As in past summers, work in practical mining was provided for students who desired it. The number of applicants was not as large as usual, as several students took summer courses at the Institute and at East Machias in order to prepare themselves more rapidly for the service of the country.

The demand for our graduates has been so large that the Department has not been able to secure any assistants whatever for this year. This places a special load upon the professors, and at the same time makes it impossible to perfect at present the many details which are needed in our new quarters.

At the end of the year 1916–1917 the last of the students following the former schedule of studies were graduated, so that the new course scheme alone is now in operation.

The falling-off of students owing to the war has not been so great in this as in some other departments. The official figure is 17 per cent. In the fourth year there are 10, in the third year also 10, and in the second 15 students. They are about evenly divided between the three options offered by the Department.

In addition there are three special students from Japan, two candidates for the degree of Master of Science from China and Japan, and one for the degree of Doctor of Engineering from Norway. Further, Mr. Z. Jeffries, formerly of the Case School of Applied Science and at present Director of the Research Laboratory of the Aluminum Casting Company of Cleveland, Ohio, is doing research work in the Metallographical Laboratory as candidate for the degree of Doctor of Science in Harvard University.

Last February the Department suffered a great loss in the death of Dr. E. D. Peters, who had come to the Institute from the Harvard Mining School. In the short time he had been at the Institute, he quickly gained the good will of his new colleagues and students, as he had done at Harvard University. His work has been taken over by Professor Hofman. During the winter term Professor A. Sauveur has been absent in France, placing at the disposal of that country his exceptional knowledge of the physics of iron and steel.

Professors H. L. Smyth and G. S. Raymer have done and are doing much work associated with military instruction in Harvard University. Professor R. H. Richards is still active as an expert in ore dressing and has been made a member of the Government Commission to investigate the supply of manganese ores in the United States. Professor Hofman devoted the summer to the new edition of his Treatise on the Metallurgy of Lead, which will be in the hands of the printer in January. Professor Locke has spent considerable time in the study of the problem of concentrating manganese ores in Virginia and of milling copper ores in Vermont, where flotation and the high price of copper give these old deposits a new value. He has also visited Canadian deposits. Professor Bugbee made a professional trip to British Columbia, and visited on his return the mines of Butte, and the mills and smelteries of Anaconda and Great Falls. Professor Hayward during the past year has given special attention to the recovery of nickel and alumina from Cuban iron ores, and to the extraction of tin from cassiterite concentrate.

H. O. HOFMAN

DEPARTMENT OF ARCHITECTURE

The Department of Architecture has felt, perhaps even more keenly than some of the other departments of the Institute, the effect of conditions incident to the war. This is to be expected in a course of instruction where the training is not quite so directly a preparation for immediate service as in some of the other departments, and is especially true of the Option in General Architecture. In Option I there are 37 students as compared with 92 last year, or a decrease of about 60 per cent. In Option II, there are 36 students this year as compared with 47 last, or a decrease of about 24 per cent. The total registration this year is about 51 per cent of that of last, or 73 students as compared with 142, divided among the years and Options as follows: Graduate year, Option I, 2; fourth year, Option I, 14, Option II, 11; third year, Option I, 11, Option II, 13; second year, Option I, 10, Option II, 12. Sixty-six students are working for the degree of the Institute; seven are specials; ten hold degrees from other institutions; thirteen have had partial college courses. This statement corresponds to conditions on November 17, 1917.

Temporary changes in the senior year of the Option in Architectural Engineering have been made to meet the demand for special training for National Service. The success of the students of this Option who took last spring the intensive work offered by the Department of Naval Architecture has influenced the present senior class of Option II to make application to be allowed to take similar work, which is to be offered by the Department of Naval Architecture during the coming term. In order that this application may be granted certain senior courses in the second term have been transferred to the present term, occupying time set free through work taken in the summer school of 1917. Other second term senior courses of minor importance will be omitted as well as the thesis usually required for graduation. The preparation given in the course in Architectural Engineering fits its students particularly well to take up the intensive training in Naval Construction which leads directly to positions in the navy yards and ship yards.

During the past year some changes have taken place in the instructing staff. The sudden death last June of Professor H. L. Warren deprived the Department of a most able lecturer on Architectural History. Professor Warren had carried on the courses in that subject since September, 1916. He is succeeded by Mr. E. T. Putnam in association with Professor Cram. Mr. Putnam was newly appointed to the staff this year. He is a graduate of Harvard University, has studied two years at the Harvard Architectural School, and two years at the École des Beaux Arts. He was formerly assistant to Professor Warren in his courses in Architectural History at Harvard, where he was instructor in the School of Architecture for five years. He also brings an experience of nine years as a teacher along architectural lines at Simmons College. He has practiced architecture in this city for nine years, is a member of the Boston Society of Architects, and of the American Institute of Architects.

Messrs. C. E. Morrow and E. C. Holbrook, former instructors in Architectural Engineering, have resigned, and Mr. P. W. Norton has been appointed instructor in their places. Mr. Norton is a graduate of Amherst College (1905), and of the Massachusetts Institute of Technology, Option II, Course IV (1908). He has had experience as a teacher of Mechanical Drawing and Mathematics, has been assistant engineer for the firm of Shepley, Rutan & Coolidge, of Boston, and since 1913 has been architectural engineer with Maginnis & Walsh, Architects, also of this city.

We have lost through resignation the services of Mr. I. P. Lord, instructor in Architectural Design since 1914, and Mr. E. F. Rockwood, who for the past seven years has been in charge of the course in Reinforced Concrete Design. The work formerly carried by Mr. Rockwood has been undertaken by Mr. Dean Peabody, Jr., of the Department of Mechanical Engineering.

A matter of considerable interest was the formation during the summer of a joint committee composed of the members of the instructing staffs of the Harvard School of Architecture and the Department of Architecture at Technology. The function of the committee is to consider questions pertaining to architectural education with a view to improving the courses and instruction in the two schools. The committee, under the chairmanship of a member of our Visiting Committee, Mr. H. J. Carlson, has already held a number of meetings, and certain of its suggestions regarding the

joint problems which have for several years been taken by Harvard, the Boston Architectural Club, and Technology will be put into immediate effect.

The necessity for some kind of social center for the students of the Department emphasizes itself daily. The opportunities for this afforded by the basement of Rogers are very great, and should be made available as soon as it becomes possible to do so. To adapt this area for the proper purpose, expenditure will be necessary along two lines: (a) repairs, structural changes, and heating; (b) furnishings. Estimates have been obtained covering the cost under (a) including the substitution of a direct flight of stairs from the main floor to the basement for the present circular stairway. The cost for adequate furnishings has also been determined. Efforts have been made to secure the full amount required as a memorial to an alumnus of Technology. Thus far a definite promise has not been received, but if the amount for the structural changes could be appropriated there is little doubt that funds for furnishings could be obtained.

The large exhibition room at the rear of Rogers is fulfilling all our expectations of its usefulness. At the end of the school year 1916–1917 it was hung with student-work from Harvard College, the Boston Art Museum, and the Institute. The problems taken jointly by Harvard, the Boston Architectural Club, and the Institute have been shown here. In October of the present school-year a very interesting exhibition was held of the work of Mr. K. E. Carpenter, '09, holder of the 1912–1915 Fellowship in Architecture at the American Academy in Rome; and in November was held the joint exhibition of Architecture, Landscape Architecture, and Arts and Crafts. Between the various exhibitions the walls of the room have been hung with the work of our own students. Many visitors interested in architecture have attended these exhibitions. The room by reason of its large wall-space also lends itself admirably to the judging of the problems in Design.

The two undergraduate societies, the Architectural Society and the Architectural Engineering Society, will work together during the present year, holding joint meetings and so far as possible choosing topics for discussion which shall be of interest to both societies. This is as it should be. It is of interest to note that a very large proportion of the freshmen who intend to enter the Department of Architecture have this year joined the undergraduate societies. The

societies are endeavoring to keep in touch with all of the former students of the department who have entered the National Service and have been sent abroad. A number of interesting communications have been received and read from former students already in France.

The following gifts have been received by the Department during the past year: A very wonderful collection of rubbings of mortuary brasses, made by Kenneth Weeks, a former student of this Department, who was one of the first Americans at the beginning of the war to volunteer in the Foreign Legion, and was killed in the Spring of 1916. The rubbings were presented to the Department by his mother, Mrs. Andrew Weeks. A collection of about 1200 photographs and a number of books from Mr. A. S. Jenney; six books from Mr. Ernest Bowditch; three books from Professor R. A. Cram; a collection of books and magazines from Mr. T. H. Skinner, M.I.T., '92; seventeen specimens of marble from Professor S. Codman.

The income from the Frank W. Boles Memorial Fund, which was established in the summer of 1916, has furnished the means for purchasing thirty-nine volumes for the special collection to be used in connection with the instruction in Architectural Design.

The 1917 Traveling Fellowship in Architecture was awarded to R. M. Stowell. The American Institute of Architects' medal was won by H. Sterner. The gold medal offered by the Société des Architectes diplomés par le Gouvernement Français was awarded to W. B. Colleary, the silver medal offered by the same society was awarded to R. M. Stowell. The Boston Society of Architects' Prizes were won by R. H. Scannell, regular student, and W. B. Colleary, special. Mr. J. M. Batschy received the William E. Chamberlain Prize. The following students received the Francis Ward Chandler Prizes: E. M. Woodward (graduate year), F. S. Carson (fourth year), F. W. Peers (third year). The "Class of 1904" Prizes were won by R. T. Gidley, regular student, and L. I. Beal, special student.

WM. H. LAWRENCE

DEPARTMENT OF CHEMISTRY AND CHEMICAL ENGINEERING

The School of Chemical Engineering Practice, outlined in the last Departmental Report, has, notwithstanding adverse conditions imposed by the war, been a signal success. It opened in February with about thirty selected students distributed among the five stations, located respectively at the plants of the Eastern Manufacturing Company at Bangor, Me., the New England Gas and Coke Company at Everett, Mass., the Carborundum Company at Niagara Falls, N.Y., the American Synthetic Color Company, Stamford, Conn., and the Atlas Portland Cement Company at Northampton, Pa. The students participating in the work of the School were of unusual excellence in personality and ability, and, as early as June, some of them were released to engage in important chemical work connected with the Gas Defense Service of the United States Government, carried on under the direction of the Bureau of Mines, at Washington and elsewhere. Others left later to enlist in military service, or to take responsible industrial positions, where help was urgently needed, only six continuing to the end of the course. In spite of these unavoidable withdrawals, the School has proven to be as valuable and effective as it was hoped and expected that it would be. The coöperation and interest on the part of the Corporations who provided the various Stations has been highly gratifying, the foremen and workmen have been uniformly helpful, and it has been shown that this instructional work can be carried out without interference with the output of the plants. It has also been shown that the research work carried on at the various Stations by or under the supervision of the Directors and Assistant Directors, and even in some instances the records obtained by the students in systematic tests of the various units in the manufacturing plants, is of definite value to the Corporations themselves.

In a recently published review of the work of the School during its first year, Dr. W. H. Walker, the Director, points out that its purpose was, first, to enable the students to get what may be called

the "atmosphere" of a manufacturing plant, as contrasted with that of the institutional laboratory, to work in an environment where the magnitude of the operations seemed to preclude quantitative measurements or control, and, secondly, to introduce into that environment laboratory methods of study, using the operating plant as that laboratory. As was stated in the last Report, the unique feature of the School is to be found in the residence at these plants of members of the Institute Faculty to give these systematic courses of instruction. Much of the success of the School is to be attributed to the enthusiasm and zeal of these Directors in developing methods of instruction in this new field.

The period of residence of the various groups of students at each plant was approximately six weeks, several days being occupied in the journeys from one plant to another, to make possible visits of inspection (also prearranged and carefully supervised) to manufacturing plants of varied character.

At the various Stations the students studied the control methods employed, usually taking part in the work of the control laboratories. They also made test runs upon various units in the plants, but were also required to work with the laborers who were engaged in the routine work, or in repair work. One of the most important and satisfactory aspects of their work, as shown by various letters from these students, is their evident appreciation of the value of contact and acquaintance with those in positions of responsibility, as well as with those with whom they labored, and sometimes those whose labor they had occasion to direct.

The School of Chemical Engineering Practice is, as was pointed out in the last Report, a part of a five year Course leading to the Master's Degree, the last year to be spent at the Institute, after the close of the School. It was confidently expected that the experiences in the School would develop a desire for increased knowledge and power, which would make the fifth year of the greatest value. There is much evidence to be found in the letters and verbal statements of the students that such would have been the case had not the war caused the withdrawal of these men, with one exception, into military or industrial service. The plans for the fifth year had to be abandoned for the present, and, on similar grounds, the School of Engineering Practice has also been discontinued, at least for the period of the war. The instructional equipment at the various Stations has

been stored for later use, and there is assurance that these Stations can be reopened when conditions permit. It has unfortunately been necessary to release the very efficient staff of instructors for much-needed service to the Government or elsewhere. In three instances the Directors of the Stations were taken over by the Corporations who furnished the Stations.

All the students who participated in the School have been recommended for the Degree of Bachelor of Science by the Faculty.

The Department is fortunate in having been able to render material service to the Federal Government, particularly in connection with Gas Defense problems, under the auspices of the Bureau of Mines. Professor W. K. Lewis was called into this service before the close of the last academic year, and Professor J. F. Norris, Dr. F. H. Smyth, and Mr. Robert E. Wilson went to Washington as soon as the year closed. Professor Lewis is now Consulting Chemical Engineer at the Bureau of Mines, in charge of Gas Defense work, but, at much personal sacrifice, returns to the Institute for two days each week, to make possible the continuance of the undergraduate subjects in Chemical Engineering. Professor Norris is on leave of absence, and is in charge of a large laboratory force at the Experiment Station of the Bureau of Mines at Washington. Dr. Smyth has accepted a commission as Lieutenant in the Gas Defense Service. Mr. Wilson, who was appointed Instructor in Chemical Engineering, is now acting as Consulting Chemical Engineer at the Bureau of Mines. Both of these men have leave of absence from the Institute.

Professor W. H. Walker, after acting in various advisory capacities, has accepted a commission as Lieutenant-Colonel, and is now organizing the Chemical Service of the Army to act in concert with a similar corps with the expeditionary forces in France, to deal with the chemical problems which arise in the conduct of the war. He also is on leave of absence. Mr. Stanley L. Chisholm, who was engaged as Assistant in Analytical Chemistry, was drafted, and is now transferred to the Gas Defense Service, and numerous other Institute men formerly connected with the Department are in the same service.

Professor Noyes has for several months given much of his time to the work of the Research Council of the National Academy of Sciences, and is chairman of the important committee on the supply of nitrates and nitric acid. With Professor Keyes, he is now con-

ducting research work of importance at the Institute bearing upon this problem.

During the closing months of the last academic year Professors Mulliken, Spear, Norton, and Mueller carried on research work on Gas Defense problems, and this work is being continued by them and also by Professors Moore, Lewis, and Millard. Professors Moore and Talbot gave courses of instruction during a part of the summer to students preparing for military service. Professor Talbot has accepted membership on the Advisory Board connected with the Bureau of Mines, appointed by the Secretary of the Interior, which, for the present, is also concerned with the Gas Defense work.

The Department has been unfortunate in the loss of the services of Assistant Professor John F. Norton, who resigned to accept a position of responsibility in the Department of Biology in the University of Chicago, under conditions which were highly complimentary to him. His service to the Institute was most satisfactory, and of much promise for the future. Professor Woodman has been placed in charge of the instruction in the Chemistry of Sanitation, and Professor Mueller has taken over the course in Biological Chemistry.

It is obvious that this depletion of the Instructing Staff has imposed serious difficulties in maintaining the work of the Department. The temporary abandonment of the five year Course in Chemical Engineering has enabled a release of some of the senior members which otherwise would have appeared to be impossible. At present, through the loyal assistance of the members of the staff, the undergraduate subjects are still given.

For some years the Course in Chemistry has offered three series of optional studies, beginning in the second year of the Course. The first of these Options was designed particularly for those desiring to take up teaching or research, whether in the industrial field or in more abstract science. The second offered opportunity for more extensive practice, and the third combined biological subjects with those in Chemistry. It has seemed best to withdraw two of these options and to rearrange the Course, along the general lines of the former first Option, leaving, however, about one-quarter of the time of the fourth year free for a selection by the student, under advice of the Department, of subjects which may appeal most strongly to him, from among the different branches of chemistry and related sciences.

While this revised Course lays constant and special emphasis upon research, it is not, on that account, less effective for those who expect to enter the industrial field. The recent satisfactory development of the four and five year Courses in Chemical Engineering promises to meet a demand, always large, for men equipped to take part promptly in manufacturing operations. These men are, however, in general more than operators, and have capacity for the handling of problems of development and research. This will be particularly true of the graduates from the five year Course. But there exists also a demand for men who have obtained all that can be given in four years of thorough chemical training, without the introduction of engineering subjects, and there are many able men for whom such a training is unquestionably the best. It is to develop men of this type, with power to apply their chemical knowledge, that the Course has been rearranged.

Dr. C. K. Reiman, Instructor in Inorganic Chemistry, has resigned to take up research work in physiological chemistry. Mr. Clark S. Robinson has been transferred from his instructorship in Inorganic Chemistry to one in Industrial Chemistry, and is giving exceptionally loyal service in the present emergency. Messrs. E. P. Stevenson and C. N. Jacobs have been promoted to instructorships in Inorganic Chemistry, and Messrs. Charles R. Park, A.B. (Cornell), and Ralph D. McIntire, S.M. (Wooster), have been appointed to instructorships in the same subject. Messrs. John B. Dickson, Ph.D., and Charles M. Wareham, S.B., have been appointed Instructors in Theoretical Chemistry and the Chemistry of Sanitation, respectively.

Of the assistants of last year, Messrs. Belcher, Crandall, Davies, Gooding, Maverick, Wellington, Hood, Meigs, Simpson, and Wu have resigned, and the new appointees are Messrs. Roger B. Brown, S.B., James F. Maguire, Jr., S.B., Earle E. Richardson, S.B. (Wesleyan), Chandler T. White, S.B. (Dartmouth), Walter G. Whitman, S.B., Edward Zeitfuchs, S.B., Alden D. Nute, Alan G. Richards, and Miss Louise P. Johnson, S.B. (Simmons).

Miss Ruth M. Thomas continues as Research Associate in Organic Chemistry, which is again made possible by funds supplied by Dr. F. J. Moore.

Miss Helen Vincent, who was Research Assistant under a grant from the Ellen H. Richards Fund, continued the work upon the

"Chemistry and Biology of Activated Sludge" under the direction of Professor Norton during the year. Miss Amy Walker, A.M. (Smith), has been appointed Research Assistant, under a grant from the same fund, and is working upon a problem in connection with the preservation of canned fish, under the direction of Professor Woodman.

There has been an unprecedented demand for men with chemical training during the past year, and this grows daily more insistent. The supply has long since been exhausted. The number of students electing Chemical Engineering in the entering class of last year rose to over 100, and the total for Chemical Engineering and Chemistry reached 120, indicating a recognition of the growing importance of this field of science. Many of these men will doubtless be called, or will voluntarily respond, to the requirements of war service, but it is plain that the industrial requirements of the country, under conditions of both peace and war, demand that these men shall continue their training and that the Institute and the department shall do their utmost to equip these men as speedily and effectively as possible for service. It is a cause for congratulation that the new laboratories, which are serving well their intended purpose, are at our disposal in this crisis.

H. P. TALBOT

RESEARCH LABORATORY OF PHYSICAL CHEMISTRY

Notwithstanding the war the Research Laboratory has been unusually active during the past year.

An investigation on war problems has recently been undertaken on behalf of the Ordnance Department of the Army. Professors A. A. Noyes and F. G. Keyes have been appointed Consulting Chemists to the Ordnance Department, and are charged with carrying on this investigation. Dr. Charles L. Burdick, previously Research Associate in Physical Chemistry, has been commissioned as Lieutenant in the Ordnance Reserve Corps, and has been detailed to devote himself to this research, in which three of the graduate and senior students are also assisting.

The Laboratory is fortunate in having associated with it this year as Research Associate, Dr. Duncan MacInnes, who has come here on a leave of absence from the University of Illinois to engage in research. He is continuing the study of the structure of crystalline substances with the aid of X rays, begun last year by Dr. C. L. Burdick and Mr. R. G. Dickinson. One of the unit research laboratories has been entirely devoted to these researches, and it has been equipped with a transformer, an X-ray outfit, and a spectrometer, costing in the neighborhood of one thousand dollars. It is expected to make this one of the main lines of investigation in the laboratory through a series of years.

The researches on the thermodynamic properties of liquids and vapors under the direction of Professor Keyes have been continued with the aid of two graduate students. The free energy investigations under Professor Noyes have also been continued.

During the summer, with the assistance of Dr. Graham Edgar, who came to the Institute as Research Associate from the University of Virginia, a new system for the detection of the acidic constituents of inorganic substances was worked out in the laboratory, and this has been used in the course of instruction in Qualitative Analysis by the second year students during the present term.

A. A. NOYES

DEPARTMENT OF ELECTRICAL ENGINEERING

A very notable educational plan was put into effect in June by the establishment of an Electrical Engineering Course in coöperation with the Lynn works of the General Electric Company. This Course is called Course VI–A, to distinguish it from our long established Electrical Engineering Course called Course VI. The Lynn works produce a large variety of electrical machinery and manufactures, besides steam turbines and turbine blowers, and its work occupies over 13,000 employees, which considerations make it an uncommonly desirable enterprise in which to instruct young men in the problems of manufacturing and in the administrative methods useful in the engineering industries. The Course VI–A is founded on a different plan from coöperative arrangements heretofore often proposed. Instead of starting when they come to us at once on alternate attendance in short periods at school and shops, the students in this Course first pursue the first two years of our Electrical Engineering "Course VI." After satisfactorily completing these two years of Institute work, they enter upon the coöperative instruction in possession of a sound training in elementary chemistry, physics, and mathematics, and they take up alternate terms at the works and at the Institute for three years, making the duration of the course five years in all. This Course is carried on in three terms per year, two of the terms corresponding to the regular Institute terms, and the third being a summer term of substantially equal length. The vacation is thereby shortened from four months to approximately one month in each year. During the period of this course the curriculum covers in essential degree the subjects of Course VI and in addition affords a large opportunity for experience and instruction in the shops and some two terms of advanced work and research (including special assignments at the works). The degree of Master of Science will be conferred on graduates from this course.

The advantages to students and to American industries which reasoning shows should arise out of such courses of instruction are so great that it may be expected that many of our future manufacturing executives will be recruited from the students of this Course. Its

establishment at this juncture is therefore particularly fitting, in order that the needs of our electrical industries for trained manufacturing men after the war may be more adequately supplied. The far-sighted recognition of the situation by both President Rice of the General Electric Company and yourself, which resulted in the establishment of the Course, is a matter for felicitation. In this connection, it is also a pleasure to record the great interest in this Course taken by Mr. Walter C. Fish, General Manager of the Lynn Works, and his associates.

The curriculum of the Course is subject to the approval of the Institute Faculty and also of the General Electric Company. The administration has therefore been wisely placed under the guidance of a joint committee consisting of Mr. Frederick P. Fish, Chairman, Professor Elihu Thomson, Mr. Magnus W. Alexander, Professor Comfort A. Adams and myself. The provisions for the students in the shops are in the sympathetic and efficient hands of Mr. Alexander, and the supervision of the instruction is largely in the hands of Professor Wickenden. The first groups of students are now in their second term, and results to date are most favorable to the plan.

Our plan, put in effect last year, of beginning the work of this Department in the second year instead of the beginning of the third year as theretofore, has had a wholesome and stimulating result, especially noticeable in the success of laboratory work. Professor Wickenden's engagement in the problems of additional training at the works for the engineering graduates employed by the engineering department of the Western Electric Company and the vocational training of their junior employees gives us an additional industrial contact of service in scrutinizing the standards of our curriculum.

The experience of a full Institute year in the new quarters for our laboratories has proved them to be most satisfactory. This is particularly true of the research laboratories and electrical measurements laboratory. The setting up of the equipment in the calibrating room and high voltage testing room of the latter, which was deferred last year, is now completed. Our laboratories were open for instruction last summer, for the accommodation of the students in Course VI–A, under the direction of Mr. Marston and Mr. Dawes. During the second term of the last Institute year, our laboratories were used for the instruction of Harvard College students registered in the Harvard subject entitled "Engineering Sciences 8," our instructors

doing the work. This will presumably hereafter be a regular part of our second term work.

Our research laboratories are handicapped by the relatively few available young men who wish to go into research rather than go directly into the national army. The year nevertheless has not been unfruitful. The research of Dr. Wiseman on the dielectric strength of varnished cambric used as an insulating material for cables brought out results so remarkable that it seemed important to have an independent verification, and this was undertaken by Mr. F. M. Farmer, Chief Engineer of the Electrical Testing Laboratories of New York. His results substantiated ours, and the joint results will soon be published. A new zero method for precise measurement of alternating currents suggested by the Bureau of Standards was investigated by Mr. C. O. Gibbon, as a Master's thesis, and his result will soon be published with the assent of the Bureau. Improvements in hot-wire anemometers developed by Mr. R. D. Fay as his Bachelor's thesis have been summarized and communicated to the Journal of the Franklin Institute. Mr. Fay is now employed in important government research. Mr. D. J. McGrath's research on street railway fares has been published as a volume of 169 pages.

Researches have been continued on sound-wave analyses, skin effects of alternating currents, insulation of cables, physical qualities of transmission lines, and core-loss analysis. Investigation of a method of measuring the dielectric losses in 3-phase cables is now being started.

Professor Kennelly, Mr. Achard, and Mr. Dana have been awarded Longstreth silver medals by the Franklin Institute for the research on the skin effect in steel rails, the results of which were published in the Journal of the Franklin Institute.

The war situation has made it difficult to obtain suitable men for the teaching staff to take the place of the younger men who have gone into the service, and this may become increasingly noticeable while the war continues. We have thus far succeeded in meeting the situation satisfactorily, by promotion and appointment. Mr. C. W. Ricker, Instructor, has been put in charge of the dynamo laboratory, of which Professor Green has heretofore had charge, and Mr. Wm. T. Haines has been promoted to an Instructorship in place of Mr. Perry. Messrs. E. A. Ekdahl (Technology '16), C. O. Gibbon (M.S., 1917), Guy A. Gray (Technology '17), and C. E.

Lansil (Technology '17) were appointed Assistants. The lesser number of Institute students in the eleven courses with work in our laboratories this term, compared with the corresponding term last year, made it unnecessary to appoint men for several places vacated. The Department is fortunate in having Professor W. S. Franklin of the Physics Department assume responsibility for the class in one of our subjects. On the other hand, Professor Kennelly of this Department has assumed the teaching of one section in second year Physics.

In connection with a plan for accelerating graduation of this year's senior class, Professor R. R. Lawrence volunteered to teach without compensation a class in Alternating Current Machinery during last summer. About half of the fourth year students in Course VI pursued the subject and this term are pursuing a second term subject in the laboratory and another in the classroom which Mr. Ricker and I are respectively carrying on as extra work. The men who have embraced opportunities will be sufficiently advanced by the end of this term so that they may be graduated in February if they are called to the army. Plans are under consideration for bringing the following classes also along more rapidly than the regular course provides.

This year will be notable in the history of the Department for several reasons associated with the nation's part in the war. Not the least is the way in which the staff of the Department and the alumni and students of Course VI have taken part in war activities. Out of the Department staff at the time of the declaration of war, eight are already in the nation's army. Several of these men upon receiving commissions were at once detailed to special studies or researches in their respective Corps. A service flag with eight stars now hangs on the corridor wall alongside of our Department headquarters in recognition of these men. Four others of our staff went into research or teaching employment directly related to the war, and three others went into commercial employment not directly related to the war. We therefore lost fifteen men from our staff by the end of the last Institute year, as follows: Assistant-Professor C. W. Green, Captain, Coast Artillery, O. R. C., Instructor F. G. Perry, Captain, Coast Artillery, O. R. C., Instructor H. B. Richmond, 1st Lieutenant, Coast Artillery, O. R. C., Research Assistant E. W. Bowler, 2nd Lieutenant, Engineer O. R. C., Assistant W. B. Littlefield, 2nd Lieutenant, Infantry N. A., Research Assistant P. L. Alger, 2nd

Lieutenant, Ordnance O. R. C., Research Assistant J. B. Peterson, drafted to National Army, Research Assistant W. E. Wynne, Field Artillery, United States Army, Research Assistant George Y. Allen, Bureau of Steam Engineering, United States Navy, Assistant H. N. Carlson, Instructor in Electricity and Signals (in charge of Department), United States Navy Aviation Detachment and Instructor in Ground School for Aviators, Technology, Assistant H. G. Dodge, Research work of Western Electric Co., Assistant G. W. Wyman, Instructor in United States Ground School for Aviators, Technology, Research Assistant R. J. Wiseman, Research Department of Western Union Telegraph Co., Research Assistant R. S. Burnap, Research Department of Edison Lamp Works, Instructor R. F. Zecha, Inspector of Machines, Fore River Shipbuilding Co.

Since the present term has opened Mr. O. R. Schurig, Instructor and Research Associate, has joined the research staff of the General Electric Co.

In addition to the foregoing, various members of the staff are devoting part of their time to war enterprises, such as the District Exemption Board dealing with appeals and industrial exemptions for the City of Boston and the Gas and Electric Service Committee of the Council of National Defense, of each of which I am a member, the Engineering Committee of the Council of National Defense, of which Professor Adams is a member, the Standards Committee of the American Institute of Electrical Engineers of which Professors Kennelly, Adams, and Laws are members, and the Mass. Sub-Committee of the Aviation Section of which Professor Clifford is a member. Professor Harrison W. Smith, Research Associate of the department, is Dean of the Academic Board of the Navy Aviation Detachment, Technology. Mr. N. S. Marston of our staff is also Lecturer for the Navy Aviation Detachment.

This devotion of the Department staff to the national interest, gratifying as it is, has its counterpart in the devotion of alumni and students of Course VI, and a service flag of a large number of stars, representing nearly a hundred in the army and navy, will soon be exhibited alongside the service flag of the Department staff referred to above.

DUGALD C. JACKSON

DEPARTMENT OF PHYSICS

After a half century of connection with the Institute as student and teacher Professor Cross has retired. Graduated from the Course in Science and Literature in 1870, appointed instructor in 1870, assistant professor in 1875, Thayer Professor of Physics in 1878, Director of Rogers Laboratory in 1885, in charge of the Course of Electrical Engineering from its establishment in 1882 till 1902, and Emeritus in 1917, Professor Cross has a record of continuous and devoted attention to duties, whether large or small, that none of us can hope to match. He has seen the Institute advance from a small beginning through various vicissitudes to its present state on its new site, and by his wise counsel through all the years has done much to help in the advance. We are glad that he is still so much with us at his desk in the Department Headquarters. The best testimony of our high regard for him is our resolve collectively to carry on his great work with all diligence, as we see the light, to the end that physics at the Institute may by our united efforts maintain and where possible increase the great estate to which he has brought it.

Dr. H. P. Hollnagel has been advanced from instructor to assistant professor. Two of our experienced instructors, Dr. G. E. Washburn and Mr. F. L. Hunt, have resigned to take up work at the Bureau of Standards in Washington on problems raised by the war. We are fortunate in securing the services of Dr. W. S. Franklin to aid in carrying on our work. The number of our assistants, normally eight, has been reduced to three by the pressure of the war and further reduction is threatened. It is not improbable that we shall have further to augment the average size of the sections in Sophomore Physics Recitations, unfortunate as that would be, and materially to alter the scheme of instruction in Sophomore Physics Laboratory. Several of the advanced courses already have been temporarily withdrawn and the students concentrated in other courses; this retrenching cannot, however, be carried much further without serious loss in the effectiveness of our Course in Physics. As a whole the members of the Department are bearing a considerable overload of teaching as we willingly must in the emergency; in addition several are studying hard on war problems and others stand ready to aid in this work. Many of our scientific and industrial activities do not lend themselves at this time to publication; others will be found in the bibliography.

E. B. WILSON

DEPARTMENT OF GEOLOGY

During the present year the Department of Geology has become well established in its new quarters. Much attention has been given to the arrangement of collections and laboratories. In common with other departments of the Institute, the geological section has suffered from the disarrangement incidental to the state of war. A number of students left before the spring term was concluded and some of the graduate students as well as the present instructor, Mr. Barry, are expected to leave shortly for military duty.

Instructing Staff. — There has been no change during the year in the regular staff. In January Professor Lindgren gave a series of twelve lectures on Gold and Silver Deposits in the Geological Department of Harvard University, to undergraduates and advanced students. Mr. William F. Jones, a former student of the Institute, who has done much field work in oil and coal deposits during recent years, gave an informal course of thirty hours on these subjects during the spring term for undergraduates and advanced students. During October and November Mr. E. S. Bastin, of the U. S. Geological Survey, gave a series of lectures on economic geology to the members of the senior class. Professor L. C. Graton, of Harvard University, lectured on "Ore Deposits" during the spring term to the men of Option 2 of the Mining Course.

Course Scheme. — The new Course Scheme for mining students is in operation and appears to be satisfactory. A new course on Engineering Geology of thirty hours is now given in the fall term and is elective in Courses I, III, XI, and XII. A new Course in Crystallography will be given this year to students in chemistry.

Students. — There are but few students who take the purely geological course. The lectures in Economic Geology are now attended by twelve students. The class in Dynamic and Structural Geology now numbers seventy men from the geological, mining, civil, and sanitary engineering departments, and a similar number of students attended the lectures on General Geology in the spring term of 1917.

Advanced Students. — In June, 1917, the degree of Doctor of Philosophy was conferred on Victor Dolmage upon the presentation of a thesis on "The Geology of the Telkwa River District, British Columbia." At the present time there are two candidates: W. L. Whitehead and John G. Barry. Advanced instruction is also given to one candidate for the M. S. degree in the Department of Mining. During the spring term advanced instruction in Economic Geology was given to six special students from Harvard, the Institute of Technology, and Princeton, and it is expected that a similar number will attend the course in the spring term of 1918.

Collections and Instruments. — During the year the specimens in the new Museum of Economic Geology have been labeled and rearranged. Many new donations have been received, including suites from the Chilean nitrate and copper deposits. New apparatus for the preparation of polished sections of ore has been installed. Two new biological microscopes have been obtained for the study of fossils as well as a new binocular microscope. Two microscopes for petrographic use to replace old nearly worn out instruments have been ordered.

A special appropriation of $1000 was made by the Executive Committee for the purpose of equipping the Research Laboratory of the Department. Some portion of the equipment has been purchased, but its installation and the purchase of further equipment has been delayed by war conditions to such an extent that it has not been possible as yet to begin the research work contemplated.

Professional Work. — From February to June Professor Lindgren was absent on professional work and engaged in the study of the two largest Chilean copper deposits. During part of the summer and fall he was also engaged in professional work in the Coeur d'Alene lead deposits, and also in studying certain gold deposits in southern Idaho.

During the summer Professor Warren has been engaged in a study of titaniferous iron ores, and also in an investigation of methods of determinations of crystalline matter under the microscope.

Professor Lahee has spent some time revising a second impression of his book on Field Geology, and has contributed a chapter on Geology to a new handbook on mining. During the summer he was engaged in field examinations connected with borings for oil in West Virginia. He has also been called upon for examination of mica deposits in connection with the war.

Mr. W. L. Whitehead, a candidate for the Ph.D. degree in the Department, was engaged during the first part of the year in professional work in the nitrate fields of Chile, and during this visit he also found time to investigate the silver deposits of Chanarcillo, which form the subject of his thesis.

Library. — The usual accession of current publications were received by the Departmental Library. During the year 738 books were taken out from the Library.

Publications. — The list of publications is the smallest presented by this Department for many years. Among the causes contributory to this are the professional activity of the Department in the field, which, however, promises to bear fruit soon in an increased number of contributions to the research literature.

WALDEMAR LINDGREN

DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING

The record for the Department for the past year consists principally of the conditions brought about in consequence of the declaration of a state of war with Germany.

Attention was called in the Report for 1917 of arrangements to meet demands of the Navy Department for Naval Constructors, and in particular for the entrance into active service of student officers (class of 1917) in September, 1916, after a summer of special instruction. At the same time, arrangements were made to accelerate the work of the succeeding class (1918).

Upon the declaration of a state of war, all student officers were immediately ordered to active service, and by special vote of the faculty the class of 1918 was recommended for the Degree of Master of Science at that time. The junior class was given leave of absence, and arrangements have been made, at the request of the Navy, for officers to complete the necessary work of that year by individual work with examination by certain members of the faculty. The senior class of the regular course in Naval Architecture all went into active service, taking advantage of the vote of the faculty allowing departments to recommend students having clear records on April 27th; half of the class were enrolled as Ensigns in the Navy in the Bureau of Construction and Repair, and the others took positions in yards engaged on government construction.

In response to a call for draughtsmen for the Navy, an intensive course was opened April 23d and completed June 30th. By special action of the Civil Service Commission, regular students who completed this course became eligible for service on the same grounds as graduates of technical colleges. There were forty-eight in this class of which three were, for one reason or another, not eligible for service in the Navy. One has a commission in the Signal Corps, and another has been placed in a shipyard. Forty-five of the class were recommended for degrees in the several departments of Civil, Mechanical, and Electrical Engineering, or in Architecture or Engineering

Administration on the basis of intensive active service. The success of this course was largely due to the devotion of Professor George Owen and Mr. Evers Burtner.

The Navy Department took over the forty-five men from the course on July 2d, and gave them four months of instruction and practical experience in the Boston Yard; of this number part are to be commissioned in the Corps of Naval Constructors, others are to be appointed civilian inspectors of construction and the remainder are naval draughtsmen.

It is proposed to give another intensive course, beginning February 4th, with work distributed throughout the term.

In the graduate course of Aëronautical Engineering there were four candidates for the degree of Master of Science and two specials; two of the former were officers from the Signal Service, who were ordered to active duty on the declaration of a state of war. All candidates for the degree of Master of Science took advantage of the action of the faculty concerning active duty. Mr. T. L. Blakemore went to the Bureau of Construction and Repair and F. E. McKone was appointed professor of Mechanical Engineering, including Aëronautical Engineering, at the University of Washington.

Of the members of the staff of the Department, Professor W. H. H. Keith enrolled in the Corps of Constructors as Lieutenant, Junior Grade, and Mr. Harold Larner as Ensign. Professor William Hovgaard is on leave, being special aid in the Bureau of Construction and Repair at Washington, and Mr. Evers Burtner is a naval draughtsman at the Portsmouth Navy Yard; the latter is to return to the Institute in February.

Mr. Alexander Klemin has served as instructor in the government ground schools for aviators at the Institute, and has also run the Aërodynamic Laboratory during the summer; he is now employed as Aëronautical Engineer by the Signal Service, as well as serving as instructor in the graduate course of Aëronautical Engineering. Mr. Thomas W. Huff resigned at the end of the school year to enter an aëronautical construction company. Mr. G. M. Denkinger and Mr. E. P. Warner were appointed assistants in Aëronautical Engineering for the present year.

The National Advisory Committee on Aëronautics entrusted the Aërodynamical Laboratory with a contract which (with certain commercial work) kept the laboratory busy during the summer; Messrs.

Denkinger, Warner, Aldrin, and Husted were employed on this work during the summer. Now, the Signal Service has been given exclusive use of the Aërodynamical Laboratory for the year, and Messrs. Denkinger and Warner are engaged as Aërodynamical Engineers in addition to their service with the Institute.

Professor C. H. Peabody has served as President of the Academic Board of the School of Military Aëronautics and the Naval Aviation Detachment, beginning for the former, May 21st, and for the latter, July 23d; on account of the pressure of other duties he was relieved of the former November 19th. As an adjunct to the Naval Aviation Detachment, there has been established a School for Inspectors on the staff of which are: —Professors Miller, Fay, Hayward, Taft, and Ives, and Messrs. Klemin, Cowdy, Adams, and certain instructors in the Detachment.

In consequence of the call to active service in the Army and Navy, the senior class in Naval Architecture has been greatly reduced. The junior class is of normal size, and the sophomore class is much increased, so that the total registration is larger than last year. In Aëronautical Engineering, there are three regulars and four specials. Unfortunately, the Signal Service has not found it possible to send Army officers to this course this year.

In consequence of the dislocation of the work of the Department of Civil Engineering, to meet the requirements of the School of Military Aëronautics, the students in the Department have been temporarily transferred to the drawing room of the Department of Mechanical Engineering, and the Department Library has been transferred to the General Library.

More detailed plans are now being developed for the Pratt School of Naval Architecture which it is hoped can be erected in the near future.

C. H. PEABODY

DEPARTMENT OF DRAWING AND DESCRIPTIVE GEOMETRY

During the first term of the past year to each full time instructor having classes in first year Mechanical Drawing or Descriptive Geometry there were assigned nearly one hundred students per week. Each of these one hundred students was scheduled for three two-hour exercises per week. For the second term the number of students to each instructor was slightly less. It has been felt in the Department that where an instructor was required to handle so many, it meant an overload for the instructor, a consequent lowering of efficiency, and too little of that personal contact so important to the first year student. These conditions are to be improved for the coming year by the enlargement of the staff by one new member.

The changes in the instructing staff are as noted below: — Mr. Goodrich has been promoted from the rank of instructor to that of assistant professor; Mr. Wareham has resigned to take up work with the Department of Chemistry; Mr. Stevens, who served as part time assistant, has left to go into engineering work, and on account of the small number of students in the Architectural Department Mr. J. E. Bird was not reappointed this year. Mr. W. D. McJennett has been appointed full-time instructor, and Mr. C. R. Mabie full-time assistant. Mr. W. C. F. Gartner has been appointed a half-time assistant. Both Mr. Mabie and Mr. McJennett come to the Department with previous experience as teachers.

The new text-book on Descriptive Geometry by Professors Kenison and Bradley, issued last year in a preliminary edition, has been enlarged and placed in the hands of the present first class year.

As planned in the preceding year, the Department has taken over the courses in Stereotomy, and has given during the past year the instruction in this subject to the Civil Engineering students. Other changes have been made so that under the present arrangement, with the exception of I, XI, and XV, option 1, all of the courses taking Descriptive Geometry complete the subject in their first year. For most of the courses this seems better than to have the work extend into the second year.

During the past summer the Department was formerly able to grant the use of a number of its drafting rooms and offices to one of the government schools. It was also privileged to assist some of our senior class in preparing for the examinations for the Engineer Corps.

ALFRED E. BURTON

DEPARTMENT OF ENGLISH

Four of the men on the staff of the English Department during the year 1916–1917 are now in military service. Mr. W. B. Pressey is a private in the United States Marines; Mr. J. K. Torbert was drafted and is at Camp Travis in Texas; Mr. William Green is in the Gas Defense Service at Washington; and Mr. C. H. Sutherland of the Civil Engineering Department has a commission in the Engineer Officers' Reserve Corps, and is serving in Texas. Two of the places thus made vacant have been filled by Mr. Frank L. Hewitt and Mr. Penfield Roberts, each of whom received the master's degree from Harvard in 1917. Mr. Allen French, who is a graduate of the Institute of the Class of 1892, and who for some years was instructor in English, has also been added to the staff for the first term.

Owing to the large entering class, the number of students taking English shows hardly any diminution from that of last year. One new required course is being given in the first term to third year students in Courses I, III, options 2 and 3, and XI. Professor Pearson and Professor Robinson are conducting the two sections in the course, and special emphasis is put upon the oral presentation of papers and discussion of them by the class.

During the summer the head of the Department sent a circular letter to a large number of Institute graduates asking for an expression of their opinion as to the importance of proficiency in English on the part of the Institute graduate, and the desirability of giving him more training of this sort while he was at the Institute as a student. The replies indicate a general and almost unanimous desire on the part of the writers that the students should receive all the training in English that they could possibly obtain without prejudice to the pursuit of their professional studies. Particular stress was laid in these letters on the importance (1) of ability in writing reports and business letters, (2) of skill in making oral presentation of subjects, and (3) of general reading along all lines in which the educated man of today should be familiar. The effect of these letters from the alumni has been to give us greater certainty in our aims in teaching the students, and fresh enthusiasm in all our work of instruction.

HENRY G. PEARSON

DEPARTMENT OF ECONOMICS AND STATISTICS

In June the Course in Engineering Administration graduated its first class, numbering 37, divided among the several options as follows: (1) Civil Engineering, 9; (2) Mechanical and Electrical Engineering, 20; (3) Chemical Engineering, 8. Before war was declared there was a gratifying demand on the part of industrial establishments for these graduates, indicating that the inauguration of this new course was more than justified. The demand, however, could only in small part be met, for many of the class promptly entered into military service or undertook special training which would be of service to the War and Navy Departments. At the present time (November, 1917) 13 have positions with private industrial establishments and 24 are in military and naval service.

Mr. Christiansen, instructor in Business Management, resigned his position in June and has been succeeded by Erwin H. Schell, with the rank of assistant professor. Professor Schell graduated from the Institute in 1912 in Course II. Under Mr. Christiansen's direction this course was developed last year with success, and it is believed that with this experience as a basis, supplemented by the special training which his successor brings to the department, the results this year will show further progress. There has been a generous coöperation on the part of factory managers in opening their establishments for plant visits and theses investigations; and in addition many have accepted invitations to lecture on special topics.[1]

[1] A full list of those who lectured to the class in Business Management, with the topics on which they spoke, during the past academic year, is as follows: E. B. Saunders, "Organization of the Simonds Manufacturing Company"; S. W. Wilder, "Organization of the Merrimac Chemical Company"; W. H. Blood, Jr., "Organization of Stone and Webster" and "The Value of Being Able to Observe Correctly"; W. E. P. Howell, "Purchasing for the Dennison Company"; Walter Goodenough, "Purchasing for Stone and Webster"; Professor P. T. Cherington, "Sources of Raw Material Supply" and "Marketing Methods for Copper, Iron and Steel"; J. M. Davis, "Purchasing for the General Electric Company"; Howard Coonley, "The Problem of the Location of the Plant"; J. J. Gillespie, "Factory Buildings, Power, Equipment, and Layout with Special Reference to Shoe Factories"; L. C. Leowenstein, "Choice of Type of Power for a Manufacturing Plant"; Professor George B. Haven, "Power and Transmission"; Henry P. Kendall, "The Science and Art of Management"; F. G. Coburn, "Handling Stores" and "Introducing Management Principles"; P. A. McKittrick, "Classification and Mnemonic Symbols"; H. L. Gantt, "Routing and Schedul-

In Securities and Investments the plan referred to in last year's report, of inviting outside lecturers to supplement the ordinary class-room work, has been continued.[1]

With reference to the outside activities of the members of the staff, mention may be made of the appointment of Professor Doten, during the past year, as a member of the State Immigration Bureau and of the Cambridge Park Commission. In November of this year he was appointed head of the Information Division in the Industrial Service Department of the United States Shipping Board and was given leave of absence for this duty.

DAVIS R. DEWEY

ing"; D. B. Gauchet, "Handling Orders through Shops of the General Electric Company"; F. B. Gilbreth, "Time Study"; R. A. Wentworth, "Shop Inspection"; C. E. Woods, "Planning Production in the Manufacture of Rifles at the Remington Arms Company"; Professor M. T. Copeland, "Statistics for the Chief Executive"; Clinton H. Scovell, "Machine Hour Rates"; Edwin Mulready, "Work of the State Board of Labor and Industries"; Everett Morss, "Handling Men"; T. K. Corey, "Problems in Personnel Management"; Edward Hurst, "Personal Experiences in Industrial Engineering"; Henry S. Dennison, "The Dennison Industrial Partnership Plan"; Meyer Bloomfield, "Employment Problems in Personnel Management"; J. F. Tobin, "Collective Bargaining"; W. E. C. Nazro, "Welfare Work"; S. E. Thompson, "Time Study"; Warren Ordway, "Market Study and Sales Organization"; Melville Smith, "Advertising"; E. F. Cullen, "Sales Campaigns"; Frank James, "Advertising Campaigns."

[1] A full list of those who lectured to the class in Securities and Investments, with the topics on which they spoke, during the past academic year, is as follows: Henry J. Horn, "Analysis of Railroad Accounts"; S. B. Pearmain, "Stock Exchange"; Frank A. Merrill, "Municipal Securities"; Levitt Parsons, "History of a Bond Issue"; William L. Garrison, Jr., "The Work of a Bondhouse"; Montgomery Rollins, "Convertible Bonds"; Hastings Lyon, "Rights and Stock Dividends"; Harvey S. Chase, "The Executive Budget in Connection with the Coming Constitutional Convention in Massachusetts"; E. L. Carey, "Railroad Financing and Stocks"; George E. Farrington, "Reorganized Properties"; Arthur S. Dewing, "Tests of Public Utility Investments" and "Financing Plan at Time of Promotion of a Corporation"; Arthur Gilbert, "Public Utility Bonds"; J. B. Hardon, "Mining Securities"; A. P. Brown, "Commercial Paper" and "Test of Commercial Paper"; L. R. Nash, "Financing of Public Utilities"; George B. Baker, "Water Power Bonds"; Roger W. Babson, "The Investments of a Young Man."

DEPARTMENT OF MODERN LANGUAGES

The Department of Modern Languages has been quietly performing its function as handmaid to the sciences during the past year by offering instruction in French, German, and Spanish.

The maximum enrollment in the various languages was as follows: German for first year students, two grades Elementary and Intermediate, 471 enrolled in twenty-three sections. For second year students, one grade, Advanced 140 enrolled in nine sections. Options of more advanced grade for third and fourth year students 36 enrolled in three sections.

French for first year students, two grades, Elementary and Intermediate 66 enrolled in two sections. Advanced options for second, third, and fourth year students 21 enrolled in two sections.

Spanish, one grade Elementary, as an option for second, third, and fourth year students 28 enrolled in two sections.

The instruction is given by a staff of two Professors, one Associate Professor, and four Instructors (one of the latter on part time) giving from three to nineteen hours of instruction per week. The classes contain from six to forty-four students, averaging nineteen, however.

From among the entering class 154 offered Latin as an elective subject, 13 German, and of those coming to us from other colleges 128 were able to fulfill our language requirements wholly or in part. The substitution of equivalents was offered for Elementary French by 8 in Latin, 8 in Spanish, and 4 in Chinese. For German by 2 in Greek, 1 in French, 1 in Latin, 3 in Chinese, 1 in Danish, which would seem to indicate that there are not many who apply to us for admission who have not made some preparation in German and French.

Several of our staff have been called upon to aid in Government work. In April Professors Vogel and Kurrelmeyer were invited to go to Washington to serve in the capacity of censors, but the demands of our own "Tech" work made it inexpedient to respond to the call at that time. On July 31st, a requisition from the Bureau of Steam Engineering of the United States Navy Department was received calling for services "to translate ships' orders from German into.

English: services as interpreter and translator in connection with the U.S.S. *America*, U.S.S. *Covington*, and U.S.S. *Mt. Vernon*," the three German steamers taken over by our Government. Professor Vogel was in charge of the work, which lasted from August 1 to October 6. He was assisted by Messrs. Cawley and Lieder during part of the time. This was very interesting language work in engineering.

Last June Messrs. Meister, Lieder, and Cawley served as Readers, and Professor Vogel as Chief Reader in German for the College Entrance Examination Board in New York. Professor Vogel has again been appointed Chief Examiner in German for the examinations to be held next June.

Changes in the Department to be noted are the retirement of Messrs. Erhardt and Meister. A notable addition to the Department was effected by the appointment of Dr. Arthur L. McCobb, a graduate of Bowdoin and Ph.D. of Johns Hopkins University, who brings a wide training and experience in language teaching and an equally excellent scholarship to the Department.

FRANK VOGEL

MATHEMATICS

The work of the Department during the year covered by the present report has undergone no fundamental change. It is, however, a matter of much satisfaction that the new edition of Professor Woods' and Professor Bailey's text is now in use in the second year as well as in the first.

Special classes conducted during the year by members of the Department have included Advanced Calculus and Differential Equations by Professor Woods, Fourier's Series by Professor Bailey, Mathematical Laboratory by Professor Lipka, Fluid and Rigid Dynamics by Professor Wilson, Analytical Mechanics by Professor Moore. This year Professor Moore has taken over a part of Professor Wilson's advanced courses.

In the present third year class, which had anticipated the elements of differential equations in the second half of the second year, we are this fall following a composite program, including additional work in differential equations, with selected topics from the mathematical laboratory work developed by Professor Lipka. A small class in this work was conducted by Professor Phillips during the summer for students in the new Coöperative Course in Electrical Engineering. In the first year we are postponing analytic geometry until trigonometry has been completed, at the middle of the first term.

Professor Bartlett has returned this fall after a year's leave of absence, spent largely in the Far East. Professor Wilson has been detached from the Department to become head of the Department of Physics. Mr. Libby has resigned to engage in teaching elsewhere. Dr. W. H. Wilson, of the University of Illinois, has been added to the Department, and Dr. Lipka and Dr. Hitchcock have been promoted to assistant professorships. The Department remains somewhat shorthanded, while the amount of work has not diminished with the falling off in the size of the upper classes.

The principal first term mathematical classes are as follows:

	Students	Sections
Math. 10 (plane trigonometry)	496	21
Math. 11 (analytic geometry)	540	23
Math. 21 (integral calculus)	423	21
Math. 31 (differential equations II)	69	4

H. W. TYLER

Society of Arts

In January, 1917, President Maclaurin invited to a conference at the Institute the superintendents of schools and the principals of high and preparatory schools of the cities and towns of this vicinity. A plan for giving at the Institute a series of scientific lectures for the benefit of pupils of these schools was proposed and discussed. As a result of the hearty indorsement given by those present, the plan was adopted and lectures were delivered on the second Tuesdays of February, March, April, and May, in the largest lecture hall in the buildings of the Institute in Cambridge.

These lectures were planned for pupils of the grade of seniors or juniors of the high school. While it was thought that pupils who were studying science might benefit specially from these lectures, a knowledge of science was not assumed by any of the lecturers.

The school authorities were invited to make applications for tickets for pupils of their schools, and the demand for these was so great that only a small portion of those requested could be issued to each of the schools. Rather than have a great many pupils from any one school, it was planned to have a large number of schools represented. At each of the lectures the hall was crowded.

The first lecture, given by Professor Henry P. Talbot, Head of the Department of Chemistry of the Institute, was on "Chemistry and What it is About." The purpose of the lecture was to show what chemistry covers the distinction between physics and chemistry, and some of the important types of chemical changes. The effect of such forms of energy as light, heat, and electricity on chemical changes was demonstrated and it was shown that each form of energy can be obtained as a result of chemical changes. The lecture was profusely illustrated with experiments.

The second lecture, on March 16, was given by Professor James F. Norris, also of the Institute's staff, on the "Chemistry of Fire." Experiments were performed to show that fire is caused by combustion and that in ordinary burning air is necessary. It was shown that the light and heat produced during combustion can be utilized

in many ways, some of them of great practical importance. A knowledge of the nature of fire, it was pointed out, leads to the invention of methods to control and extinguish it.

The third lecture, on April 10, was given by Professor Louis Derr of the Department of Physics at the Institute, on "Magnets and Magnetism." Experiments were first shown illustrating the present-day arrangement of the magnetizing process. The story of the electric magnet was then told from the early discovery of Oersted and Arago to Sturgeon's great invention. Many uses, familiar and unfamiliar, of the electric magnet were shown, the curious properties of the magnetic field were illustrated, and the lecture concluded with an exhibition of the remarkable behavior of various solids, liquids and gases in intense magnetic fields.

The fourth lecture was given on May 8, by Mr. John C. Packard, of the Brookline High School, entitled "Electricity at Work and at Play." It covered the elements of electric heat and light beginning with a hot wire surrounding a test tube of water and ending with an aurora tube, without connection or filament, lighted by induction from a huge Tesla coil. In this lecture twenty-one experiments were performed to illustrate the subject matter.

At the close of these lectures numerous commendatory letters were received in regard to them, and many urged that a similar course be given another year.

WALTER HUMPHREYS,
Secretary.

Publications

THE INSTITUTE

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

TREASURER'S REPORT

FOR THE YEAR ENDED JUNE 30, 1917

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, 1917, 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, for New Buildings	$2,500,000.00
Estate Charles H. Pratt, for Naval Arch. School	906,711.28
M. I. T. Alumni Fund, for Walker Memorial and Equipment	207,870.65
T. C. du Pont, for Dormitories	100,000.00
John M. Longyear, for Equipment	20,000.00
Galen L. Stone, for Equipment	10,000.00
Arthur Winslow, for Equipment	10,000.00
Anonymous, for Grounds	5,000.00
Rand Memorial Committee, for Fireplace	544.65
Tech Women's Association, for Equipment of Emma Rogers Room	500.00
Anonymous, for Equipment	300.00
F. A. Eustis, for Equipment	200.00
Professor F. J. Moore, for Equipment	100.00
New England Cotton Yarn Company, for Equipment of Mechanical Engineering Department	250.00
H. T. Hayward, for Equipment Mechanical Engineering Department	100.00
International Cotton Mills, for Equipment of Mechanical Engineering Department	100.00
G. E. Kuhnhardt, for Equipment of Mechanical Engineering Department	100.00
Edward Lovering, for Equipment of Mechanical Engineering Department	100.00
Pacific Mills, for Equipment of Mechanical Engineering Department	100.00
Stevens & Sons Company, for Equipment of Mechanical Engineering Department	100.00
U. S. Worsted Company, for Equipment of Mechanical Engineering Department	100.00
Spaulding Bartlett, for Equipment of Mechanical Engineering Department	100.00
Wm. M. Wood, for Equipment of Mechanical Engineering Department	100.00
American Felt Co., for Equipment of Mechanical Engineering Department	100.00
General Education Board, for General Endowment Fund	250,000.00
Charles Hayden, for General Endowment Fund	100,000.00
Anonymous Donor, for General Endowment Fund	100,000.00
T. C. duPont, for General Endowment Fund	100,000.00
Edward D. Adams, for General Endowment Fund	50,000.00
C. A. Stone, for General Endowment Fund	25,000.00
E. S. Webster, for General Endowment Fund	25,000.00
F. G. Webster, for General Endowment Fund	10,000.00

Henry R. Towne, for General Endowment (H. R. Towne Fund)	10,000.00	
George R. White, for General Endowment Fund	10,000.00	
George Wigglesworth, for General Endowment Fund	10,000.00	
F. L. Higginson, for General Endowment Fund	10,000.00	
Frank E. Peabody, for General Endowment Fund	10,000.00	
Everett Morss, for General Endowment Fund	10,000.00	
Kidder, Peabody & Company, for General Endowment Fund	10,000.00	
Col. T. L. Livermore, for General Endowment Fund	10,000.00	
Anonymous Donors for General Endowment Fund	30,000.00	
Elihu Thomson, for General Endowment Fund	5,625.00	
J. E. Aldred, for General Endowment Fund	5,000.00	
James J. Phelan, for General Endowment Fund	5,000.00	
A. F. Bemis, for General Endowment (H. R. Towne Fund)	5,000.00	
Hiram F. Mills, for General Endowment Fund	5,000.00	
William F. Henry, for General Endowment Fund	2,500.00	
Gaston, Snow & Saltonstall, for General Endowment Fund	1,500.00	
Edward Cunningham, for General Endowment Fund	1,100.00	
Mrs. H. G. Fitz, for General Endowment Fund	1,000.00	
Charles T. Main, for General Endowment Fund	1,000.00	
Caroline E. Ross, for Walker Memorial	1,000.00	
W. H. Lincoln, for General Endowment Fund	1,000.00	
Edwin F. Atkins, for General Endowment Fund	1,000.00	
Elliot C. Lee, for General Endowment Fund	1,000.00	
Alexander Cochrane, for General Endowment Fund	1,000.00	
Anonymous Donor, for General Endowment Fund	1,000.00	
Charles A. Dean, for General Endowment Fund	1,000.00	
Henry P. Day, for General Endowment Fund	1,000.00	
N. H. Stone, for General Endowment Fund	1,000.00	
A. W. Preston, for General Endowment Fund	1,000.00	
Wallace L. Pierce, for General Endowment Fund	1,000.00	
Francis A. Foster, for General Endowment Fund	500.00	
Desmond Fitz-Gerald, for General Endowment Fund	500.00	
J. Randolph Coolidge, for General Endowment Fund	500.00	
William L. Putnam, for General Endowment Fund	500.00	
Class of 1917, for General Endowment Fund	375.00	
A. Shuman, for General Endowment Fund	100.00	
A. W. Wheelwright, for General Endowment Fund	100.00	
Norman H. George, for General Endowment Fund	100.00	
Charles H. Jones, for General Endowment Fund	50.00	
A. K. Lawrie, for General Endowment Fund	50.00	
H. A. Kinnicatt, for General Endowment Fund	6.00	
Estate Matilda Crocker, for Scholarship	50,801.06	
Estate Morrill Wyman, for Relief	15,243.79	
Alexander S. Wheeler, family and friends of, for Wheeler Fund	15,000.00	
Estate Edward Whitney, for Research	12,890.54	
Estate Wm. J. Walker, for General Purposes	12,535.54	
Estate Helen Collamore, for Fellowship Fund	12,483.97	
Charles W. Hubbard, for General Purposes	10,000.00	
Estate Edmund K. Turner, for Civil Engineering Department	8,417.25	
Estate Caroline L. W. French, for General Purposes	6,528.46	
Estate Wm. E. Chamberlain, for Architectural Department	3,000.00	
Estate Sarah S. Forbes, for Scholarship	100.00	
		$4,725,983.19

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

Anonymous Donor, for Biological Equipment Fund	$1,500.00	
Anonymous Donor, for Sanitary Research	5,000.00	
Mrs. W. Scott Fitz, for Seismological Fund	250.00	
		6,750.00

Gifts for Research (Schedule B-1, Included in Minor Fund Earnings):

Am. Tel. and Tel. Co., for Library Fund	$8,653.11	
Am. Tel. and Tel. Co., for Research	9,009.00	
Stone & Webster, for Elec. Ry. Traffic Research	2,000.00	
General Electric Co., for Elec. Ry. Traffic Research	1,000.00	
J. F. Lord, for Applied Chemistry	675.00	
Audiphone Co., for Applied Chemistry	300.00	
		21,637.11

Miscellaneous Gifts:

Barber Asphalt Paving Co., for C. Richardson Fellowship		$1,000.00	
Estate Frances E. Weston, for			
Frances E. Weston Scholarship	$200.00		
Samuel Martin Weston Scholarship	200.00		
		400.00	
Anonymous Donor, for Scholarship		300.00	
Edward D. Peters, for Scholarship, Mining Dept.		250.00	
S. B. Pearmain, for Economics Department		40.00	
Montgomery Rollins, for Course XV		20.00	
Roger Babson, for Course XV		20.00	
G. B. Baker, for Course XV		20.00	
George E. Farrington, for Economics Department		20.00	
Montgomery Rollins, for Economics Department		20.00	
Herbert E. Fales, for General Purposes		250.00	
J. J. Gillespie, for General Purposes		50.00	
Walter Goodnough, for General Purposes		25.00	
T. K. Core, for General Purposes		25.00	
F. K. Hall, for General Purposes		20.00	
Frank A. Merrill, for General Purposes		20.00	
Students in Dormitory, for flag pole		34.23	
			2,514.23
			$4,756,884.53

Of the above total $4,756,884.53, the sum of $30,901.34 was given for current expenses or research, and has been carried into the income for the year.

Respectfully submitted,

FRANCIS R. HART,
Treasurer.

November 1, 1917.

SCHEDULE A

FINANCIAL RESULT OF THE YEAR ENDED JUNE 30, 1917, COMPARED WITH THE PREVIOUS YEAR

	1916–17	*1915–16*
Current Income, Schedule **B–1**	$1,074,659.69	$754,378.70
Current Outgo, Schedule **C–1**	1,052,985.76	708,655.13
Excess of Income	$21,673.93	$45,723.57
Gifts for general purposes, Schedule **B–1**	390.00	770.00
Net income for year	$22,063.93	$46,493.57
LOSSES AND GAINS DURING YEAR		
Gains and credits, Schedule **S**	18,845.04	12,094.17
	$40,908.97	$58,587.74
Losses and charges, Schedule **S**	144,587.66	1,544.74
	$103,678.69	$57,043.00
Income transferred to Funds—net	14,816.71	15,463.80
Decrease of current surplus	$118,495.40	*$41,579.20

*Increase.

SCHEDULE B–1

INCOME

	Regular courses	*Research and funds*	*Total*
INCOME FROM STUDENTS:			
Tuition fees	$449,963.56		
Entrance examination fees forfeited	1,545.00		
Locker fees	1,110.71		
Supplies, chemicals, laboratory materials, etc.	22,051.46		
Sale of lecture notes, etc.	582.92		
Registration fees	95.00		
Dormitory rentals (Schedule C–7)	25,696.54		
	$501,045.19		$501,045.19
INCOME FROM INVESTMENTS:			
Endowments for general purposes, Schedule P	152,285.24	$496.43	
Endowments for scholarship purposes, applied	25,212.50		
Endowments for other designated purposes, Schedule Q recapitulation	15,948.13	94,524.34	
	$193,445.87	$95,020.77	
Other income not applied to Funds	40,023.72		
	$233,469.59		
Less:—			
Accrued interest on purchases	40,023.72		
Net	$193,445.87	$95,020.77	288,466.64
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:			
Biological Dept. Special Equipment Fund		$2,000.00	
Sanitary Research Fund		5,000.00	
Seismological Fund		250.00	
		$7,250.00	7,250.00
Other Purposes:			
Salaries	$750.00		750.00
MINOR FUND EARNINGS:			
American Tel. & Tel. Research Fund.		$9,009.00	
American Tel. & Tel. Library Fund		8,653.11	
Course XV Fund		60.00	
Dormitory Fund		53.85	

	Regular courses	*Research and funds*	*Total*
MINOR FUNDS EARNINGS—*Continued.*			
Electric Railway Traffic Fund		3,000.00	
Jacques Fund		15.14	
Letter Box Fund		2.35	
Physico-Chemical Research Fund.		488.37	
Research Laboratory of Organic Chemistry		32.90	
Research Laboratory of Applied Chemistry		7,207.15	
Roentgen Ray Experiment Fund.		13.45	
Sanitary Research Fund		100.00	
		$28,635.32	28,635.32
INCOME FROM OTHER SOURCES:			
Harvard University	$39,761.71		
Interest, net	16,523.89		
Huntington Hall	3,500.00		
U. S. S. M. & R. Co.	250.00		
Walker Building	8,000.00		
Dining Service, Temporary Restaurant	58,028.76		
Bursar's Fund reimbursements		392.97	
	$126,064.36	$392.97	126,457.33
INCOME FROM SOCIETY OF ARTS:			
Dues	81.86		81.86
Total income, Schedule **A**	$943,360.63	$131,299.06	$1,074,659.69
GIFTS FOR			
General Purposes, Schedule **A**	$390.00		$390.00

SCHEDULE C–1

OUTGO

		Regular courses	*Research and funds*	*Total*
SALARIES OF TEACHERS:				
Professors		$158,426.21	$4,999.92	
Associate Professors		61,558.64	150.00	
Assistant Professors		54,198.49	9,625.02	
Instructors		83,639.23	6,052.35	
Lecturers		5,832.50		
Assistants		34,981.71	18,642.01	
		$398,636.78	$39,469.30	$438,106.08
WAGES ACCESSORY TO TEACHING:				
Stenographers and Assistants		24,290.41	1,384.50	25,674.91
DEPARTMENT SUPPLIES AND REPAIRS (Schedule **C–2**):				
Supplies	$68,839.93			
Wages	8,027.60	76,867.53		76,867.53
ADMINISTRATION AND GENERAL EXPENSE:				
Salaries of officers		32,041.74		
Salaries of assistants, stenographers, etc.		34,682.82		
Lecture notes		519.80		
Advertising and printing		15,274.66		
Insurance		4,436.57		
General Expense		60,177.80		
		$147,133.39		147,133.39
OPERATION AND MAINTENANCE OF PLANT:				
Mechanicians' wages		17,079.73		
Building service, etc.		83,284.36	2,910.79	
Light, heat and power		58,681.34		
Repairs viz:				
wages	$6,935.13			
stock and expense	24,366.63	31,301.76		
		$190,347.19	$2,910.79	193,257.98
EXPENSES OF MINOR FUNDS (excluding salaries):				
American Tel. & Tel. Research Fund			1,096.60	
American Tel. & Tel. Library Fund			5,038.65	
Biological Equipment			1,898.33	
Chemical Eng. Practice Fund			7,588.24	
Course XV Fund			61.20	
Electric Railway Traffic Fund			123.60	
Historical Exhibit			32.98	
Naval Architectural Fund			515.47	
Physico-Chemical Research Fund			2,716.67	
Research Laboratory of Applied Chemistry			3,263.44	

	Regular courses	*Research and funds*	*Total*
EXPENSES OF MINOR FUNDS — *Continued.*			
Roentgen Ray Experiment Fund		$52.00	
Sanitary Research Fund		1,541.67	
Seismological Research		250.00	
Tech Bureau, Paris		2,300.00	
Vehicle Research Fund		94.86	
		$26,573.71	$26,573.71
AWARDS:			
Edward Austin Fund awards		5,355.00	
Teachers' Fund awards		3,314.50	
Bursar's Fund awards		425.00	
Fellowship awards		2,253.09	
Dormitory awards (Whitney Fund)		857.50	
Architectural Prizes		400.00	
		$12,605.09	$12,605.09
MISCELLANEOUS EXPENSES:			
Premiums charged off —			
General Investments	$6,737.59		
Rogers Memorial Investments	167.00		
Whitney Fund Investment	133.50		
Draper Fund Investments	24.00		
Edna Dow Cheney Fund		207.82	
Pratt Naval Arch. Fund		33,252.92	
Ellen H. Richards Fund		78.22	
Dormitories, expense	22,889.95		
Summer Camp expense (net)	960.72		
Alumni New Site Fund	3,000.00		
Physico-Chemical Research Fund	3,750.00		
Appropriated for President's Fund	500.00		
Research Laboratory of Applied Chemistry	750.00		
Dining Service — Temporary Restaurant	58,536.62		
Appropriated for Historical Exhibit	400.00		
	$97,849.38	$33,538.96	$131,388.34
SOCIETY OF ARTS. Expenses	1,378.73		1,378.73
Total Outgo, Schedule **A**	$936,503.41	$116,482.35	$1,052,985.76

SCHEDULE C-2

DETAIL OF DEPARTMENTS

	Expense		*Repairs*			
	Supplies	*Salaries and wages*	*Stock*	*Wages*	*Total*	*Overdraft*
Architecture	$1,817.08	$160.00	$20.04	$2.88	$2,000.00	$237.18
Biology	1,375.05	199.52	77.33	148.10	1,800.00	870.10
Chemistry	4,324.36	..	178.30	197.34	4,700.00	938.44
Chemistry — Special	5,631.32	..	28.34	40.34	5,700.00	
Chemical Supply Room	18,111.96	..	18.72	40.56	18,171.24	
Civil and Sanitary Eng'g.	1,876.87	..	38.92	56.22	1,972.01	
Drawing	225.53	..	21.48	32.40	279.41	
*Economics	2,638.31	458.83	..	..	3,097.14	
Electrical Engineering	5,641.30	50.32	662.22	290.44	6,644.28	130.29
English	190.00	..	..	..	190.00	25.27
General Library	2,663.74	..	3.78	7.48	2,675.00	38.02
Geology	1,378.67	28.05	33.38	59.90	1,500.00	81.25
Geology — Special	153.00	..	..	..	153.00	
History	434.08	64.00	1.20	.72	500.00	53.05
Mathematics	238.75	361.25	..	..	600.00	27.58
Mechanical Engineering	5,034.12	1,576.67	1,348.12	893.81	8,852.72	
Military Science	548.18	280.00	79.83	5.28	913.29	
Mining	3,540.14	27.27	437.13	433.15	4,437.69	107.11
Modern Language	104.99	385.00	..	..	489.99	
†Naval Architecture	524.63	1,493.23	59.41	132.80	2,210.07	14.16
Physical Training Gymnasium.	129.04	..	9.77	6.24	145.05	
Physical Training Athletic Field.	1,631.18	1,835.17	13.49	298.27	3,778.11	
Physics	4,557.84	..	519.47	234.27	5,311.58	
Physics — Special	2,432.50	..	86.36	70.64	2,589.50	
	$65,202.64	$6,919.31	$3,637.29	$2,950.84	$78,710.08	$2,522.45
Expense items brought down			65,202.64	6,919.31		
Total stocks and supplies			$68,839.93			
Total salaries and wages				$9,870.15		
Grand total					$78,710.08	
Less Salaries of Teachers (included elsewhere)				1,842.55	1,842.55	
Total, Schedule **C-1**				$8,027.60	$76,867.53	
Department overdrafts (Schedule **D** — Current Assets)						$2,522.45

*Including Engineering Administration.
†Including Aeronautics.

SCHEDULE D

TREASURER'S BALANCE SHEET

1

INVESTMENT ASSETS

Securities and Real Estate, Schedule **H**	$9,136,037.84
Cash: In banks for Investment, Schedule **E**	45,040.75
Cash: Expended for new Equipment (carried down per contra)	24,733.07
Total	$9,205,811.66

2

CURRENT ASSETS

Cash available for general purposes, Schedule **E**			$116,757.16
Accounts Receivable			13,701.64
Student Fees Receivable			10,940.00
Student Deposits Receivable			1,607.56
Unexpired Insurance			12,050.24
Advances — account 1917–18	Department Appropriations Schedule **C–2**	$2,522.45	8,726.37
	Summer Camp	6,203.92	
Purchases — account 1917–1918 — Dining Room			4,617.36
Net expenditures a/c U. S. Government Schools			8,189.47
Total			$176,589.80
Excess of Investment Assets (per contra)			80,421.66
Total			$257,011.46

3

EDUCATIONAL PLANT ASSETS

Lands, Buildings and Equipment. Book Values

Total book value at beginning of year (net)	$6,047,795.72
Land, Boylston, Clarendon and Newbury Streets, Boston, not previously included	1,500,000.00
Equipment from Buildings in Boston not previously included	500,000.00
Additions during year	1,910,872.26
Total Book Value at end of year, Schedule **J**	$9,958,667.98

M. I. T. ALUMNI FUND. ASSETS

Appropriated for Equipment of New Buildings, Walker Memorial and Dormitories	$490,000.00
Appropriated for 1916 Reunion	19,672.06
Balance, Cash in bank (Schedule **E**)	1,995.66
	$511,667.72

SCHEDULE D

JUNE 30, 1917

1

ENDOWMENT AND OTHER FUNDS

Funds, Schedule **Q** recapitulation	$9,112,430.22
Minor Funds, Schedule **R**	12,959.78
Total Funds	$9,125,390.00
Excess of investment assets (carried down per contra)	80,421.66
Total	$9,205,811.66

2

CURRENT LIABILITIES

Accounts Payable	$23,085.07
Tuition in advance, 1917–18	7,913.00
Summer Camp, 1917, Fees and Deposits	1,652.65
Summer Camp, Outside Students' Fees	150.00
Entrance Examination Fees	5,425.00
Students' Deposits in advance	4,010.50
Dormitories, Income in advance	1,834.64
Students' deposits outstanding	680.00
Locker deposits outstanding	360.00
Dining Room — advance sale of coupons	2,373.68
Alumni New Site Fund	1,074.58
Gifts, anticipated	250.00
Total	$48,809.12
Surplus available for current expense, Schedule **S**	208,202.34
Total	$257,011.46

3

EDUCATIONAL PLANT AND CAPITAL ACCOUNTS

Endowment for Educational Plant, Schedule **K–1**	$9,233,934.91
Notes Payable	700,000.00
	$9,933,934.91
Expended in Advance (contra)	24,733.07
Total	$9,958,667.98

M. I. T. ALUMNI FUND

Balance at beginning of year	$400,651.60
Subscriptions and net income for year	111,016.12
	$511,667.72

WALKER MEMORIAL FUND. ASSETS

Appropriated for Walker Memorial Building	$164,409.53
Losses on Sales of Securities	4,988.65
	$169,398.18

IMPROVEMENT FUND. ASSETS

Appropriated for Equipment, Walker Memorial	$24,491.04
	$24,491.04

WALKER MEMORIAL FUND. (Final Statement)

Balance at beginning of year	$158,488.53
Net income for year	10,909.65
	$169,398.18

IMPROVEMENT FUND. (Final Statement)

Balance at beginning of year	$23,390.52
Net income for year	1,100.52
	$24,491.04

SCHEDULE E

CASH RECEIPTS AND DISBURSEMENTS

FOR THE YEAR

Total Cash Disbursements (less transfers)	$6,761,759.60
Total Cash Receipts (less transfers)	6,221,235.89
Excess of Disbursements	$540,523.71
Cash balance at beginning of year	704,317.28
Cash balance at end of year	$163,793.57

CASH BALANCE

Cash on deposits at banks:		
For Alumni Fund		1,995.66
For Investment		45,040.75
For General Purposes	$114,270.51	
Cash at office:		116,757.16
For General Purposes	2,486.65	
Cash balance as above		$163,793.57

SCHEDULE H

SECURITIES: BONDS, STOCKS,

Bonds	*Description of securities*	*Due*	*Balance at beginning of year*
$1,000.00	Adirondack Elec. Power Corp. 5%	1962	$920.00
26,000.00	Am. Dock and Improvement Co. 5%	1921	26,340.00
115,000.00	Am. Tel. & Tel. Co. 4%	1929	114,025.00
5,000.00	Am. Thread Co. 4%	1919	29,587.50
75,000.00	Atch., Topeka & Santa Fe R. R. Co. 4%	1995	26,410.00
75,000.00	Atch., Topeka & Santa Fe R. R. Co. 4½%	1962	97,525.00
1,000.00	City of Baltimore 4%	1961	950.00
94,000.00	Baltimore & Ohio R. R. Co. 3½%	1925	30,090.00
1,000.00	Belt R. R. and Stock Yds. Co. 4%	1939	900.00
30,000.00	Blackstone Valley Gas & Elec. Co. 4½%	1919	30,000.00
50,000.00	Blackstone Valley Gas & Elec. Co. 5%	1939	50,239.00
10,000.00	Boston & Northern St. Ry. Co. 4%	1954	9,250.00
100,000.00	Brooklyn Rapid Transit Co. 5%	1918	70,050.00
1,000.00	Buffalo, Rochester & Pitts. Ry. Co. 4½%	1921	1,000.00
..	Burlington & Mo. River R. R. Co. 6%	1918	1,000.00
1,000.00	Business R. E. Trust, Boston, Trustees 4%	1921	950.00
1,000.00	Central Ill. Public Service Co. 5%	1952	880.00
50,000.00	Central Pacific Ry. Co. 4%	1954	40,918.75
93,000.00	Chesapeake & Ohio Ry. Co. 5%	1939	47,279.00
25,000.00	Chesapeake & Potomac Tel. Co. 5%	1943	..
1,000.00	Chicago, Burlington & Quincy R. R. 4%	1927	1,000.00
1,000.00	Chicago, Burlington & Quincy R. R. 3½%	1949	837.50
48,000.00	Chicago, Burlington & Quincy R. R. 4%	1958	38,082.00
9,000.00	City of Chicago, Ill. 4%	1924	..
16,000.00	City of Chicago, Ill. 4%	1930	..
50,000.00	Chicago City Railway 5%	1927	..
50,000.00	Chi. Junc. Rys. and Union Stock Yds. 4%	1940	49,250.00
35,000.00	Chi. Junc. Rys. and Union Stock Yds. 5%	1940	34,743.75
1,000.00	Chi. Mil. & Puget Sound Ry. Co. 4%	1949	895.00
25,000.00	Chi. Mil. & St. Paul Ry. Co. 4%	1934	..
55,000.00	Chi. Mil. & St. Paul Ry. Co. 5%	2014	56,109.00
2,000.00	Chicago & Northwestern Ry. Co. 4%	1926	1,900.00
100,000.00	Chicago & Northwestern Ry. Co. 4%	1987	..
65,000.00	Chicago Union Station 4½%	1963	..
..	Chi. & West Michigan Ry. Co. 5%	1921	100,420.00
1,500.00	City of Cincinnati 4½%	1935	..
50,000.00	City of Cincinnati 4½%	1936	..
6,500.00	City of Cincinnati 4½%	1945	..
1,000.00	City of Cincinnati 4½%	1933	1,031.00
100,000.00	Cleveland Elec. Ill. Co. 5%	1939	..
25,000.00	Cleveland & Pittsburgh R. R. Co. 4½%	1942	25,744.00
100,000.00	City of Columbus, Ohio 4½%	1944	..
2,000.00	Commonwealth of Mass. 3½%	1930	..
1,000.00	Concord & Montreal R. R. Co. 4%	1920	940.00
68,000.00	Cons. Gas, Elec. Light & Power 4½%	1935	..
50,000.00	Consumers Power Co. 5%	1936	..
51,000.00	Cumberland Tel. & Tel. Co. 5%	1937	50,305.75
17,000.00	Delaware & Hudson Co. 4%	1943	17,260.00
100,000.00	Delaware & Hudson Co. 5%	1935	32,132.00
25,000.00	Detroit Edison Co. 5%	1933	50,949.00

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*
..	..	$920.00	..	$50.00
..	$85.00	26,255.00	..	1,300.00
..	..	114,025.00	..	4,600.00
..	24,656.25	4,931.25	$590.00	1,200.00
$45,590.00	..	72,000.00	162.45	2,030.00
..	24,381.25	73,143.75	1,096.88	3,937.50
..	..	950.00	..	40.00
56,400.00	..	86,490.00	140.00	1,190.00
..	..	900.00	..	40.00
..	..	30,000.00	326.25	1,350.00
..	11.00	50,228.00	..	2,500.00
..	..	9,250.00	..	400.00
30,225.00	275.00	100,000.00	540.27	3,500.00
..	..	1,000.00	..	45.00
..	1,000.00	..	..	60.00
..	..	950.00	..	40.00
..	..	880.00	..	50.00
..	..	40,918.75	..	2,000.00
53,342.50	346.50	100,275.00	640.28	3,400.00
24,500.00	..	24,500.00	204.86	1,250.00
..	..	1,000.00	..	40.00
..	..	837.50	..	35.00
9,225.00	..	47,307.00	158.88	1,720.00
9,081.90	11.90	9,070.00	11.00	..
16,243.20	18.20	16,225.00	19.56	..
49,750.00	..	49,750.00	1,138.90	1,250.00
..	..	49,250.00	..	2,000.00
..	..	34,743.75	..	1,750.00
..	..	895.00	..	40.00
23,406.25	..	23,406.25	41.67	..
..	11.00	56,098.00	..	2,750.00
..	..	1,900.00	..	80.00
96,500.00	..	96,500.00	788.89	2,000.00
100,750.00	35,273.00	65,477.00	1,381.25	2,250.00
..	100,420.00	..	..	..
1,637.04	7.04	1,630.00	20.38	33.75
53,125.00	165.00	52,960.00	839.75	1,087.18
7,282.73	28.73	7,254.00	95.88	146.25
..	2.00	1,029.00	..	45.00
102,110.00	96.00	102,014.00	1,012.77	2,400.00
..	30.00	25,714.00	..	1,125.00
109,236.20	342.20	108,894.00	750.00	2,250.00
2,000.00	..	2,000.00	..	70.00
..	..	940.00	..	60.00
63,630.00	..	63,630.00	150.50	
50,000.00	..	50,000.00	113.58	
..	..	50,305.75	..	2,550.00
..	10.00	17,250.00	..	680.00
74,535.00	370.00	106,297.00	1,243.89	3,250.00
..	25,504.00	25,445.00	..	2,500.00

Schedule H. (*Continued.*)

Bonds, shares	*Description of securities*	*Due*	*Balance at beginning of year*
$50,000.00	Detroit Edison Co. 5%	1940	$50,125.00
1,000.00	Dom'n Power & Transmission Co. 5%	1932	910.00
100,000.00	Edison Electric Ill. Co. 5%	1922	..
17,000.00	Electrical Securities Corp. 5%	1940	..
1,000.00	Electrical Securities Corp. 5%	1942	990.00
25,000.00	Electrical Securities Corp. 5%	1943	25,000.00
1,000.00	Erie R. R. Co. 5%	1917	1,000.00
92,000.00	General Electric Co. 5%	1952	71,971.00
47,000.00	Georgia Ry. & Electric Co. 5%	1932	22,440.00
30,000.00	City of Grand Rapids 3½%	1928	..
50,000.00	Great Britain and Ireland 5%	1918	..
68,000.00	Illinois Central R. R. Co. 4%	1951	3,000.00
100,000.00	Illinois Central R. R. Co. 4%	1952	..
2,000.00	Illinois Central R. R. Co. 3½%	1952	1,570.00
1,000.00	Illinois Central R. R. Co. 4%	1955	875.00
25,000.00	Indianapolis Union Ry. Co. 5%	1965	24,906.25
50,000.00	Interboro Rapid Trans. Co. 5%	1966	..
1,000.00	Iowa Central Railway 5%	1938	..
50,000.00	Kansas City, Mo. 4½%	1935	..
7,000.00	Kan. City, Clinton & Spfd. Ry. Co. 5%	1925	6,289.21
50,000.00	Kan. City, Ft. Scott & Mem. R. R. 6%	1928	53,991.00
8,500.00	Kan. City, Ft. Scott & Mem. R. R. 4%	1934	8,287.50
37,000.00	Kan. City, Mem. & Birming. R. R. 5%	1934	34,225.00
50,000.00	Kansas City Terminal 4%	1960	..
18,000.00	Kentucky Central Ry. Co. 4%	1987	17,910.00
1,000.00	Lackawanna Steel Co. 5%	1923	927.50
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. Co. 4%	1949	96,137.50
50,000.00	City of Los Angeles 4½%	1942	26,192.50
25,000.00	City of Los Angeles 4½%	1943	26,217.50
5,000.00	City of Los Angeles 4½%	1931	..
75,000.00	Maine Central Ry. Co. 4½%	1935	100,125.00
25,000.00	Manchester Traction Light & Power Co. 5%	1918	24,750.00
1,000.00	Maryland, Dela. & Va. Ry. Co. 5%	1955	800.00
100,000.00	Massachusetts Gas Cos. 4½%	1931	49,312.50
66,000.00	Milwaukee Gas Light Co. 4%	1927	46,812.50
100,000.00	Milwaukee County 4½%	1927	..
50,000.00	City of Minneapolis 4%	1927	48,175.00
10,000.00	City of Minneapolis 4½%	1930	..
20,000.00	City of Minneapolis 4½%	1931	..
20,000.00	City of Minneapolis 4½%	1932	..
50,000.00	Minneapolis Gen. Elec. Co. 5%	1934	50,505.00
100,000.00	Minn., St. Paul & Sault St. Marie 4%	1938	46,500.00
50,000.00	City of Montreal, Canada 5%	1936	50,000.00
1,000.00	Montreal Tramways Co. 5%	1941	890.00
1,000.00	National Dock Trust 4½%	1940	925.00
50,000.00	New England Tel. & Tel. Co. 4%	1930	50,280,00
50,000.00	New England Tel. & Tel. Co. 5%	1932	10,118.00
52,000.00	N. Y. C. & H. R. R. R. Co. 4%	1998	46,046.65

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
..	$5.00	$50,120.00	$406.25	$2,500.00
..	..	910.00	..	50.00
$102,220.00	444.00	101,776.00	55.56	..
16,830.00	..	16,830.00	406.11	425.00
..	..	990.00	..	50.00
..	..	25,000.00	..	1,250.00
..	..	1,000.00	..	50.00
23,246.25	92.25	95,125.00	159.03	4,050.00
51,250.00	25,696.00	47,994.00	1,297.77	2,350.00
29,100.00	..	29,100.00	236.25	525.00
49,625.00	..	49,625.00	361.11	1,250.00
59,817.50	..	62,817.50	453.33	1,420.00
90.500.00	..	90,500.00	408.01	2,000.00
..	..	1,570.00	..	70.00
..	..	875.00	..	40.00
..	..	24,906.25	..	1,250.00
49,562.50	..	49,562.50	69.44	..
1,000.00	..	1,000.00	..	50.00
54,275.00	237.00	54,038.00	18.75	..
..	..	6,289.21	24.50	350.00
..	362.00	53,629.00	..	3,000.00
..	..	8,287.50	129.50	340.00
..	..	34,225.00	..	1,850.00
44,187.50	..	44,187.50	672.22	1000.00
..	..	17,910.00	..	720.00
..	..	927.50	..	50.00
..	..	3,000.00	..	120.00
..	..	84,087.50	..	3,400.00
..	..	96,137.50	..	4,000.00
27,004.00	127.50	53,069.00	212.50	1,687.50
..	47.50	26,170.00	84.38	1,125.00
5,271.45	19.45	5,252.00	25.63	112.50
..	25,037.00	75,088.00	168.75	3,937.50
..	..	24,750.00	..	1,250.00
..	..	800.00	..	50.00
47,500.00	..	96,812.50	868.75	4,500.00
15,120.00	..	61,932.50	453.56	2,320.00
105,552.01	459.01	105,093.00	437.50	2,250.00
..	..	48,175.00	..	2,000.00
10,423.00	32.00	10,391.00	33.00	225.00
20,890.00	63.00	20,827.00	..	450.00
20,932.00	62.00	20,870.00	236.50	450.00
..	30.00	50,475.00	627.78	2,500.00
46,925.00	..	93,425.00	983.33	3,000.00
..	..	50,000.00	395.83	2,500.00
..	..	890.00	..	50.00
..	..	925.00	..	45.00
..	21.00	50,259.00	..	2,000.00
40,877.50	66.50	50,929.00	271.97	1,500.00
..	..	46,046.65	..	2,080.00

Schedule H. (*Continued.*)

Bonds, shares	*Description of securities*	*Due*	*Balance at beginning of year*
$4,000.00	N. Y. C. & H. R. R. R. Co. 3½%	1998	$2,905.00
1,000.00	N. Y. C. Lines Equipment 4½%	1919	985.00
36,000.00	N. Y. C. Lines Equipment 5%	1919	34,740.00
2,600.00	N. Y. Central R.R. 6%	1935	2,689.00
75,000.00	New York City 4¼%	1964	..
100,000.00	N. Y. Connecting R.R. Co. 4½%	1953	98,625.00
31,000.00	N. Y., N. H. & H. R.R. Co. 6%	1948	34,687.00
55,000.00	N. Y. Telephone Co. 4½%	1939	77,281.25
..	Nipe Bay Co. 6%	1917	29,471.25
33,000.00	City of Norfolk, Va. 4%	1954	..
1,000.00	Northern Me. Seaport R.R. Co. 5%	1935	850.00
159,000.00	Northern Pacific Gt. No. R.R. Co. 4%	1921	155,437.50
75,000.00	Northern Pacific Ry. Co. 4%	1997	67,875.00
50,000.00	Norton Company 5%	1922	..
1,000.00	Ogdensburg & Lake Champlain Ry. 4%	1948	..
25,000.00	Old Colony St. Ry. Co. 4%	1954	22,750.00
50,000.00	City of Omaha, Neb. 4½%	1934	..
50,000.00	City of Omaha, Neb. 4½%	1941	..
50,000.00	Province of Ontario 5%	1926	..
84,000.00	Oregon R.R. & Navigation Co. 4%	1946	50,877.00
50,000.00	Oregon Short Line R.R. Co. 4%	1929	48,500.00
14,500.00	Oregon Short Line R.R. Co. 5%	1946	521.75
41,000.00	City of Ottawa, P. Q. 4½%	1930	..
75,000.00	Pacific Tel. & Tel. Co. 5%	1937	73,915.10
18,000.00	Pennsylvania R.R. Co. 4½%	1960	18,645.00
100,000.00	Pennsylvania R.R. Co., 4½%	1965	25,153.00
..	Pere Marquette R.R. Co. 4%	1951	440.00
117,900.00	Pere Marquette R.R. Co. 5%	1956	..
50,000.00	City of Philadelphia 4%	1947	..
25,000.00	Portland General Electric Co. 5%	1935	25,490.00
1,000.00	City of Portland, Ore. 4%	1936	950.00
50,000.00	City of Portland, Ore. 4½%	1945	50,966.00
50,000.00	City of Quebec 5%	1920	49,375.00
25,000.00	Rensselaer & Saratoga R.R. Co. 7%	1921	..
51,000.00	Rio Grande Western Ry. Co. 4%	1939	49,180.00
1,000.00	City of Saginaw, Mich. 3½%	1922	946.25
15,000.00	City of Saginaw, Mich. 4%	1924	15,000.00
40,000.00	Salt Lake City, Utah 4½%	1934	..
15,000.00	City of San Francisco 5%	1937	16,379.00
10,000.00	City of San Francisco 5%	1939	10,970.00
100,000.00	City of Savannah, Ga. 4½%	1934/40	..
19,000.00	Seattle Electric Co. 5%	1929	18,430.00
6,000.00	Seattle Electric Co. 5%	1930	6,240.00
1,000.00	Somerset Ry. Co. 4%	1955	850.00
100,000.00	Southern Bell Tel. & Tel. 5%	1941	22,110.00
45,000.00	Southern Calif. Edison Co. 5%	1939	..
25,000.00	Southern Ry. Co. 4%	1951	24,875.00
25,000.00	City of St. Paul 4½%	1935	50,829.00
50,000.00	City of St. Paul 4¼%	1936	..
1,000.00	City of Toledo 4½%	1931	1,028.00

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
..	..	$2,905.00	..	$140.00
..	..	985.00	..	45.00
..	..	34,740.00	..	1,800.00
..	$5.00	2,684.00	..	156.05
$104,593.75	26,290.75	78,303.00	$755.56	1,593.70
..	..	98,625.00	1,843.75	4,500.00
..	118.00	34,569.00	..	1,860.00
..	24,150.39	53,130.86	178.13	3,037.50
31,503.75	60,975.00	..	288.33	3,600.00
33,000.00	..	33,000.00	150.33	660.00
..	..	850.00	..	50.00
..	..	155,437.50	1,968.33	6,360.00
..	..	67,875.00	..	3,000.00
50,000.00	..	50,000.00	6.94	..
680.00	..	680.00	..	20.00
..	..	22,750.00	..	1,000.00
54,017.50	236.50	53,781.00	806.25	1,125.00
54,750.00	197.00	54,553.00	68.75	..
50,000.00	..	50,000.00	1,000.00	2,500.00
31,791.25	..	82,668.25	273.99	2,680.00
..	..	48,500.00	..	2,000.00
14,840.00	30.75	15,331.00	40.83	375.00
39,003.30	..	39,003.30	574.00	922.50
..	..	73,915.10	..	3,750.00
..	15.00	18,630.00	..	810.00
75,968.75	23.75	101,098.00	287.50	4,500.00
..	440.00	..	..	..
104,732.50	12.91	104,719.59	..	2,947.50
51,750.00	58.00	51,692.00	77.78	..
..	27.00	25,463.00	..	1,250.00
..	..	950.00	..	40.00
..	34.00	50,932.00	..	2,250.00
..	..	49,375.00	..	2,500.00
28,218.75	804.75	27,414.00	335.42	1,750.00
755.00	..	49,935.00	..	2,020.00
..	..	946.25	..	35.00
..	..	15,000.00	..	600.00
42,062.50	121.50	41,941.00	420.00	675.00
..	69.00	16,310.00	..	750.00
..	44.00	10,926.00	309.03	500.00
106,681.31	354.31	106,327.00	631.25	2,250.00
..	..	18,430.00	..	950.00
..	18.00	6,222.00	..	300.00
..	..	850.00	..	40.00
79,327.50	60.50	101,377.00	1,788.18	3,050.00
44,550.00	..	44,550.00	62.50	..
..	..	24,875.00	..	1,000.00
..	25,437.00	25,392.00	..	2,250.00
52,437.50	128.50	52,309.00	466.32	1,062.50
..	2.00	1,026.00	..	45.00

Schedule H. (*Continued.*)

Bonds	*Description of securities*	*Due*	*Balance at beginning of year*
$1,100.00	Toledo Terminal R.R. Co. 4½%	1957	$825.00
5,000.00	Terminal R.R. Assn. of St. Louis 4%	1953	5,000.00
100,000.00	Terminal R.R. Assn. of St. Louis 4½%	1939	50,000.00
25,000.00	Terre Haute Traction & Light Co. 5%	1944	..
50,000.00	City of Toronto 5%	1932	..
100,000.00	Union Pacific R.R. Co. 4%	1947	51,270.00
70,000.00	United Fruit Co. 5%	1918	69,900.00
8,000.00	United Fruit Co. 4½%	1923	7,642.50
42,000.00	United Fruit Co. 4½%	1925	40,625.00
60,000.00	U. S. of America, certificate of indebtedness 3½%	1917	..
1,000.00	U. S. Envelope Co. 5%	1924	1,000.00
103,000.00	U. S. Steel Corp'n 5%	1963	26,989.00
1,000.00	Washington Co. R.R. Co. 3½%	1954	750.00
..	West End St. Ry. Co. 4%	1917	100,000.00
100,000.00	Western Tel. & Tel. Co. 5%	1932	16,078.75
25,000.00	Western Electric Co. 5%	1922	24,875.00
2,000.00	Western Union Telegraph Co. 4½%	1950	1,860.00
1,000.00	Westinghouse Elec. & Mfg. Co. 5%	1917	1,000.00
40,000.00	City of Winnipeg, Man. 5%	1926	..
50,000.00	Winston-Salem Southbound Ry. 4%	1960	..
10 shares	American Mfg. Co. Com.		896.00
5 "	American Mfg. Co. Pfd.		376.00
50 "	American Tel. & Tel. Co.		5,730.00
80 "	Amoskeag Mfg. Co. Pfd.		6,420.00
46 "	Amoskeag Mfg. Co. Com.		1,495.00
141 "	Batopilas Mining Co.		..
2 "	Bates Mfg. Co.		241.00
6 "	Boston & Lowell R.R. Corp'n		780.00
295 "	Boston & Albany R.R. Co.		60,911.50
18 "	Boston & Maine R.R. Com.		530.00
19 "	Boston & Maine R.R. Pfd.		855.00
10 "	Boston Ground Rent Trust		897.00
68 "	Boston Real Estate Trust		68,461.50
12 "	Boston Wharf Co.		1,323.64
31 "	Boston Woven Hose & Rubber Co. Com.		7,750.00
20 "	Boston Woven Hose & Rubber Co. Pfd.		2,340.00
12 "	Boylston Market Ass'n		16,800.00
75 "	British Westinghouse Elec. & Mfg. Co. Pfd.		600.00
12 "	Calumet & Hecla Mining Co.		6,000.00
4 "	Cambridge Gas Light Co.		1,020.00
91 "	Central Wharf & Wet Dock Corp'n		18,900.50
93 "	Chi., Milwaukee & St. Paul Ry. Co. Pfd.		7,367.00
33 "	Chi., Milwaukee & St. Paul Ry. Co. Com.		3,168.00
29 "	Chicago & Northwestern Ry. Co. Com.		3,770.00
6 "	Concord & Montreal R.R.		276.00
40 "	Congress St. Associates		..
2 "	Cooperative Publishing Co.		2.00
7 "	Copley Sq. Trust Pfd.		686.00
4 "	Cordis Mills		..
5 "	Delaware & Hudson Co.		750.00

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
..	..	$825.00	..	$49.50
..	..	5,000.00	..	200.00
$50,375.00	$17.00	100,358.00	$681.25	3,375.00
25,000.00	..	25,000.00	246.53	625.00
50,000.00	..	50,000.00	791.67	1,250.00
49,868.75	38.75	101,100.00	72.33	2,000.00
..	..	69,900.00	316.67	3,500.00
..	..	7,642.50	..	360.00
..	..	40,625.00	553.13	1,890.00
60,000.00	..	60,000.00	113.40	..
..	..	1,000.00	..	50.00
84,052.00	2,327.00	108,714.00	1,686.11	4,800.00
..	..	750.00	..	35.00
..	100,000.00	..	..	4,000.00
85,682.50	117.25	101,644.00	1,675.37	2,900.00
..	..	24,875.00	..	1,250.00
..	..	1,860.00	..	90.00
..	..	1,000.00	..	50.00
39,350.00	..	39,350.00	533.33	1,000.00
43,875.00	..	43,875.00	55.56	..
280.00	..	1,176.00	..	58.05
94.00	..	470.00	..	26.00
480.00	96.88	6,113.12	..	384.00
1,470.00	..	7,890.00	..	326.20
1,771.00	..	3,266.00	..	103.50
141.00	..	141.00	..	..
295.00	..	536.00	..	28.00
..	..	780.00	..	48.00
..	..	60,911.50	..	2,581.25
88.00	..	618.00	..	..
..	..	855.00	..	..
..	..	897.00	..	50.00
3,200.00	..	71,661.64	..	3,060.00
..	..	1,323.00	..	60.00
..	1,937.50	5,812.50	..	372.00
..	..	2,340.00	..	120.00
..	..	16,800.00	..	840.00
..	..	600.00	..	41.40
..	88.26	5,911.74	..	1,140.00
..	..	1,020.00	..	40.00
..	..	18,900.00	..	728.00
..	..	7,367.00	..	651.00
..	..	3,168.00	..	165.00
..	36.25	3,733.75	..	203.00
282.00	..	558.00	..	26.25
3,880.00	..	3,880.00	..	170.00
..	..	2.00	..	..
..	..	686.00	..	35.00
560.00	..	560.00	..	12.00
..	..	750.00	..	45.00

Schedule H. (*Continued.*)

Shares		*Description of securities*	*Balance at beginning of year*
2	"	Dwight Mfg. Co.	$1,600.00
27	"	Essex Co.	3,780.00
152	"	Fitchburg R.R. Co. Pfd.	4,055.00
31	"	Great Falls Mfg. Co.	3,472.00
56	"	Hamilton Woolen Co.	5,390.00
18	"	Illinois Central R.R. Co.	1,890.00
50	"	Lancaster Mills	5,519.00
3	"	Lawrence Gas Co.	165.00
1	"	Lowell & Andover R.R.	..
101	"	Maine Central R.R. Co.	9,740.00
5	"	Merchants Warehouse Co. Pfd.	475.00
50	"	Nashua Mfg. Co.	32,500.00
3	"	National Grand Bank of Marblehead	324.00
7	"	Newburyport Gas & Elec. Co.	1,190.00
36	"	New Eng. Tel. & Tel. Co.	4,500.00
65	"	N. Y. C. and H. R. R.R. Co.	5,768.75
50	"	N. Y. N. H. & H. R.R. Co.	3,725.00
54	"	Old Colony R.R.	3,780.00
10	"	Pemberton Co.	850.00
8	"	Pemberton Bldg. Trust	..
77	"	Pepperell Mfg. Co.	4,375.50
8	"	Pennsylvania R. R. Co.	440.00
..	"	Pere Marquette Ry. Co. Com	..
11	"	Pere Marquette Ry. Co. Pfd.	..
63	"	Plymouth Cordage Co.	..
50	"	Pray Building Trusts	2,500.00
197	"	Pullman Co.	31,520.00
50	"	Samson Cordage Co	5,000.00
6	"	State Street Exchange	390.00
25	"	South Terminal Trust	2,000.00
2	"	Tri-Mountain Trust Co.	..
20	"	Union Pacific R.R. Co. Com.	2,635.00
3	"	Union Pacific R.R. Co. Pfd.	243.00
300	"	United Fruit Co.	38,362.50
70	"	Vermont & Mass. R.R. Co.	8,680.00
11	"	Wash. Water Power Co. of Spokane	924.00
188	"	Westinghouse Elec. & Mfg. Co. Com.	9,212.00
100	"	Westinghouse Elec. & Mfg. Co. Pfd.	6,450.00
10	"	York Mfg. Co.	425.00
		MORTGAGE NOTES:	
		E. V. & C. T. Bigelow 5%	4,500.00
		W. H. Partridge 5%	7,000.00
		Sam'l Carr et al. Trustee 6% (face 125,000)	75,000.00
		Park Square Real Estate Trust Co. 4%	..
			$4,119,713.60

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
..	..	$1,600.00	..	$160.00
..	..	3,780.00	..	297.00
$7,644.00	..	11,699.00	..	637.50
..	..	3,472.00	..	372.00
..	..	5,390.00	..	336.00
..	..	1,890.00	..	126.00
..	..	5,519.00	..	150.00
330.00	..	495.00	..	16.00
98.00	..	98.00	..	8.00
..	..	9,740.00	..	606.00
..	..	475.00	..	25.00
..	..	32,500.00	..	2,750.00
..	..	324.00	..	18.00
..	$35.00	1,155.00	..	56.00
360.00	121.23	4,738.77	..	246.75
..	8.12	5,760.63	..	325.00
..	..	3,725.00	..	..
3,510.00	..	7,290.00	..	236.25
..	..	850.00	..	55.00
360.00	..	360.00	..	10.00
2,470.00	..	6,845.50	..	1,026.00
..	..	440.00	..	24.00
142.00	142.00	..	..	..
440.00	..	440.00	..	27.60
11,970.00	..	11,970.00	..	378.00
..	..	2,500.00	..	50.00
..	..	31,520.00	..	1,576.00
..	..	5,000.00	..	300.00
..	..	390.00	..	21.00
..	..	2,000.00	..	87.50
180.00	..	180.00	..	4.50
..	..	2,635.00	..	210.00
..	..	243.00	..	12.00
..	..	38,362.50	..	2,400.00
..	..	8,680.00	..	420.00
..	..	924.00	..	44.00
..	105.46	9,106.54	..	611.00
..	56.10	6,393.90	..	350.00
575.00	..	1,000.00	..	80.00
..	..	4,500.00	..	225.00
..	..	7,000.00	..	350.00
..	..	75,000.00	..	5,137.50
250,000.00	..	250,000.00		
$3,720,165.14	$510,625.69	$7,329,253.05	$40,023.72	$256,539.74

Schedule H. (*Continued.*)

		Due	*Balance at beginning of year*
REAL ESTATE:			
	Avon Street Land and Buildings, Equity		..
	Back Bay, Boston, Land and Building, Equity		$25,000.00
	Clarendon Street Land and Buildings		142,762.94
	Newbury Street Land and Building		12,168.00
	Pearl Street, Boston, Equity		44,764.32
	Portland, So. Portland & Mt. Desert, Maine, ¼ interest		4,625.00
			$4,349,033.86
INVESTMENTS, W. B. ROGERS MEMORIAL FUND:			
$25,000.00	Atchison, Top. & St. Fe Ry. Co. 4%	1995	$24,470.00
6,000.00	Baltimore & Ohio R.R. Co. 3½%	1925	5,310.00
7,000.00	Chesapeake & Ohio Ry. Co. 5%	1939	7,699.00
1,000.00	Chi. Burl. & Quincy R.R. 4%	1958	1,000.00
40,000.00	Chi. Junc. Rys. & U. Stock Yds. Co. 5%	1940	39,400.00
4,000.00	Cin., Ind., St. Louis & Chi. Ry. 6%	1920	4,000.00
..	Detroit, Grand Rapids & West'n R.R. 4%	1946	37,500.00
35,000.00	Fort St. Union Depot Co. 4½%	1941	34,825.00
..	Kansas City Belt Ry. Co. 6%	1916	27,000.00
31,000.00	N. Y. C. & H. R. R.R. 4%	1934	30,225.00
1,000.00	Central Lines Equipment 5%	1919	965.00
37,500.00	Pere Marquette Ry. Co. 4%	1956	..
24,000.00	Rome, Watertown & Ogdensburg R.R. 5%	1922	24,666.00
4,000.00	United Electric Securities Co. 5%	1940	4,034.00
			$241,094.00
INVESTMENTS, EBEN S. DRAPER FUND:			
$20,000.00	Mil. & St. Paul Ry. Co. 5%	2014	$20,392.00
16,000.00	Georgia Ry. & Elec. Co. 5%	1932	16,280.00
24,000.00	Indianapolis Union Ry. Co. 5%	1965	23,880.00
20,000.00	New York Tel. Co. 4½%	1939	19,395.00
20,000.00	Wilmington City Elec. Co. 5%	1951	19,600.00
			$99,547.00
INVESTMENTS, THOS. WENDELL BAILEY FUND:			
5 shares	Swift & Co.		$525.00
	Miscellaneous Oklahoma Properties		1,152.00
			$1,677.00
INVESTMENTS, JOY SCHOLARSHIP FUND:			
	Mass. Hospital Life Insurance Co.		$5,000.00
INVESTMENTS, SUSAN H. SWETT SCHOLARSHIP FUND:			
	Mass. Hospital Life Insurance Co.		$10,000.00
INVESTMENTS, RICHARD LEE RUSSEL FELLOWSHIP FUND:			
$2,000.00	Fisk Wharf and Warehouse Trust		$1,980.00
INVESTMENTS, JONATHAN WHITNEY FUND:			
$25,000.00	American Thread Co. 4%	1919	..
25,000.00	Atchison, Topeka & St. Fe Ry. Co. 4½%	1962	..
35,000.00	Chicago Union Station 4½%	1963	..
25,000.00	Detroit Edison Co. 5%	1933	..
25,000.00	Georgia Ry. & Electric Co. 5%	1932	..

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
$60,732.55	..	$60,732.55	..	..
..	$25,000.00	..	..	..
..	142,762.94	..	..	$3,750.00
..	12,168.00	..	..	*1,546.15
..	..	44,764.32	..	2,261.10
..	..	4,625.00	..	..
$3,780,897.69	$690,556.63	$7,439,374.92	$40,023.72	$261,004.69
..	..	24,470.00	..	1,000.00
..	..	5,310.00	..	210.00
..	31.00	7,668.00	..	350.00
..	..	1,000.00	..	40.00
..	..	39,400.00	..	2,000.00
..	..	4,000.00	..	240.00
..	37,500.00	..	..	..
..	..	34,825.00	..	1,575.00
..	27,000.00	..	..	810.00
..	..	30,225.00	..	1,240.00
..	..	965.00	..	50.00
37,500.00	..	37,500.00	..	750.00
..	134.00	24,532.00	..	1,200.00
..	2.00	4,032.00	..	200.00
$37,500.00	$64,667.00	$213,927.00	..	$9,665.00
..	4.00	20,388.00	..	1,000.00
..	20.00	16,260.00	..	800.00
..	..	23,880.00	..	1,200.00
..	..	19,395.00	..	900.00
..	..	19,600.00	..	1,000.00
..	$24.00	$99,523.00	..	$4,900.00
..	67.50	457.50	..	206.66
..	800.00	352.00	..	..
..	$867.50	$809.50	..	$206.66
..	..	5,000.00	..	212.50
..	..	10,000.00	..	425.00
..	..	1,980.00	..	80.00
24,656.25	..	24,656.25	..	
24,381.25	..	24,381.25	..	562.50
35,262.50	6.50	35,256.00	..	..
25,474.00	29.00	25,445.00	..	..
25,625.00	42.00	25,583.00	..	..

* Deficit.

Schedule H. (*Continued.*)

		Due	Balance at beginning of year
JONATHAN WHITNEY FUND — *Continued.*			
25,000.00	Maine Central Ry. Co. 4½%	1935	..
25,000.00	New York City 4¼%	1964	..
25,000.00	New York Telephone Co. 4½%	1939	..
25,000.00	City of St. Paul 4½%	1935	..
21,000.00	United Electric Securities Co. 5%	1940	$21,094.00
	Mortgage Note, M. I. T. Dormitory		..
			$21,094.00
INVESTMENTS, FRANK HARVEY CILLEY FUND:			
$8,000.00	Electrical Securities Corp'n 5%	1940	..
..	City of Nashville, Tenn. 5%	1917	$15,000.00
5,000.00	St. Louis Iron Mt. & So. R.R. 4%	1933	..
40 shares	Boston & Albany R.R. Co.		8,000.00
10 "	Boston & Providence R.R. Cpn.		2,500.00
30 "	Edison Elec. Illum., Co.		7,959.00
50 "	Fitchburg R.R. Co. Pfd.		5,000.00
75 "	Massachusetts Gas Cos. Pfd.		6,825.00
50 "	N. Y., N. H. & H. R.R.		4,700.00
25 "	Springfield Ry. Cos. Pfd.		2,125.00
50 "	West End Street Ry. Co. Com.		3,600.00
	South American Properties		1.00
	Isabelle Aznive, Mortgage Note		1,600.00
	Jacob Levenson, Mortgage Note		2,400.00
	Total		$59,710.00
INVESTMENTS, PRATT FUND:			
50 shares	American Linen Co.		..
50 "	American Sugar Refining Co. Pfd.		..
100 "	Beacon Trust Co.		..
21 "	Border City Mfg. Co.		..
198 "	Boston Elevated Ry. Co.		..
45 "	Boston & Albany R.R.		..
155 "	Cambridge Gas Light Co.		..
100 "	Copper Range Co.		..
25 "	Federal Trust Co..		..
40 "	Fitchburg R.R. Pfd.		..
25 "	King Phillip Mills		..
115 "	Lake Copper Co.		..
78 "	Lincoln Mfg. Co.		..
50 "	Mass. Gas Companies		..
600 "	Mexican Cons. Mining Co.		..
34 "	Old Colony R.R. Co.		..
86 "	Salem Gas Light Co.		..
26 "	Tecumseh Mills		..
200 "	Utah Cons., Mining Co.		..
25 "	Wamponoag Mills		..
15 "	West End St. Ry. Co.		..
100 "	Winona Copper Co.		..
			..

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
$25,031.25	$2.25	$25,029.00	..	$562.50
26,218.75	26.75	26,192.00	..	531.25
24,150.39	..	24,150.39	..	562.50
25,414.00	23.00	25,391.00	..	..
..	4.00	21,090.00	..	1,050.00
150,000.00	..	150,000.00	..	6,750.00
$250,814.39	$56.00	$271,852.39	..	$9,456.25
$7,960.00	..	$7,960.00	..	..
..	$15,000.00	..	..	$750.00
4,812.50	..	4,812.50	..	..
..	..	8,000.00	..	350.00
..	..	2,500.00	..	100.00
..	..	7,959.00	..	360.00
..	..	5,000.00	..	250.00
..	..	6,825.00	..	400.00
..	..	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
$12,772.50	$15,000.00	$57,482.50	..	$2,701.00
$4,000.00	..	$4,000.00	..	$275.00
5,900.00	..	5,900.00	..	175.00
25,000.00	..	25,000.00	..	600.00
2,370.00	57.23	2,312.77	..	90.00
16,236.00	..	16,236.00	..	693.00
8,010.00	..	8,010.00	..	303.75
34,875.00	..	34,875.00	..	1,162.50
6,700.00	..	6,700.00	..	850.00
3,450.00	..	3,450.00	..	162.50
3,000.00	..	3,000.00	..	100.00
3,500.00	..	3,500.00	..	350.00
1,610.00	..	1,610.00	..	..
7,800.00	..	7,800.00	..	390.00
4,100.00	..	4,100.00	..	100.00
600.00	..	600.00	..	..
4,760.00	..	4,760.00	..	119.00
17,200.00	..	17,200.00	..	516.00
3,562.00	..	3,562.00	..	364.00
2,800.00	..	2,800.00	..	700.00
2,000.00	..	2,000.00	..	112.50
1,125.00	..	1,125.00	..	30.00
611.99	..	611.99	..	..

Schedule H. (*Continued.*)

		Due	*Balance at beginning of year*
PRATT FUND—*Continued.*			
$15,000.00	City of Boston 4%	1924	..
20,000.00	City of Boston 4%	1935	..
15,000.00	Commonwealth of Mass. 4%	1919	..
15,000.00	Commonwealth of Mass. 4%	1920	..
5,000.00	City of Everett 4%	1921–25	..
10,000.00	City of Salem 4%	1921/24	..
11,000.00	City of Salem 4%	1921/24	..
1,000.00	Town of Winchester 4%	1919	..
3,000.00	Town of Winchester 4%	1919/23	..
3,000.00	Town of Winchester 4%	1918/23	..
	A. F. Crowley, Mortgage Notes		..
	Henry F. Farrow Co., Mortgage Notes		..
	Deposits in Savings Banks		..
	Edw. W. Fuller, Mortgage Note		..
	Eugene F. Sullivan, Mortgage Note		..
	Adolph Morse, Mortgage Note		..
	Catherine R. Walsh, Mortgage Note		..
	Real Estate, Huntington Ave., Boston		..
	Real Estate, Huntington Ave., Boston		..
	Real Estate, Huntington Ave., Boston		..
	Real Estate, Isabella St., Boston		..
	Real Estate, Pearl St., Boston		..
	Real Estate, Leverett St., Boston		..
	Real Estate, Wareham St., Boston		..
	Real Estate, Mass. Ave. and Prospect St., Cambridge		..
	Real Estate, Prospect St. and Austin St., Cambridge		..
	Real Estate, Mass. Ave., Cambridge		..
	Real Estate, Mass. Ave., Cambridge		..
			..
	Grand Total, Schedule **D**		$4,789,135.86

INVESTMENTS, WALKER MEMORIAL FUND:			
..	American Tel. & Tel. Co.	1929	$30,257.00
..	Chicago, Burlington & Quincy R.R. Co. 4%	1958	10,000.00
..	Electrical Securities Corp'n 5%	1940	16,915.00
..	Oregon Short Line R.R. Co. 5%	1946	16,160.00
..	St. Louis Iron Mt. & So. R.R. 4%	1933	4,812.50
	Total		$78,144.50
INVESTMENTS, IMPROVEMENT FUND:			
..	Cleveland Elec. Illum. Co. 5%	1939	$3,960.00
..	Electrical Securities Corp'n 5%	1940	7,960.00
..	U. S. Steel Corporation 5%	1963	9,502.00
	Total		$21,422.00

Schedule H. (*Continued.*)

Purchases and charges during year	*Sales and credits during year*	*Balance at end of year*	*Accrued int. paid*	*Interest received*
15,000.00	..	15,000.00	..	300.00
20,000.00	..	20,000.00	..	400.00
15,000.00	..	15,000.00	..	300.00
15,000.00	..	15,000.00	..	300.00
5,000.00	..	5,000.00	..	200.00
10,000.00	..	10,000.00	..	200.00
11,000.00	..	11,000.00	..	220.00
1,000.00	..	1,000.00	..	20.00
3,000.00	..	3,000.00	..	60.00
3,000.00	..	3,000.00	..	60.00
300.00	300.00	..	..	..
200.00	200.00	..	..	..
2,114.27	..	2,114.27	..	..
43,000.00	..	43,000.00	..	967.50
50,000.00	..	50,000.00	..	1,329.90
5,000.00	..	5,000.00	..	250.00
15,000.00	..	15,000.00	..	375.00
34,100.00	..	34,100.00	..	3,872.01
27,000.00	..	27,000.00	..	..
26,900.00	..	26,900.00	..	..
23,800.00	..	23,800.00	..	1,275.18
33,800.00	..	33,800.00	..	2,666.56
8,200.00	..	8,200.00	..	666.70
16,200.00	..	16,200.00	..	970.00
176,000.00	..	176,000.00	..	*9,870.00
74,100.00	..	74,100.00	..	*4,380.66
17,500.00	..	17,500.00	..	*1,000.00
90,900.00	..	90,900.00	..	*2,500.00
$901,324.26	$557.23	$900,767.03	..	$39,276.76
$5,118,707.84	$771,805.86	$9,136,037.84	$40,023.72	$328,490.36
..	$30,257.00	..	..	$600.00
..	10,000.00	..	..	200.00
..	16,915.00	..	..	425.00
..	16,160.00	..	..	350.00
..	4,812.50	..	..	200.00
..	$78,144.50	..	..	$1,775.00
..	$3,960.00	..	..	$200.00
..	7,960.00	..	..	400.00
..	9,502.00	..	..	450.00
..	$21,422.00	..	..	$1,050.00

* Gross income.

SCHEDULE J

EDUCATIONAL PLANT

Land, Buildings and Equipment

Land, Boylston, Clarendon and Newbury Sts., Boston	$1,500,000.00
Rogers Building, Boylston St., Boston	200,000.00
Walker Building, Boylston St., Boston	150,000.00
Land and Improvements, New Technology, Cambridge	1,032,867.32
Main Educational Building Group, Cambridge	4,040,752.35
Mechanic Arts Building, Cambridge	81,506.42
Power Plant (inc. Machinery and Equipment) Cambridge	249,862.23
Educational Equipment, Cambridge	1,521,244.28
Steam and Electrical Distribution System, Cambridge	147,636.36
Gas Engine Laboratory, Cambridge	25,301.88
Service Garage, Cambridge	5,981.54
Athletic Field, Cambridge	17,466.97
Summer Camp, East Machias, Maine	36,081.81
Walker Memorial Building (Incomplete) Cambridge	444,787.53
Walker Memorial Building, Equipment (Incomplete) Cambridge	32,285.71
Dormitories, Cambridge	323,981.02
Dormitories, Equipment, Cambridge	19,057.02
Miscellaneous (awaiting analysis)	129,855.54
Total, June 30, 1917	$9,958,667.98

SCHEDULE K-1

PRINCIPAL GIFTS AND APPROPRIATIONS FOR EDUCATIONAL PLANT

Anonymous Donation for New Buildings	$3,500,000.00
Anonymous Donation for Dormitories	100,000.00
T. C. duPont, Donation for Land	500,000.00
T. C. duPont, Donation for Dormitories	100,000.00
T. C. duPont, P. S. duPont, Chas. Hayden, for Mining Building	215,000.00
Alumni Fund, for Equipment, Dormitories and Walker Memorial	490,000.00
Walker Memorial Fund, for Walker Memorial	164,409.53
Improvement Fund, for Walker Memorial	24,491.04
Appropriation from Emma Rogers' Fund for Dormitories	150,000.00
Whitney Fund, Mortgage Loan for Dormitories	150,000.00
Estate of F. W. Emery, for New Equipment	120,561.80
Land in Boston, Grant of Commonwealth	1,500,000.00
Sale of Land and Buildings in Boston	656,919.45
Equipment from Buildings in Boston (estimated)	500,000.00
Other Funds, Donations, etc.	1,062,553.09
	$9,233,934.91

SCHEDULE P

ENDOWMENT FUNDS FOR GENERAL PURPOSES

Increases and Decreases of Funds for General Purposes

Invested funds Restricted	*Funds June 30, 1916*	*Investment income*	*Other increases or decreases of funds*	*Expenditures*	*Funds June 30, 1917*
Anonymous Endowment Fund	..	$52,812.50	$2,500,000.00	$52,812.50	$2,500,000.00
General Endowment Fund	$702,043.00	33,800.00	815,506.00	33,800.00	1,517,549.00
George Robert Armstrong	5,000.00	211.25	..	211.25	5,000.00
Charles Cloate	33,932.63	1,436.50	..	1,436.50	33,932.63
Eben S. Draper	100,000.00	4,900.00	..	4,900.00	100,000.00
Martha Ann Edwards	30,000.00	1,267.50	..	1,267.50	30,000.00
William Endicott	25,000.00	1,056.25	..	1,056.25	25,000.00
Jonathan French	23,906.80	1,014.00	1,305.68	1,014.00	25,212.48
James Fund	163,654.21	6,929.00	..	6,929.00	163,654.21
Katharine B. Lowell	5,000.00	211.25	..	211.25	5,000.00
Richard Perkins	50,000.00	2,112.50	..	2,112.50	50,000.00
John W. and Belinda L. Randall	83,452.36	3,506.75	..	3,506.75	83,452.36
William B. Rogers	250,225.00	9,665.00	..	9,665.00	250,225.00
Saltonstall Fund	47,269.77	1,985.75	..	*1,489.32	47,766.20
Samuel E. Sawyer	4,764.40	198.58	..	198.58	4,764.40
William J. Walker	11,128.05	633.75	12,535.54	633.75	23,663.59
Albion K. P. Welch	5,000.00	211.25	..	211.25	5,000.00
Unrestricted					
Sidney Bartlett	10,000.00	422.50	..	422.50	10,000.00
Stanton Blake	5,000.00	211.25	..	211.25	5,000.00
Helen Collamore	..	295.75	12,483.97	295.75	12,483.97
George B. Dorr	49,573.47	2,112.50	..	2,112.50	49,573.47
Caroline L. W. French	95,620.56	4,140.50	5,222.78	4,140.50	100,843.34
Arthur T. Lyman	5,000.00	211.25	..	211.25	5,000.00
James McGregor	2,500.00	105.63	..	105.63	2,500.00
Nathaniel C. Nash	10,000.00	422.50	..	422.50	10,000.00
Frances M. Perkins	16,525.00	697.13	..	697.13	16,525.00
Emma Rogers	528,377.06	15,970.50	..	166,270.50	378,077.06
Robert E. Rogers	7,680.77	325.33	..	325.33	7,680.77
Seth K. Sweetser	25,061.62	1,056.25	..	1,056.25	25,061.62
Nathaniel Thayer	25,000.00	1,056.25	..	1,056.25	25,000.00
Lucius Tuttle	50,000.00	2,112.50	..	2,112.50	50,000.00
Charles G. Weld	15,000.00	633.75	..	633.75	15,000.00
Alexander S. Wheeler	5,000.00	1,056.25	25,000.00	1,056.25	30,000.00
	$2,390,714.70	$152,781.67	$3,372,053.97	$302,585.24	$5,612,965.10

*One-fourth income added to fund.

SCHEDULE Q

ENDOWMENT FUNDS FOR DESIGNATED PURPOSES

Increases and Decreases of Funds for Designated Purposes

Invested funds	*Funds June 30, 1916*	*Investment income*	*Other increases or decreases of funds*	*Expenditures*	*Funds June 30, 1917*
FUNDS FOR SALARIES:					
Samuel C. Cobb For General Salaries . . .	$30,000.00	$1,267.50	..	$1,267.50	$30,000.00
Sarah H. Forbes For General Salaries . . .	500.00	21.13	..	21.13	500.00
George A. Gardner For General Salaries . . .	20,000.00	845.00	..	845.00	20,000.00
James Hayward Professorship of Engineering	18,800.00	802.75	..	802.75	18,800.00
Wm. P. Mason Professorship of Geology .	18,800.00	802.75	..	802.75	18,800.00
Henry B. Rogers For General Salaries . . .	25,000.00	1,056.25	..	1,056.25	25,000.00
Nathaniel Thayer Professorship of Physics .	25,000.00	1,056.25	..	1,056.25	25,000.00
Totals	$138,100.00	$5,851.63	..	$5,851.63	$138,100.00
FUNDS FOR LIBRARY, READING ROOMS AND GYMNASIUM					
Cilley Fund	$65,156.36	$2,701.00	$138.03	..	$67,995.39
Charles Lewis Flint Library .	5,000.00	211.25	..	211.25	5,000.00
William Hall Kerr Library .	2,102.75	84.50	..	80.00	2,107.25
Arthur Rotch Architectural Library	5,000.00	211.25	..	211.25	5,000.00
John Hume Tod Fund . . .	2,852.29	105.63	..	105.43	2,852.49
Technology Matrons Tea Fund	2,000.00	84.50	..	55.50	2,029.00
Edna Dow Cheney for Margaret Cheney Reading Room	15,069.77	591.50	1.75	877.13	14,785.89
Totals	$97,181.17	$3,989.63	$139.78	$1,540.56	$99,770.02
FUNDS FOR DEPARTMENTS:					
Frank W. Boles Memorial .	$15,682.50	$633.75	..	$273.02	$16,043.23
Samuel Cabot (Industrial Chemistry)	59,622.59	2,112.50	..	2,120.00	59,615.19
Wm. E. Chamberlain Fund .	..	..	$3,000.00	..	3,000.00
Chemical Engineering Fund.	300,000.00	11,618.75	..	25,935.72	285,683.03
Susan E. Dorr Fund	95,955.67	4,056.00	..	4,056.00	95,955.67
George H. May Chem. Dept.	5,000.00	211.25	..	211.25	5,000.00
Pratt Naval Arch. Fund . .	..	39,276.76	906,711.28	32,252.92	912,735.12
Arthur Rotch Architectural Fund	25,000.00	1,056.25	..	1,056.25	25,000.00
Edmund K. Turner Fund. .	178,462.94	7,605.00	8,417.25	*6,203.00	188,282.19
Totals	$679,723.80	$66,570.26	$918,128.53	$73,108.16	$1,591,314.43

*One-fourth net income added to fund.

Schedule Q. *(Continued.)*

FUNDS FOR RESEARCH:					
Ellen H. Richards Research Fund	$15,847.49	$633.75	..	$678.22	$15,803.02
Charlotte B. Richardson (Industrial Chemistry)	37,378.78	1,267.50	..	1,267.50	37,378.78
Whitney Fund	27,589.88	1,056.25	12,890.54	1,436.99	40,099.68
Totals	$80,816.15	$2,957.50	$12,890.54	$3,382.71	$93,281.48
FUNDS FOR FELLOWSHIPS:					
Collamore Fund	$10,100.00	$422.50	..	..	$10,522.50
Dalton Graduate Chemical	5,678.49	211.25	..	$350.00	5,539.74
Moore Fund	5,269.77	211.25	..	..	5,481.02
Willard B. Perkins	7,881.57	253.50	..	..	8,135.07
Clifford Richardson	..	..	$1,000.00	828.09	171.91
Richard L. Russel	2,266.57	80.00	..	..	2,346.57
Henry Saltonstall	10,818.23	422.50	..	425.00	10,815.73
James Savage	14,185.84	422.50	..	250.00	14,358.34
Susan H. Swett	10,645.45	425.00	..	400.00	10,670.45
Totals	$66,845.92	$2,448.50	$1,000.00	$2,253.09	$68,041.33
FUNDS FOR SCHOLARSHIPS:					
Anonymous	..	..	$300.00	..	$300.00
Elisha Atkins	$5,359.12	$211.25	..	$220.00	5,350.37
Billings Student Fund	52,541.20	2,112.50	..	2,200.00	52,453.70
Jonathan Bourne	10,479.71	422.50	..	400.00	10,502.21
Lucius Clapp	5,270.95	211.25	..	220.00	5,262.20
Lucretia Crocker	..	1,985.75	50,551.06	..	52,536.81
Isaac W. Danforth	5,425.38	211.25	..	220.00	5,416.63
Ann White Dickinson	42,635.79	1,732.25	..	1,800.00	42,568.04
Farnsworth Fund	5,409.12	211.25	..	220.00	5,400.37
Charles Lewis Flint	5,456.63	211.25	..	200.00	5,467.88
Sarah S. Forbes	3,468.81	126.75	100.00	130.00	3,565.56
George Hollingsworth	5,036.40	211.25	..	..	5,247.65
T. Sterry Hunt	3,247.47	126.75	..	130.00	3,244.22
Wm. F. Huntington	5,444.22	211.25	..	230.00	5,425.47
Joy Scholarships	10,000.00	423.75	..	423.75	10,000.00
Income Joy Scholarships	3,641.99	..	423.75	75.00	3,990.74
Wm. Litchfield	5,450.12	211.25	..	220.00	5,441.37
Elisha T. Loring	5,459.91	211.25	..	220.00	5,451.16
George H. May	4,893.32	211.25	..	250.00	4,854.57
James H. Mirrlees	3,019.97	105.63	..	110.00	3,015.60
Nichols Fund	5,409.12	211.25	..	220.00	5,400.37
Charles C. Nichols	5,450.41	211.25	..	220.00	5,441.66
John Felt Osgood	5,400.12	211.25	..	220.00	5,391.37
Richard Perkins	56,391.97	2,197.00	..	2,300.00	56,288.97
Thomas Sherwin	5,459.12	211.25	..	220.00	5,450.37
Susan Upham	1,059.50	42.25	..	40.00	1,061.75
Ann White Vose	65,696.25	2,535.00	..	2,700.00	65,531.25
Louis Weissbein	4,191.88	169.00	..	180.00	4,180.88
Frances Erving Weston	1,000.00	..	200.00	250.00	950.00
Samuel Martin Weston	200.00	..	200.00	200.00	200.00
Totals	$332,498.48	$14.936.63	$51,774.81	$13,818.75	$385,391.17

Schedule Q. (*Continued.*)

Invested funds	*Funds June 30, 1916*	*Investment income*	*Other increases or decreases of funds*	*Expenditures*	*Funds June 30, 1917*
FUNDS FOR PRIZES:					
Arthur Rotch Prize Fund in Architecture	$5,359.12	$211.25	..	$200.00	$5,370.37
Arthur Rotch "Special" Prize Fund in Architecture.	5,959.12	211.25	..	200.00	5,970.37
Totals	$11,318.24	$422.50	..	$400.00	$11,340.74
FUNDS FOR RELIEF:					
Architectural Society	$1,238.55	$42.25	..	..	$1,280.80
Edward Austin	396,176.25	15,210.00	$1,521.00	$16,493.50	396,413.75
Thomas Wendall Bailey	2,169.23	206.66	..	..	2,375.89
Levi Boles	10,273.00	422.50	..	..	10,695.50
Bursar's Fund	6,625.79	270.66	392.97	425.00	6,864.42
Teachers' Fund	121,781.79	4,225.00	..	3,314.50	122,692.29
Jonathan Whitney	488,629.79	16,018.75	..	3,057.50	501,591.04
Morrill Wyman	52,448.64	2,112.50	15,751.12	..	70,312.26
Totals	$1,079,343.04	$38,508.32	$17,665.09	$23,290.50	$1,112,225.95
Funds for General Purposes	$2,390,714.70	$152,781.67	$3,372,053.97	$302,585.24	$5,612,965.10
Funds for Salaries	138,100.00	5,851.63	..	5,851.63	138,100.00
Funds for Libraries, Reading Rooms and Gymnasiums	97,181.17	3,989.63	139.78	1,540.56	99,770.02
Funds for Departments	679,723.80	66,570.26	918,128.53	73,108.16	1,591,314.43
Funds for Research	80,816.15	2,957.50	12,890.54	3,382.71	93,281.48
Funds for Fellowships	66,845.92	2,448.50	1,000.00	2,253.09	68,041.33
Funds for Scholarships	332,498.48	14,936.63	51,774.81	13,818.75	385,391.17
Funds for Prizes	11,318.24	422.50	..	400.00	11,340.74
Funds for Relief	1,079,343.04	38,508.32	17,665.09	23,290.50	1,112,225.95
Grand Total	$4,876,541.50	$288,466.64	$4,373,652.72	$426,230.64	$9,112,430.22

SCHEDULE R

INCREASES AND DECREASES OF MINOR FUNDS

	Funds June 30, 1916	*Income and other increases of funds*	*Expenditures and other decreases of funds*	*Funds June 30, 1917*
MINOR FUNDS:				
American Tel. & Tel. Library Fund	* $122.94	$8,746.29	$8,239.57	$383.78
American Tel. & Tel. Research Fund	565.56	9,510.75	10,202.64	*126.33
Biology Dept. — Special Equipment Fund	..	2,000.00	1,898.33	101.67
Commercial Research Fund	7.52	..	..	7.52
Course XV Fund	100.00	60.00	61.20	98.80
Dormitory Fund	2,692.33	53.85	..	2,746.18
Edison Electric Vehicle Fund	*186.69	186.69		
Electric Railway Traffic Research Fund	580.79	3,006.42	1,250.52	2,336.69
Historical Exhibit	..	400.00	32.98	367.02
Jacques Fund	757.21	15.14	..	772.35
Letter Box Fund	130.27	2.60	.25	132.62
Macy Research Fund	202.24	..	196.32	5.92
Naval Architectural Fund	571.34	..	515.47	55.87
Ozone Fund	14.18	..	..	14.18
Physico-Chemical Research Fund	924.63	4,238.37	5,385.64	*222.64
President's Fund	13.74	500.00	..	513.74
Research Laboratory of Applied Chemistry	2,493.60	8,407.15	8,072.79	2,827.96
Research Laboratory of Organic Chemistry	1,644.87	32.90	..	1,677.77
Roentgen Ray Experiment Fund	672.43	13.45	52.00	633.88
Sanitary Research Fund	2,359.36	5,100.00	5,299.39	2,159.97
Seismological Research Fund	..	250.00	250.00	
Technology Bureau, Paris	..	..	2,300.00	*2,300.00
Terminal Research Fund	*9.63	9.63		
Traveling Scholarship in Architecture	750.00	..	..	750.00
Vehicle Research Fund	198.67	..	175.84	22.83
	$14,359.48	$42,533.24	$43,932.94	$12,959.78

* Overdraft.

SCHEDULE S

CURRENT SURPLUS

Balance, July 1, 1916	$326,697.74
Net decrease, Schedule **A**	118,495.40
Balance, June 30, 1917, Schedule **D**	$208,202.34

Details of Losses and Gains, etc.

LOSSES AND CHARGES:		
Adjustment a/c Physics Dept.	$60.00	
Refund of Student Fees	379.54	
Loss on Sale of Stock	140.00	
Sale of Grundmann Studios — transfer from Investments to New Building Funds	142,762.94	
Refund of Student Deposits	109.58	
Losses on Sales of Bonds	975.00 160.60	
Total losses (Schedule **A**)		$144,587.66
GAINS AND CREDITS:		
Gains on Sales of Bonds	$7,612.50	
Payment by Harvard University a/c 1915–1916	10,504.00	
Students' Deposits a/c 1915–1916	728.54	
Total gains (Schedule **A**)		$18,845.04

84 State Street, Boston
September 26, 1917.

To the Auditing Committee
of the Massachusetts Institute of Technology, Cambridge, Mass.

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, 1917.

We have established the assets and liabilities of the Institute as set forth on the balance-sheet of the printed report of the Treasurer, including a comparison of the detail list of securities with the certified list furnished by the Old Colony Trust Company, but we have not made a physical inventory of the securities themselves.

The various schedules A to S inclusive, except the supporting details of Schedule C, 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, 1917, were actually available and that these balances are correct.

Very respectfully,

HARVEY S. CHASE & CO.

Certified Public Accountants